

08025 Water and Sewer Connections Construction

Index

08025-1	Scope	3
08025-2	Permits and Fees	3
2.1	Existing Infrastructure - Requirements and Fees	3
08025-3	Materials	4
3.1	Water and Sewer Materials	4
3.2	Concrete	4
3.3	Granular Backfill	4
3.4	Street Surface and Base Gravel	4
3.5	Pipe Bedding Aggregate	4
3.6	Unshrinkable Fill	4
3.7	Crushed Rock	4
3.8	Tapping Method	5
08025-4	Existing Utilities and Structures	7
4.1	General	7
4.2	Conflicting Utilities	7
4.3	Disruption of Service	8
4.4	Existing Sidewalks and Curbs	8
4.5	Signing	8
4.6	Damage to Existing Utilities and Structures	8
08025-5	Excavation	9
5.1	General	9
5.2	Classes of Excavation	9
5.3	Trenching	11
08025-6	Shoring	13
08025-7	Preparation of Trench Bottom	13

08025-8	Connection to Existing Facilities	14
8.1	Tapping Water Mains	14
8.2	Water Services Greater than 50 mm	15
8.3	Tapping of Sewer Mains	16
8.4	Connections into Manholes	17
08025-9	Laying and Jointing Pipe	18
9.1	Sewer Service Pipe	18
9.2	Water Service Pipe	21
08025-10	Inspection	22
08025-11	Backfill	22
11.1	Initial Backfill in the Pipe Zone	22
11.2	Backfill above the Pipe Zone	23
11.3	Backfilling Tunnels	25
11.4	Backfilling in Winter Conditions	25
08025-12	Connection Cut Offs	25
12.1	Domestic Water Connection (50mm or less):	25
12.2	Commercial, Industrial and Multi-unit Water Connection (Up to 50 mm)	26
12.3	Commercial, Industrial and Multi-unit Water Connections (100mm or greater)	26
12.4	Reuse of an Existing Main Stop	26
12.5	Sanitary Sewer	27
08025-13	Restoration and Clean-up	27
08025-14	Inspection Fees, Tapping Fees, and Refundable Deposits	29

Tables

Table 1: Tapping Method for Various Pipe Materials and Sizes.....	6
Table 2: Inspection Fees, Tapping Fees, and Refundable Deposits.....	29

08025-1 Scope

These specifications shall cover the supply of all material, labour, equipment, plant and tools necessary for the construction and cut-off of water, sanitary sewer and storm sewer service connections within Saskatoon's City Limits.

These specifications regulate the construction of service connections including water services up to 50mm in diameter and sewer services up to 150mm in diameter. The construction of larger service connections is regulated by these specifications together with Water Main Construction, Section 08030 and Gravity Storm and Sanitary Main Construction, Section 08010.

08025-2 Permits and Fees

The Contractor shall construct all service connections as per the drawings submitted with the "Building Application - Water and Sewer Section" form.

Before any work within the City Right-of-Way is performed, the Contractor shall have an approved permit "Use of Right-of-Way Permit". This permit shall be obtained by contacting the Transportation Right of Way Group at 975-2460. There may be restrictions on times and dates that portions of Right-of-Way may be available, and this will be outlined in the Use of Right-of-Way permit.

2.1 Existing Infrastructure - Requirements and Fees

Certain fees for inspection, tapping mains, pavement and concrete repair, detouring services and public liability insurance shall be charged by the City to the Contractor on completion of the work.

The contractor shall obtain the conditions of work and fee rates by contacting the Water & Sewer Connections Desk at 975-2461 before estimating or commencing any particular project. The Water & Sewer Connections Desk will outline the requirements and fees so that the Contractor shall know in advance and the safety of the water and sewer system remains intact.

08025-3 Materials**3.1 Water and Sewer Materials**

Materials for use in the construction of water, sanitary sewer and storm sewer service connections shall conform to Section 08000 and 08003.

3.2 Concrete

All concrete shall be sulphate resistant and have a minimum compressive strength of 20MPa at 28 days.

3.3 Granular Backfill

Granular backfill shall consist of a graded mixture of sand, gravel, and stone of which no portion shall be greater than 75mm in diameter, nor shall the material contain more than 10% by volume passing 0.420mm (No. 100) sieve.

3.4 Street Surface and Base Gravel

Street gravel shall be composed of durable rock, free from undesirable quantities of soft or flaky particles, loam, organic or other deleterious material. Street gravel shall conform to the gradation as per Section 08000-7.2.

3.5 Pipe Bedding Aggregate

Pipe bedding aggregate shall conform to the relevant gradation specifications as per Section 03001-3.2.

3.6 Unshrinkable Fill

This material shall conform to the relevant specifications as per Section 03001-3.2.

3.7 Crushed Rock

Crushed rock is fragments of durable rock, free from undesirable quantities of soft or flaky particles, shale, loam and other harmful material.

Where crushed rock is required the material shall conform to the relevant specifications as per Section 03001-3.2.

3.8 Tapping Method

The method of tapping shall reflect the table below. Any deviations shall be approved by the Engineer and the Water and Waste Operations Division.

