2020 - SECTION 67

SERVICE CONNECTION SYSTEM

67.1 GENERAL

Building service connections for water and sewer shall be installed in accordance with these Specifications and/or approved Detailed Engineering Drawings.

67.2 MATERIALS

67.2.1 COPPER and COMPOSITE SERVICE PIPE

No	Manufacturer	Model/Type	Size (mm)*	Remarks
1	CERO	K	19 to 50	Third Party Certified to ASTM B88 and CSA HC7.6-1978
2	Halstead	K	19 to 50	Third Party Certified to ASTM B88 and CSA HC7.6-1978
3	Great Lakes Copper	K	19 to 50	Third Party Certified to ASTM B88 and CSA HC7.6-1978
4	Rheau	Municipex	19 to 50	Third Party ASTM F876, ASTM F877 and AWWA C904
5	IPEX	Blue 904	19 to 50	CSA – B 137.5
6	Poly Tubes	Municipal Tubing	38 to 50	CAN/CSA – B 137.10
7	HDPE	DR9/DR11	25 to 50	CSA B137.10 AWWA C901/C906
* *Approvals are based on nominal diameter. Servicing Standards are based on internal diameter.*				

67.2.2 MAIN STOP (Corporation Stop)

Conforming to: AWWA C800 Cambridge model 301, ball valve corporation stop (or equivalent) with compression type connections.

67.2.3 WATER SERVICE SADDLES

Robar type 2706 (bronze) or equivalent Double stainless steel straps.

67.2.4 CURB STOP (Curb Cock or CC)

Conforming to: AWWA C800 Ford model BC44-333SW-Q (or equivalent) with compression type connections.

67.2.5 SERVICE BOX

Service boxes shall be extension type for 2.1m to 2.7m bury or 2.4m to 3.0m bury, Trojan or approved equal.

The top box shall be 32mm, schedule 40 standard galvanized steel pipe complete with cap, 32mm brass pentagon head plug and 10mm set screw.

The casing shall be 25mm, schedule 40 standard galvanized steel pipe.

Bottom box shall be cast or ductile iron complete with a 10mm diameter stainless steel set screw. Casting shall have the manufacturer's name or identification marks distinctly cast upon them. The interior and exterior of the bottom box shall be epoxy coated in accordance with AWWA C 673. All coated elements shall carry a label identifying the name of the coating applicator.

The operating rod shall be a 12.7mm stainless steel rod for 20mm and 25mm curb stops, for 40mm and 50mm curb stops the operating rod shall be a 16.0mm stainless steel rod, AIST type 304, attached to manganese bronze clevis (the clevis shall be installed so that the flared end of the CC rod is inline with the service when in the on position), SAE 34, with a 3.5mm brass or stainless steel rivet. The manufacturer shall supply and insert the brass cotter pin into the clevis and apply sufficient bending to prevent the cotter pin from falling out of the clevis.

67.2.6 SEWER SERVICE PIPE

Poly Vinyl Chloride (PVC) Type PSM, Minimum 100 mm dia. & 150mm

Conforming to CSA B182.1 M1983

Standard Dimension Ratio 28

Bell and Spigot type joints.

If the service is pre-insulated Urecon pipe it may conform to SDR-35

Poly Vinyl Chloride (PVC) Type PSM, greater than 150mm

Conforming to CSA B182.1 M1983

Standard Dimension Ratio 35

Bell and Spigot type joints.

Low Pressure sewer service pipe HDPE DR11:

- 40mm Residential
- 50mm Commercial

67.2.7 SEWER SERVICE FITTINGS

Tee or wye fittings connecting sewer services to PVC sewer mains shall conform to:

CSA B182.2 M1983 Poly Vinyl Chloride (PVC) Type PSM

Standard Dimension Ratio 28

Bell and spigot type joints

67.2.8 INSULATED PIPE AND FITTINGS

Insulation for pipe and fittings shall be foam insulation a minimum of 50 mm in thickness. The insulation shall be Urecon insulated products or their equivalent. Kits to field insulate the fittings may be used as long as manufacturer's specifications are adhered to at all times.