See Division 15 – Construction Materials for approved products.

Table Legend:

1. Direct tapping allowed
2. Tap through an approved tapping saddle
3. Tap through an approved tapping tee
4. Tap through an approved tapping sleeve
5. New systems – Connect to a Pre-tapped PVC coupling
- N/A Not allowed, except where approved by the Engineer and the Water and Waste Operations Division
- * Tapping size must be one size smaller than the pipe diameter.

Table 1: Tapping Method for Various Pipe Materials and Sizes

Cast and Ductile Iron					
Pipe (mm)	100	150	200	250	300
Tap Size (mm)					
20	N/A	1, 2, 4	1, 2, 4	1, 2, 4	1, 2, 4
25	N/A	1, 2, 4	1, 2, 4	1, 2, 4	1, 2, 4
40	N/A	2, 4	2, 4	2, 4	2, 4
50	N/A	2, 4	2, 4	2, 4	2, 4
100+	N/A	N/A	*3	*3	*3
Asbestos Cement					
Pipe (mm)	100	150	200	250	300
Tap Size (mm)					
20	N/A	2, 4	2, 4	2, 4	2, 4
25	N/A	2, 4	2, 4	2, 4	2, 4
40	N/A	2, 4	2, 4	2, 4	2, 4
50	N/A	2, 4	2, 4	2, 4	2, 4
100+	N/A	N/A	*3	*3	*3
PVC					
Pipe (mm)	100	150	200	250	300
Tap Size (mm)					
20	N/A	1	1	1	1
25	N/A	1	1	1	1
40	N/A	2, 4	2, 4	2, 4	2, 4
50	N/A	2, 4	2, 4	2, 4	2, 4
100+	N/A	N/A	*3	*3	*3
Steel					
Pipe (mm)	100	150	200	250	300
Tap Size (mm)					
20	N/A	2, 4	2, 4	2, 4	2, 4
25	N/A	2, 4	2, 4	2, 4	2, 4
40	N/A	2, 4	2, 4	2, 4	2, 4
50	N/A	2, 4	2, 4	2, 4	2, 4
100+	N/A	N/A	*3	*3	*3

***Bold text denotes a change in this version (February 2021)**

08025-4 Existing Utilities and Structures**4.1 General**

Before starting any excavation, and at his own expense, the Contractor is responsible for determining the actual location and elevation of all sewer, water and gas mains or lines, electric light, power, telephone or telecommunications conduits, or other such structures or utilities which may exist in the area of the proposed work.

The Contractor is responsible for notifying the respective utility at least 48 hours before his intention to carry out operations near the said utility and if required shall pay for any services supplied for locating these utilities.

4.2 Conflicting Utilities

Where existing utilities conflict with the proposed work, the Contractor shall immediately notify the Engineer and the Owner of the utility. The Contractor shall proceed as directed by the Engineer or utility owner.

If the proposed work can be altered to avoid the conflict with the existing utility and the Engineer so orders, the Contractor shall supply all labour and material required to change his work to conform to the new alignment.

When traversing beneath existing utilities, they must be supported with timber shoring approved by the Engineer. Before backfilling the trench, the suspended utility must be supported from below with well-tamped backfill according to Subsection 11.2.1 Class I Backfill. When the level of compaction required for Class I Backfill is not attainable directly below the duct, the Contractor shall pour non-shrink concrete in compliance with Subsection 3.6. The Contractor shall supply and install this material at his cost.

Where the existing utility must be relocated to avoid conflict with the new work, the Contractor may be ordered to relocate the utility under the direction of the utility owner or the utility owner may relocate the utility himself. In either case, the Contractor shall be responsible for all the costs incurred.

4.3 Disruption of Service

When in the course of the work, existing utilities must, for reasonable cause, be temporarily disconnected, the Contractor shall give all persons affected 48 hours written notice.

The Contractor shall contact the utility owner who may disconnect the utility himself or supervise the Contractor during disconnection.

In no case shall the Contractor operate any utility without the approval of the owner.

All costs incurred during the disruption of service from any utility shall be borne by the Contractor.

4.4 Existing Sidewalks and Curbs

The Contractor shall take precautions to protect existing sidewalks and curbs from damage as a result of his operations. Where it is necessary for equipment to work on or cross existing sidewalks, the Contractor shall carefully place planks or mats on the sidewalks.

4.5 Signing

The Contractor shall sign and demark all excavations to the standard as set out by the Traffic Control Manual (1982). The Contractor shall supply and install all signs, signals, snow fence and barricades necessary for public safety. The Contractor shall securely fence all excavations during unsupervised periods.

Where the work will require the detouring of traffic around the site, the Contractor shall contact the City of Saskatoon Transportation Right of Way Group at 975-2460 and arrange for all necessary detours.

The Contractor shall be responsible for maintaining access to all private property during construction.

4.6 Damage to Existing Utilities and Structures

When a utility is exposed during construction, the Contractor shall immediately inform the owner of the utility, who may inspect the utility before backfilling.

Any damage to the existing utility shall be repaired at the Contractor's expense.