As an alternative the Contractor may construct a Frost Box to the dimensions and materials shown on the Typical Detail Drawing 61-05, "Pipe Insulation Detail" in Section 61, Sanitary Sewer System.

67.2.9 BEDDING

For all open trench excavation services, such services shall be laid on granular bedding (B1) meeting the following gradation:

a) Specified

Granular (B1)

Granular bedding shall have an even gradation falling within the following limits:

Sieve Size (CGSB Spec.)	Allowable Passing (percent)
20,000	95 to 100
12,500	75 to 95
5,000	40 to 60
2,000	25 to 45
400	10 to 25
80	2 to 10

b) Optional

i) Sand

Sand bedding shall have an even gradation falling with the following limits:

Sieve Size (CGSB Spec.)	Allowable Passing (percent)
5,000	100
2,000	70 to 95
400	30 to 65
160	10 to 25
80	2 to 10

ii) Select Native Material

Shall be well graded soil selected by the Contractor from the excavated trench material. It shall contain no particles larger than 32 mm in its largest dimension. It shall contain no frozen soil, organics, roots or other objectionable material in quantities that might cause pipe damage, excessive settlement or inadequate compaction.

67.2.10 RINK HYDRANT VALVE OPERATING ASSEMBLY

The valve casing is to be constructed of 100mm ABS pipe. The operating rod shall be the same as a main valve rod. The CC shall be fitted with a 2" gate valve operating nut (QT67

style or approved equivalent. The top end of the rod is to be fitted with a 90mm diameter rock guard bolted to the operating rod with a 50mm square operating nut.

67.3 INSTALLATION

67.3.1 Service connections shall be installed along the alignment approved in the Detailed Engineering Drawings.

The Water and Sewer services shall be laid in a common trench unless otherwise specified.

67.3.2 AUGERING/TRENCHING

All services shall be open trenched across roadways. Augering may be allowed subject to written approval by Aquatera.

Where the water service is 50 mm or smaller in size, the water and sanitary services may be installed in a common trench or augered tunnel if approved by Aquatera.

67.3.3 BEDDING

All services in open cut trenches shall be laid on 75 mm of granular B1 Bedding, and shall have the bedding placed up to a level of 300 mm above the crown of the highest service in the trench. B1 bedding shall meet the same gradation as specified in this section. Approved sand may be used with the approval of Aquatera provided the pipe diameter is less than 375 mm and the pipe has water tight joints.

67.3.4 WATER SERVICE CONNECTION

a) Water service pipes shall be installed such that a minimum 2.75 metres cover is provided on the pipe at the property line.

b) The main stop (corporation stop) shall be installed with a service saddle as specified in the Materials Section. Maximum service pipe sizes are 20mm for 150mm main and 25mm for 200mm main. This applies to direct tapping only. All main stops shall be at least 300 mm from the end of the water main joint. All main stops shall be at least 300 mm from another main stop and on a different plane. Main tapping shall be at an angle of 45° from the horizontal as illustrated in the Typical Detail Drawings and shall in no case be made in the top 1/4 of the water main.

c) Tapping and installation of the main stop shall be in accordance with the manufacturer's specifications. Tapping for service connections shall be done with full operating pressure in the main unless otherwise approved by Aquatera.

d) The service pipe, adjacent to the main stop shall be bent to form a gooseneck as illustrated in the Typical Detail Drawing and the bend shall be in the horizontal plane.

e) Curb stops and service valves shall be installed in the designated location at or below the maximum elevation. The curb stops shall be placed on a brick with a washed rock sump of same aggregate gradation as fire hydrant sump and of dimensions 1m x 0.5m x 0.30m. The rod shall be 300 – 900 mm below finished grade. A 50mm x 100mm, 2000mm long, marker stake painted blue shall be placed at all services. Services valves shall be installed in accordance with 91.3.4

f) Curb stops (CC) shall be installed at the locations shown on the drawings or as directed by Aquatera. Generally, curb stops shall be located 300mm from property line in front street serviced areas and 500mm from property line in areas service from PUL's. Curb stops shall be installed so the valve clevis is parallel to the front property line (perpendicular to the flow) when off and in line with flow when on.

g) Service box caps shall be embossed with water or sewer as applicable.

All water caps shall be painted blue and all sewer caps shall be painted green prior to initial installation and re-painted prior to FAC inspection.

h) Water services are to be extended onto private property such that they are a minimum of 1.85m beyond the outer limit of the easement and properly crimped watertight or plugged/capped.

i) All commercial lots or services greater than 75mm shall be complete with a minimum of a 50mm (2") blow off located on private property. The size of service that continues to the building will determine if the blow off will be removed at time of tie-in or not, please confirm with Aquatera Engineering at inspections@aquatera.ca.

j) REQUIREMENTS FOR EXISTING 12mm (½") WATER SERVICES

If a water service line is verified as 12mm (½") the service is required to upsized to a minimum of 19mm (¾") to meet the national plumbing code of Canada requirements at the time of re-development & prior to meter installation.

There is no Infrastructure Charge fees for upsizing from 12mm (½") to 19mm (¾"). The Infrastructure Charge fee is considered paid with the original construction costs. There is however, a fee associated with the construction & installation of the 19mm (¾") water service pipe on the public side. The installation fee will be determined by Aquatera & a quote will be provided to the customer to be pre-paid prior to construction.

In cases where the customer requires a water service greater than 19mm (¾"), the customer shall be required to pay the difference in the Infrastructure Charge fees between 19mm (¾") and the desired upsize, prior to meter installation. The customer shall also be required to pay a fee associated with the construction & installation cost quoted by Aquatera for upsizing, prior to construction.

67.3.5 SANITARY SEWER SERVICE

a) All sewer service connections to new PVC sewer mains shall be made using in-line tee or wye fittings as specified in the Material Specifications.

b) When connecting to existing mains inserta tee brand or Aquatera approved equivalent shall be used for sanitary connections. PVC saddles may also be used when connecting to existing sanitary mains subject to written approval by Aquatera.

c) Sewer service pipes shall have a minimum of 2.6m of cover at the property line.

d) Sewer service connections to deep sewer mains shall be made using risers as shown in the Typical Detail Drawings. Service Risers shall be put on all services where the main is deeper than 4.00m, as measured from the final grade to the obvert of the pipe.

e) The sewer line shall be kept free of soil, mortar and other foreign material during installation of the sewer service. Upon completion of installation the end of the sewer pipe shall be plugged with an approved plug.

f) Sewer services shall be extended to 1.85m into property or where shallow bury utilities exist or are proposed 1.85m from beyond the easement boundary, whichever is greater, and shall be properly capped.

g) When the sewer services are required to connect to mains in excess of 4.00m, as measured from finished ground elevation to the crown of the main, risers shall be installed to within 3.00m of finished surface elevation at the property line.

h) A 35mm by 90mm (2"x4") by 1500mm (5') timber marker stake painted green shall be placed at the plug. The stake must be placed in the ground so that it remains free standing and allows operation of the valve.

i) Sewer service connections may be connected directly to manholes, if approved by Aquatera, dependant on the size of manhole and number of main connections to a manhole, the maximum number of services connected to a manhole shall be four (4). The seal between the service pipe and the manhole shall be water tight. Flow transition from sewer service lines into the main flow channel is to be made in the same manner as intersecting sewer mains. In general, the service pipe is to be extended to the main channel, matching pipe obverts, the top half of the service pipe removed and cemented into the benching.

j) All service inspection risers shall be removed at time of service connection.

k) Recommended to write lot number on the inline T (inserta T) with permanent marker, so it is visible during CCTV inspection of the sanitary main.

l) For Low pressure sanitary services, the owner is required to submit a municipal plumbing inspection report to Aquatera prior to meter install scheduling. The report shall include the municipal address and/or block lot and plan numbers for the property.