No sidewalk or curb shall be removed by the Contractor without the approval of the Engineer. The City of Saskatoon shall repair sidewalks and curbs damaged or removed by the Contractor without prior approval. Unless otherwise specified, the Contractor shall pay for this work. The Contractor may repair the damage with its own forces, at no charge to the City, only if prior approval was granted by the Engineer. All work must be restored to as-built conditions and conform to current specifications.

All culverts, drains, removed; and ditches, embankments damaged during the work shall be replaced or repaired by the Contractor at his expense to the current specifications enforced by the City. Mains and service connections damaged by the Contractor shall be repaired by the Contractor at his expense subject to the Engineer's approval and inspection.

08025-5 Excavation

5.1 General

The Contractor shall schedule and conduct the work to cause the least interruption to traffic. The Contractor shall refer to Section 00700-45 (Traffic Operations) of the General Conditions and be governed by the regulations stated therein.

The Contractor shall provide for the free passage of surface water and shall not obstruct the gutters of any street.

The Contractor shall protect all trees, shrubbery, fences, poles, survey pins and all other property from damage during the work and shall repair or replace any items removed or damaged at his expense.

5.2 Classes of Excavation

5.2.1 Common Excavation

Common excavation shall be taken to mean the removal of all materials, except rock, from the trench to the lines and levels shown on the plans or specified herein for the construction of service connections.

5.2.2 Rock Excavation

The word "Rock" wherever used as the name of an excavated material, shall mean boulders and pieces of concrete or masonry exceeding 0.25 m³ in volume or solid ledge rock and masonry which, in the opinion of the Engineer, requires for its removal, drilling and blasting.

The Contractor shall note that asphalt or concrete pavements, sidewalks, drains, sewers, manholes, conduits, tanks, soft or disintegrated rock which can be removed with a hand pick or power operated excavator or shovel; loose, shaken or previously blasted rock or broken stone in rock fillings or elsewhere, and rock exterior to the maximum limits of the trench width shall not be considered "rock excavation". Rock shall be disposed of at a site designated by the Engineer.

5.2.3 Blasting

No explosives shall be stored on the site nor shall any blasting be done without the prior approval of the City Manager. Such approval shall not relieve the Contractor of his sole responsibility for any damage or accident to adjoining utilities, properties and structures or other persons as a result of his operations.

The supplying, hauling, handling and storing of all explosives and accessories shall be done according to the rules and regulations of the Explosives Division, Department of Mines, Ottawa and the Mining Act.

5.2.4 Unstable Subgrade

Where the bottom of the trench at subgrade is found to be unstable or to include ashes, cinders, any type of refuse, organic material or large pieces of inorganic material which in the opinion of the Engineer should be removed, the Contractor shall excavate and remove such unsuitable material to the width and depth ordered by the Engineer. The subgrade shall be made by backfilling with an approved granular material in 75mm lifts. Each lift shall be thoroughly compacted to a density approved by the Engineer.

Where the bottom of the trench at subgrade is found to consist of material unstable to such degree that, in the opinion of the Engineer, it cannot be corrected by methods specified above, the Contractor shall construct a foundation for the pipe in accordance with plans prepared by the Engineer.

5.3 Trenching

5.3.1 General

The line of the trench shall be straight from the water and sewer mains to the building or to the point on the lot where the service connection is to terminate.

Where possible the line of the trench shall be perpendicular to the water and sewer mains.

Deviation from this procedure shall only be permitted with the written consent of the Engineer.

The connection may not be laid so as to encroach onto an adjoining Property.

The earth taken from the trench shall be neatly deposited at the sides of the trench to obstruct the street or lane as little as possible. Where it is impractical in the opinion of the Engineer to place the earth at the side of the trench, it shall be removed and deposited to a location designated by the Engineer.

5.3.2 Trench Width and Depth

All trenches shall be sufficient width to permit proper jointing of the pipes but in all cases the width shall be at least 750mm for a single set of services and at least 1000mm wide for a double set of services.

Excavation for the service shall be carried out to provide 2850mm cover at the property line and 2250mm at the building. The slope of the sewer line shall not be less than 20mm per metre.

5.3.3 Trenching on Paved Streets

Paved streets shall include all soil cement and macadamized road surfaces in addition to those paved with asphalt and/or concrete.

Where a service connection is to be constructed on a paved street, only that portion of the street directly above the water and sewer mains shall be open cut. The remainder of the street shall be tunnelled, augured, or use another trenchless method approved by

the Engineer. Additional open cut shafts may be approved by the Engineer to ensure that the correct line and grade are being maintained.

The Contractor is responsible for controlling the removal of the asphalt to ensure that the resulting asphalt cut is rectangular in shape and the walls are vertical. Where soil conditions disrupt the integrity of the initial cut, the contractor shall ensure that the resulting cut meets the specifications listed previously.

5.3.4 Trenchless Methods

Trenchless methods may include methods such as tunnelling, auguring, directional drilling, boring, or pipe bursting as approved by the Engineer.

Where the line of the proposed service connection crosses a street designated arterial or proposed arterial; crosses a sidewalk or the location of a proposed sidewalk; crosses under another buried utility, the Contractor shall excavate using trenchless methods.