67.3.6 CLEANING AND TESTING WATER SERVICE

A sufficient flow of water shall be put through the curbstop to ensure proper cleaning of all pipes and fittings.

Water Services shall be subjected to the cleaning and testing imposed on the water mains to which they are connected.

67.3.7 CLEANING AND TESTING SEWER SERVICE

Sewer Services shall be subjected to the cleaning and testing imposed on the mains to which they are connected.

67.3.8 RINK HYDRANTS

Rink Hydrants are to be installed to the dimensions shown in the Typical Detail Drawings. The water tap, copper pipe and fittings are to be installed in accordance with the Service Connection Specifications. The valve casing is to be installed plumb. The operating rod is not to be pinned to the curb stop to facilitate removal of the rod from ground level.

67.3.9 TRACER WIRE

Tracer wire shall be installed on all main and service pipes. For open trench, tracer wire shall be a minimum 12 gauge, solid copper wire with plastic coating, attached to the piping system every 3 m with PVC tape. The wire shall wrap around the base and surface at every service valve box. The wire shall surface above ground at every cc and wrap around the cc cap and casing. The wire shall be of sufficient length to allow the wire to be uncoiled and extended 0.3 m above ground.

Tracer wire is required on valves in landscaped areas and is brought up on the outside of casing. Tracer wire is not required to surface at valves that are in roadways.

For augured pipe and directional drilling, a minimum of 12 gauge copper cladded high strength steel wire shall be used.

Where spliced-in connections occur, a manufacturer approved water-tight direct bury connector shall be used to provide electrical continuity.

The contractor/consultant shall provide a tracer wire report to Aquatera confirming lines were able to be located and have conductivity with locating equipment. (see form in section 91)

Tracer wire installation shall be considered complete and acceptable when Aquatera can locate the underground infrastructure using locating equipment.

67.4 TESTING REQUIREMENTS OF THE CONTRACTOR

Refer to Testing Section 91.4 for details.

All water services greater than 75mm are recommended to follow AWWA testing standards. Pipes of these sizes are treated as mains and require full test packages (see also section 300 – external standards documents - for testing sequence reference information). The results are to be submitted to Aquatera for review and approval. Injection points for testing shall be a minimum of 19mm (3/4") and be within 3m of the service boundary valve.

For all existing 150mm and larger water service stubs, the contractor shall install at a minimum, a 50mm temporary injection blow off within 3m of the connection tie-in of the water service for flushing and or testing. The contractor shall contact Aquatera at inspections@aquatera.ca for approval before removing the temporary blow off. It is recommended that water services have the following tests performed, pressure, chlorination, bacteriological and 2 NTU turbidity & flush.

For all water services 75mm and greater a minimum of 2ntu turbidity, pressure test, and 2 days of bacteriological tests are required and results certified by a profession Engineer (licenced to practice in Alberta). The results shall be submitted to Aquatera Engineering, prior to meter install. For services 50mm and less with a drainable CC no pressure test is required and Aquatera will complete the chlorine residual tests.

67.4.1 PRE-INSTALLATION

a) Materials:

If bedding material is different from that used for the sanitary sewer and/or the watermain, the Contractor shall provide a sieve analysis of the material proposed to be supplied.

b) System: None required.

67.4.2 INSTALLATION

a) Materials: None required.

d) Systems:

Water and Sanitary Sewer service connections shall not be backfilled until

inspected by the Engineer.

67.4.3 POST-INSTALLATION

a) Materials: None required

b) System:

The water service system will be tested in conjunction with the Water Distribution System. The sewer service is subject to the same test requirements as the sewer main

it is connected to, including CCTV video inspection. The service is to be video inspected from the property line to the sewer main. Refer to Section 25 for details.

67.5 PAYMENT

Payment shall be full compensation for the procurement of all permits and processes, the supply and the installation of all materials, the supply and use of all equipment, the supply and use of all labour and supervision; all being necessary to complete the work to specification at the construction site.

67.5.1 AUGERING/TRENCHING

Augering/trenching is considered incidental to the Work and no separate payment shall be made.

67.5.2 BEDDING

Bedding is considered incidental to the Work and no separate payment shall be made.

67.5.3 WATER SERVICE

Payment will be made per lineal metre (L.M.) of water service pipe installed for the unit prices submitted on the Tender Form and shall include augering/trenching and bedding.

67.5.4 SEWER SERVICE

Payment will be made per lineal metre (L.M.) of sewer service pipe installed for the unit prices submitted on the Tender Form and shall include augering/trenching and bedding.

67.5.5 FITTINGS

Main stops, service saddles, curb stops, service boxes, plugs, tees, wyes and bends shall be paid for on a unit basis (No.) and such payment shall be full compensation for the supply and installation of the specified fittings.

67.5.6 SERVICE RISERS

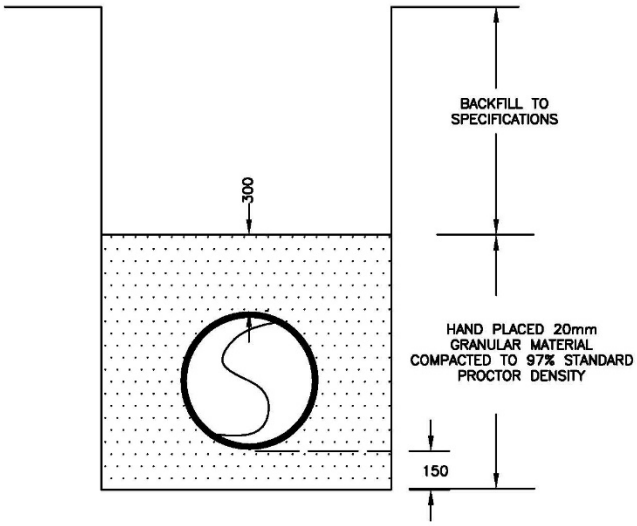
Service Risers shall be paid for on a vertical metre unit (V.M.) basis and such payment shall be full compensation for the supply and installation of the specified CSP, concrete, spacers, compacted sand and any other materials or labour above what is required for a standard sewer service.

67.5.7 CLEANING

Cleaning shall be considered incidental to the work and shall not be paid separately.

67.5.8 TESTING REQUIREMENTS OF THE CONTRACTOR

There shall be no payment for the testing requirements of the Contractor except for the closed circuit TV inspection which will be paid under the Sanitary Sewer System inspection.



CLASS B-1

NOTE:
1. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE NOTED.
2. SAND MAY BE ALLOWED ON PIPE SIZES LESS THAN OR EQUAL TO 375mm DIAMETER PROVIDING THE PIPE HAS WATER TIGHT JOINTS.