Where an existing service line is being replaced, the Contractor shall use pipe bursting unless otherwise specified.

The Contractor shall maintain the correct line and grade on the utility throughout the trenchless section and shall provide for the protection of the workers according to the regulations of the Saskatchewan Department of Labour.

The maximum size of a tunnel, bore hole, or pipe-bursting head shall be the largest outside diameter of the pipe measured at the joint plus 50 mm.

The minimum length of the trenchless section under an existing or proposed sidewalk shall be 3000 mm.

5.3.5 Trenching in Winter Conditions

If thawing of the ground is required, the method shall first be approved by the Engineer.

All excavated material that is frozen or which subsequently becomes frozen shall be removed from the site of the work and shall be disposed of to a site designated by the Engineer.

5.3.6 Excavations for Tappings and Tee Installation

The minimum excavation size required for tapping water mains is 1000mm perpendicular to the main by 900mm along the main

For water connections larger than 50mm the minimum dimensions of the excavation are 1500mm perpendicular to the main by 1500mm along the main.

08025-6 Shoring

Open cut trenches and shafts shall be sheeted and braced as required by the Occupational Health and Safety Regulations of the Saskatchewan Department of Labour and as may be necessary to protect life, property and the work.

All necessary shoring and bracing required for the prevention of movement surrounding the excavation shall be provided for and installed by the Contractor.

The right of the Engineer to order sheeting, bracing, underpinning or any other form of brace or support shall not be construed as creating any obligation on his part to issue such orders, and his failure to exercise his right to do so shall not relieve the Contractor from his responsibility for damages to persons or property arising from or upon the work of construction occasioned by negligence or otherwise growing out of a failure on the part of the Contractor to leave in place in the trench sufficient sheeting and bracing to prevent any caving or moving of the ground adjacent to the sides of the trench, or for failure to construct and maintain proper support of all kinds whatsoever in the first instance.

Sheeting and bracing left in place must be cut off and removed for a depth of 900mm below the established street grade or the existing surface of the street, whichever is lower.

All materials and labour required for shoring shall be furnished by the Contractor.

08025-7 Preparation of Trench Bottom

The Contractor shall remove by pumping or other means approved by the Engineer any water accumulated in the excavation. Trenches shall be free of water before the pipe is laid. Previously laid pipe shall not be used to drain the trench bottom. The disposal of water after removal from the trench shall be to the satisfaction of the Engineer.

The trench bottom shall be shaped in such a way that the body of the pipe rests on solid ground throughout its length, and so that when in final position the pipe is true to line and grade. Bell holes shall be hand excavated below the bottom of the trench and be of sufficient size to allow ample room for making complete and proper pipe joints.

Where the pipe zone contains rock or boulders that may damage the pipe, the bottom of the trench shall be over excavated to a depth of one-fourth (1/4) the diameter of the pipe, but in no case less than 150mm below the bottom of the pipe. Where over excavation of the trench bottom has occurred, the Contractor shall replace the excavated material with approved granular backfill to the invert of the pipe and compact it to 98% of Standard Proctor Density.

08025-8 Connection to Existing Facilities

The Contractor shall supply all materials when making the connection including but not limited to the following: main stops or valves, water pipe, tees, anodes, welded tee (steel pipe), pipe coatings, saddles, pipe hub ends for storm sewer connections and cement mortar.

In all situations, when the existing water main being connected to is cast iron, the contractor shall connect a 24lb anode to the water main as specified in Section 08000-4.4.

8.1 Tapping Water Mains

City employees shall perform all tapping of water services up to 50mm in diameter. When a tapping is required, the Contractor shall give the City 48 hours' notice and shall have the mains properly exposed and ensure that the trench is safe and properly shored.

The Contractor shall indicate the location on the main where the tapping is to be made.

The Contractor shall supply and install a tapping saddle or sleeve, when required, on the water main at the required location. See Section 08025-3.8 for required tapping method.

Copper water tubing requires a smooth even "Gooseneck" curve at the main stop. 19mm copper connections shall have a gooseneck 300mm above the water main crown. Larger copper connections shall have a gooseneck 400mm above the water

main crown. For copper services the main is tapped at 30 to 45 degrees above the horizontal plane.

Polyethylene connections shall have a horizontal gooseneck extending in two curves a distance of 400mm on each side of the centre line of the connection. The tapping shall be horizontal and perpendicular to the water main.

Tappings shall not be made closer than 450mm from a joint or a main stop.

8.2 Water Services Greater than 50 mm

The Contractor shall supply and install all materials for water services greater than 50 mm.

Water services shall be installed at the City water main by excavating, removing a portion of the water main and installing a water main tee, short length of PVC pipe (each a minimum of 300mm long), and pipe coupling to the existing water mains and a valve on the water service.

The Water Service shall connect horizontally and perpendicular to the water main.

Water services greater than 50mm up to 150mm in diameter, require a 150mm tee, 150mm valve and reducer.

The Contractor shall protect each valve with a 24 pound Anode as specified in Section 08000-4.4. The tee, pipe coupling and all other metal water main fittings shall be connected each with a 12 pound Anode as specified in Section 08000-4.4. The anode shall be attached using a "Cadweld" in compliance with the manufacturers recommended installation procedures. The Contractor shall supply and install sacrificial zinc anodes to provide cathodic protection for all valves, hydrants and cast iron fittings installed under this Contract.

The Contractor shall connect a 24 lb. anode to each hydrant and each valve. Where the anode is connected to a valve, the anode wire shall also be connected to the valve box.

The Contractor shall connect a 12 lb. anode to each cast iron fitting, each Robar coupling and to each copper water service line where the existing service lines are being reconnected into the new water main.

The Contractor shall install the anodes one metre away from the fitting/valve at water main depth and shall connect the anode wire to the cast iron using the "Cadweld" method. The Contractor shall provide experienced personnel who shall make these connections in accordance with the manufacturer's recommendations.

Following welding, the Contractor shall remove all slag from the weld, file off all sharp edges and coat all exposed cast iron surfaces, steel surfaces and "Cadweld" locations with "Denso" tape and paste.

When the installation is complete, the Contractor shall pour 10 litres of water over the anode and backfill uniformly around the anode. The exposed metal surfaces on all metal fittings shall then be field coated in compliance with 08000-4.2.

Where a water service will be made to an existing steel water main it shall be a Reinforced branch conforming to "Steel Water Pipe - A Guide for Design and Installation, American Water Works Association, M11 Manual". The Branch shall come complete with a flange end suitable for attaching a flanged valve.

8.3 Tapping of Sewer Mains

Sewer and storm sewer mains shall be tapped above the springline of the pipe at 45 degrees to the vertical plane. A 45° Long Radius shall connect to the saddle to allow for connection of the graded service. Where the main pipe is clay tile or concrete only one tapping shall be made into a one length of pipe. Tappings shall not be made closer than 450mm from a joint or another tapping. The method of tapping used shall ensure a smooth edged hole suitable for accommodating the service saddle. No sharp or raised surfaces shall exist within the area covered by the saddle gasket, and the opening shall be sized small enough to allow the entire area of the saddle gasket to make contact with the outside of the pipe.

Where the pipe diameter is too large for existing saddle sizes, the bell end of a pipe may be used for connection to the main. The diameter of the opening shall be no larger than 1 ¼ the diameter of the connecting service; the bell shall not protrude past the inner wall of the main greater than 25 mm, and 0.3 m³ of concrete shall be placed under the connection at the main.

The Contractor shall satisfy himself as to the relative position of the water and sewer leads at the house in order to properly plan his work so that when the mains are tapped

the service pipes can be laid parallel to each other and at the correct grade and alignment.

8.4 Connections into Manholes

8.4.1 Existing Manholes

Wherever it is practicable, sanitary and storm sewer connections shall be made directly into existing manholes.

The Contractor shall supply all material, labour and equipment, required to tap into the manhole and complete the connection. The Contractor shall mortar the service pipe firmly into place, supply grout and reshape the channelling in the manhole if required; trim off the service pipe leaving no more or less than 100mm extending into the inside of the manhole; supply and install an interior drop structure if required and remove any dirt or concrete rubble which has entered the manhole or main sewer as a result of his operations.

8.4.2 Constructing New Manholes

The Contractor shall supply all materials, labour and equipment required to construct the new manhole and complete the connection according to Section 8010-8.

Where the size of a sanitary service exceeds 150mm and the connection cannot be made into an existing manhole, the Contractor shall construct a new standard 1200mm manhole at the point of entry.

Where the size of the storm sewer service exceeds one-half the diameter of the storm sewer main or when the size of the storm sewer service exceeds 250mm, the Contractor shall construct a new 1200mm manhole at the point of entry.

Where the connection is to be made to a large storm or sanitary sewer main, the Engineer may, on request, approve a special connection directly into the main.

08025-9 Laying and Jointing Pipe**9.1 Sewer Service Pipe****9.1.1 General**

The pipe shall be protected against impact shocks and free falling during the handling. Pipe shall be kept clean at all times.

Each pipe shall be inspected for defects before being lowered into the trench. Those not conforming to specifications will be rejected, and shall be removed from the site of the work. All sewers shall be laid in an upgrade direction with the bells laid upgrade. The sections of pipe shall be fitted together to form a smooth and uniform invert.

In making joints, care must be taken not to disturb or break joints already made, otherwise the pipes shall be uncovered, and the joints remade.

The interior of pipes shall progressively be freed from all dirt or other superfluous material.

Before leaving the work at any time, all open ends of pipe in place shall be closed with a watertight cap or plug.

Where the point of termination is at the property line, the Contractor shall install a watertight plug.

9.1.2 Bedding

The pipe shall be bedded in a natural solid soil foundation shaped to fit the lowest part of the pipe exterior.

The foundation supporting the pipe shall have a minimum width equal to 60% of the outside diameter of the pipe and shall be carefully hand trimmed and levelled to provide even bearing throughout the whole length of the pipe. The remainder of the pipe shall be surrounded by approved excavated material placed and compacted by hand to fill completely all spaces adjacent to the pipe. If the pipe cannot be laid on a solid soil foundation, bedding sand shall be used. All pipe shall be sand bedded on City of Saskatoon property. All pipe bedding shall be properly compacted with approved tamping machines.

9.1.3 Alignment and Grade

Sewer service lines shall be straight, perpendicular to the main sewer and shall terminate at a point designated by the Engineer.

Sewer service lines shall be installed with a minimum 2% grade, unless specific grades are supplied in the field by the Engineer, in which case these grades shall be adhered to.

9.1.3.1 Use of Bends

Long sweep 22-1/2 degree bends and long sweep 45 degree bends may be used on the horizontal. Short 45 and 22 degree bends shall not be used unless approved by the Engineer. Long sweep bends on the horizontal greater than 45 degrees shall require a cleanout.

9.1.4 Jointing**9.1.4.1 Slip-Seal Joint**

This material is not approved for new installations.

9.1.4.2 Plain End Pipe

This material is not approved for new installations.

9.1.4.3 Vitra-Mate or Vitra Flex

This material is not approved for new installations.

9.1.4.4 A.C. Sewer Pipe

This material is not approved for new installations.

9.1.4.5 P.V.C. Sewer Pipe

The spigot and bell ends and/or the coupling as well as the pipe interior shall be carefully cleaned and inspected for damage. The neoprene gaskets shall be properly placed in the bell or coupling groove and the pipe sliding surfaces well lubricated with the approved lubricant.

The spigot end of the pipe shall then be inserted into the bell end or coupling until it is firmly in place according to the manufacturer's instructions. Extreme care shall be exercised in this procedure to ensure that the neoprene gaskets are not dislodged or damaged during the assembly.

9.1.5 Cleanouts

The Contractor shall supply and install a sewer cleanout at the following locations according to the current City of Saskatoon Standard Drawing as posted on the City's Internet web site:

- At each horizontal deflection in excess of 45 degrees in the line of the sewer service pipe.
- At points on a long sewer service that will provide access for cleaning at intervals not greater than 25 m.

9.1.6 Pipe Laying in Tunnels

The Contractor shall use P.V.C. pipe for that portion of the sewer service connection that is to be constructed in a tunnel.

The Contractor shall ensure that all joints are made as specified prior to installation into tunnel.

9.1.7 Vertical Risers

On some streets where the sanitary sewer is at great depths, the City of Saskatoon has constructed a sanitary sewer stand pipe (riser) to facilitate the construction of the sewer connections. The Contractor may be permitted to excavate down to the main sewer in preference to locating and connecting into the stand pipe. The riser shall be constructed to current specifications.

The City shall endeavour to supply the Contractor with information leading to the location of sewer service risers on deep sewers. In the event that the risers cannot be found, or when found, it proves to be damaged or unusable, the Contractor shall construct a riser according to the current specifications.

9.2 Water Service Pipe**9.2.1 General**

The pipe and fittings shall be protected against damage during

Handling, and shall be kept clean and free from dirt. Copper pipe shall not exhibit any signs of crimping or flattening. The Contractor shall use only new material and shall not use short cut-off lengths of pipe less than 2150mm long. Unions shall not be installed between the main stop and the curb stop.

The minimum water service pipe diameter shall be 19mm copper or 25mm polyethylene.

Water service connections with a length greater than **25** m shall be a minimum of 25mm diameter copper and 38mm diameter polyethylene.

Water Services greater than 50mm shall be installed to the requirements of Section 08030 Water Main Construction.

9.2.2 Jointing

All joints at main stops, curb stops, unions or other fittings shall be compression type. Compression joints shall be made according to the manufacturer's recommended procedure.

9.2.3 Curb Stops and Boxes

The non-draining curb stop shall be installed within the City Right-of-Way at a distance of 300mm from the property line unless otherwise directed. A 305mm x 152mm x 50mm concrete bearing block shall be placed under each curb stop.

The Contractor shall fasten the stainless steel spindle to the curb stop with a brass cotter key.

Curb boxes shall be placed vertically plumb and the Water and Sewer Contractor shall leave all curb boxes at 150mm below the future back of sidewalk grade.

Should the existing curb box be located in the street or sidewalk, the Contractor shall cut through the sidewalk or pavement to place the box flush with its surroundings, and also restore the sidewalk or pavement flush with the existing surrounding elevations.

When replacing existing water service connections and installing a new curb stop, the existing curb stop must be removed. The City may approve/authorize abandonment of curb stop on a case-by-case basis. Abandonment shall include removal of the casing and rod.

Connections to vacant lots require a curb box marker. The curb box marker shall be installed a minimum length of 0.6 meters above ground and shall be 25mm polyethylene tubing. It shall be securely fastened to the spindle using tape or zip ties, as shown in the Service Connection Standard Drawing.

08025-10 Inspection

When the work is completed and before any backfilling, the Contractor shall allow an inspection of the work and shall provide all reasonable assistance during the inspection. If backfilling is completed prior to an inspection, the Engineer may require exposure of the connection for inspection purposes. All related costs of this procedure shall be at the expense of the Contractor.

When connecting to the watermain, the Contractor shall turn on the main stop and all joints shall be inspected for leakage.

When the inspection has been completed and all defects have been corrected, the Contractor shall backfill the excavation as specified.

08025-11 Backfill

The Contractor shall start backfilling immediately after the work has been inspected and all defects have been corrected, and shall complete the backfilling on the same date that the inspection was made.

11.1 Initial Backfill in the Pipe Zone

Initial backfill material in the pipe zone shall consist of selected excavated material or imported granular material, free from frozen lumps, rock, large stones, boulders or other unsuitable material. The initial lift shall be hand placed in the trench uniformly on both

sides of the pipe up to the spring line and hand tamped with an appropriate hand tamper to attain a density of 98% of Standard Proctor Density at the optimum field moisture content. Special care shall be taken to thoroughly compact the backfill around and next to the mains at the points where the mains were tapped.

Additional 150mm lifts of selected excavated material or imported granular material, as previously described herein, shall be hand placed in the trench uniformly with each 150mm lift compacted using hand operated mechanical compaction equipment to attain a minimum density of 98% of Standard Proctor Density at the optimum moisture content up to a uniform minimum level 300mm above the crown of the highest pipe in the trench.

11.2 Backfill above the Pipe Zone

After the initial backfill has been placed and compacted, the remainder of the trench shall be backfilled according to one of the following methods. All backfill shall be tested according to the City of Saskatoon's decision.

11.2.1 Class I Backfill

Class I backfill as follows shall be used on all open cut portions on existing paved streets and boulevards.

The Contractor shall supply and place granular material in 300mm lifts, over the whole width of the trench and shall compact each lift to 98% of Standard Proctor Density at optimum moisture content, using mechanical compaction equipment. The compacted granular material shall be brought up to 300mm below the original street level. The Contractor shall supply and place 300mm of street gravel

Flush with the original street level and compact it to 100% of Standard Proctor Density at optimum moisture content.

Under existing sidewalks, the Contractor shall place unshrinkable fill to an elevation 0.3 m below existing grade, unless otherwise directed by the Engineer.

11.2.2 Class II Backfill

Class II backfill, as follows, shall be used on prepaid service connections to backfill open cuts and on cash connections on all portions, other than cuts as per Section 11.2.1 Class I Backfill.

Class II backfill shall be placed uniformly along the trench in maximum 300mm lifts with each lift compacted using mechanical compaction equipment to attain 98% of Standard Proctor Density at the optimum moisture content up to the top of the trench. If the Contractor does not consistently attain the specified compaction, the lift thickness, compactive effort or compaction equipment shall be modified until the specified densities are attained consistently.

This backfill may contain coarse materials but shall be free from brush or other objectionable material that would prevent proper consolidation or that might cause subsequent settlement. Rocks or stones not exceeding 10kg may be placed in this portion of the backfill but must be placed by hand.

Where the excavation is carried out on an earth street, the compacted excavated material shall be brought up to the original street level.

Where the excavation was carried out on a gravel street, the compacted excavated material shall be brought up to 100mm below the original street level. The Contractor shall then supply and place 100mm of street gravel flush with the original street level and compact it to 100% of Standard Proctor Density at existing field moisture content.

Where the excavation was carried out on a paved street, or a street that has been prepared for paving, the compacted excavated material shall be brought up to 300mm below the top of the pavement. The Contractor shall supply and place 300mm of street gravel flush with the original street level and compact it to 100% of Standard Proctor Density at existing field moisture conditions.

11.2.3 Class III Backfill

Class III backfill shall consist of approved excavated material free from brush and rocks or stones over 10kg and other objectionable material. Backfill material shall be pushed down a ramp or slope of existing backfill and not directly onto the newly bedded pipe. The trench shall be compacted to the surface in lifts of 300mm maximum depth. The

minimum compacted effort required shall be that to obtain in-situ density of the adjacent soil type. The backfill shall not be placed at less than 92% Standard Proctor at the optimum moisture content.

11.3 Backfilling Tunnels

Where the excavation is carried out by tunnelling or boring, all voids left in the excavation after the pipe has been installed shall be filled with compacted excavated material or granular material.

Where the Contractor has augured under an existing or future sidewalk, he shall carefully plug all voids around the pipe at the end of the augured section closest to the street with concrete mortar. The remainder of the augured section may be filled with excavated material.

11.4 Backfilling in Winter Conditions

The Contractor shall remove from the site of the work any backfill material that is frozen or unacceptable to the Engineer and shall dispose of it as directed by the Engineer. The Contractor shall, at his expense, supply imported unfrozen granular material to complete the backfilling.

08025-12 Connection Cut Offs

When a water connection is no longer required or is serving a building which is being demolished, it shall be abandoned/decommissioned. The owner of the property served by the connection is responsible for retaining a Licensed Water and Sewer Contractor to perform the cut off. The Contractor shall perform the cut off in compliance with the following:

12.1 Domestic Water Connection (50mm or less):

1. Remove the main stop.
2. Remove all loose material from pipe and finish to a smooth surface.
3. Install a stainless steel repair sleeve (minimum of 300mm in length) as per manufactures specifications.
4. Removed the top section of the curb box and spindle at a depth of 1000mm below existing ground.

Or

1. Turn off the main stop.
2. Remove outlet pipe.
3. Remove all loose material from pipe and finish to a smooth surface.
4. Install stainless steel sleeve according to manufacturer's specifications.
5. Remove the top section of the curb box and spindle at a depth of 1000mm below existing ground.

12.2 Commercial, Industrial and Multi-unit Water Connection (Up to 50 mm)

Where a connection has been made with more than one main stop (e.g. a 50mm water service connection to the water main using 4 - 25mm main stops), the following shall apply:

1. Remove the section of pipe from the main including all the main stops to be cut-off.
2. Replace section of water main with approved PVC pipe.
3. Use PVC couplings, where practical, to connect the PVC pipe to the existing pipe.
4. Excavate and remove a portion of each curb box top by cutting the curb boxes and spindles at a depth of 1000mm below existing ground.

12.3 Commercial, Industrial and Multi-unit Water Connections (100mm or greater)

1. Remove the tee or tapping sleeve, the valve, valve box, valve spindle and section of main to be removed. In the case of a three way valve connection, remove two or three valves at the Engineer's discretion.
2. Replace section of water main with approved PVC pipe.
3. Use PVC couplings, where practical, to connect the PVC pipe to the existing pipe.

12.4 Reuse of an Existing Main Stop

1. The reuse of an existing mainstop is not permitted.

2. Where a main stop has been removed and a stainless steel repair sleeve installed, the stainless steel sleeve may be replaced with a repair sleeve complete with a tapping provided that the tapping will be at the correct angle for the new connection material.
3. Where the Contractor chooses to remove an existing repair sleeve and it is found that the sleeve was used in a repair, the Contractor shall install a new repair sleeve and a new tapping shall be made a minimum of 1.0 m from the repair sleeve.

12.5 Sanitary Sewer

Sanitary sewer connections shall be cut-off at the main at the existing saddle location using the following methods:

PVC main - the existing saddle shall be plugged with a PVC plug

Clay Tile main - the existing saddle shall be removed and either replaced with a PVC saddle complete with stainless steel straps, and plugged with a PVC plug; or replaced with a stainless steel repair sleeve. In both cases, the rubber gasket shall form a seal around the opening of the main. The Engineer may approve the use of a PVC plug inserted into the saddle and covered with concrete, where the removal of the saddle may damage the main.

Clay Tile main - the existing in line wye shall be plugged with a PVC plug and concreted.

08025-13 Restoration and Clean-up

The Contractor shall remove all construction planks, equipment, appliances, barricades and surplus materials and shall remove excavated material from natural drainage courses, sidewalks, crossings and do such other work as may be necessary to leave the work on any premises occupied by him in a neat, workmanlike condition. This work shall be done with a minimum of inconvenience to the public. All clean-up costs shall be borne by the Contractor.

The Contractor shall restore or replace all sidewalks, curbing, gutters, shrubbery, turf, fences, irrigation systems, poles and/or other property and surface structures damaged

or removed during the work to a condition meeting current specifications, furnishing all labour and materials incidental thereto.

All excavated material that is not to be used as backfill shall be hauled from the site to a location designated by the Engineer.

Where the Excavation or excavations are on an earth street the Contractor shall level the roadway portion as near as possible to the condition it was originally found as determined by the Engineer.

Where appurtenances such as valves and manholes exist, the road grades shall be brought level with the tops of these structures to avoid them being buried or left protruding from the roadway.

08025-14 Inspection Fees, Tapping Fees, and Refundable Deposits

Table 2: Inspection Fees, Tapping Fees, and Refundable Deposits

Activity	Fee/Deposit Amount
1. Residential Inspection of Connections Including Records (New, Disconnects, Repairs, or Similar)	\$165.00/hour regular hours (Minimum call out will be two hours/connection) \$330.00/hour overtime
2. Residential Tapping (max. 50mm) (Connection to water main by City)	\$275.00/tapping
3. Commercial Inspection of Connections Including Records (New, Disconnects, Repairs, or Similar)	\$165.00/hour regular hours (Minimum call out will be two hours/connection) \$330.00/hour overtime
4. Records (Technical Drafting Services)	Nil (cost added to inspection)
5. Commercial Tapping (max. 50mm)	\$275.00/tapping except Mueller Tapping
6. Mueller Tapping (min. 51mm)	All costs associated with tapping will be recovered through work order
7. Water Testing as required (TC & HPC bacteria)	\$55.00/set plus inspection time
8. Refundable Deposit for Water and Sewer Service Cut Off as part of Demolition Permit	\$3,000.00 Residential \$7,500.00 Commercial
9. Refundable Deposit for Boulevard Condition Maintenance as part of Demolition Permit	\$3,000.00 Residential \$7,500.00 Commercial
10. Annual Water & Sewer License Fee	\$25.00

End of Specification 08025