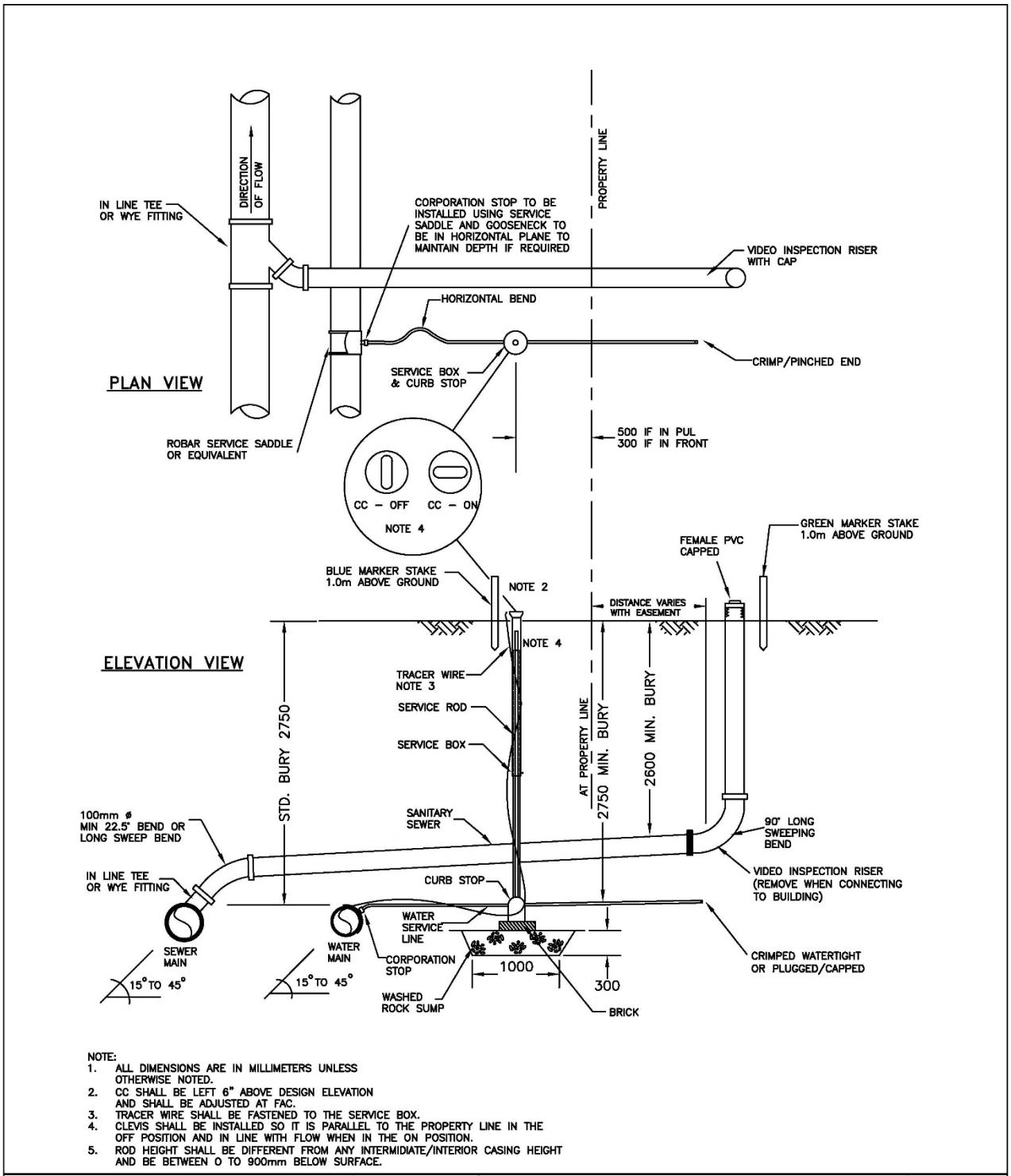
Revisions	
Date	Details
10/215/15	REMOVE CITY FILE #

BEDDING DETAILS

Approved by Timothy Lau P.Eng.	Date 12/07/12
Checked by Brad Vall C.E.T.	Scale N.T.S.
Drawn by Scott Walls	Permit Number P09242

Standard Detail 67-01

File Number



NOTE:
1. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE NOTED.
2. CC SHALL BE LEFT 6" ABOVE DESIGN ELEVATION AND SHALL BE ADJUSTED AT FAC.
3. TRACER WIRE SHALL BE FASTENED TO THE SERVICE BOX.
4. CLEVIS SHALL BE INSTALLED SO IT IS PARALLEL TO THE PROPERTY LINE IN THE OFF POSITION AND IN LINE WITH FLOW WHEN IN THE ON POSITION.
5. ROD HEIGHT SHALL BE DIFFERENT FROM ANY INTERMIDIATE/INTERIOR CASING HEIGHT AND BE BETWEEN 0 TO 900mm BELOW SURFACE.

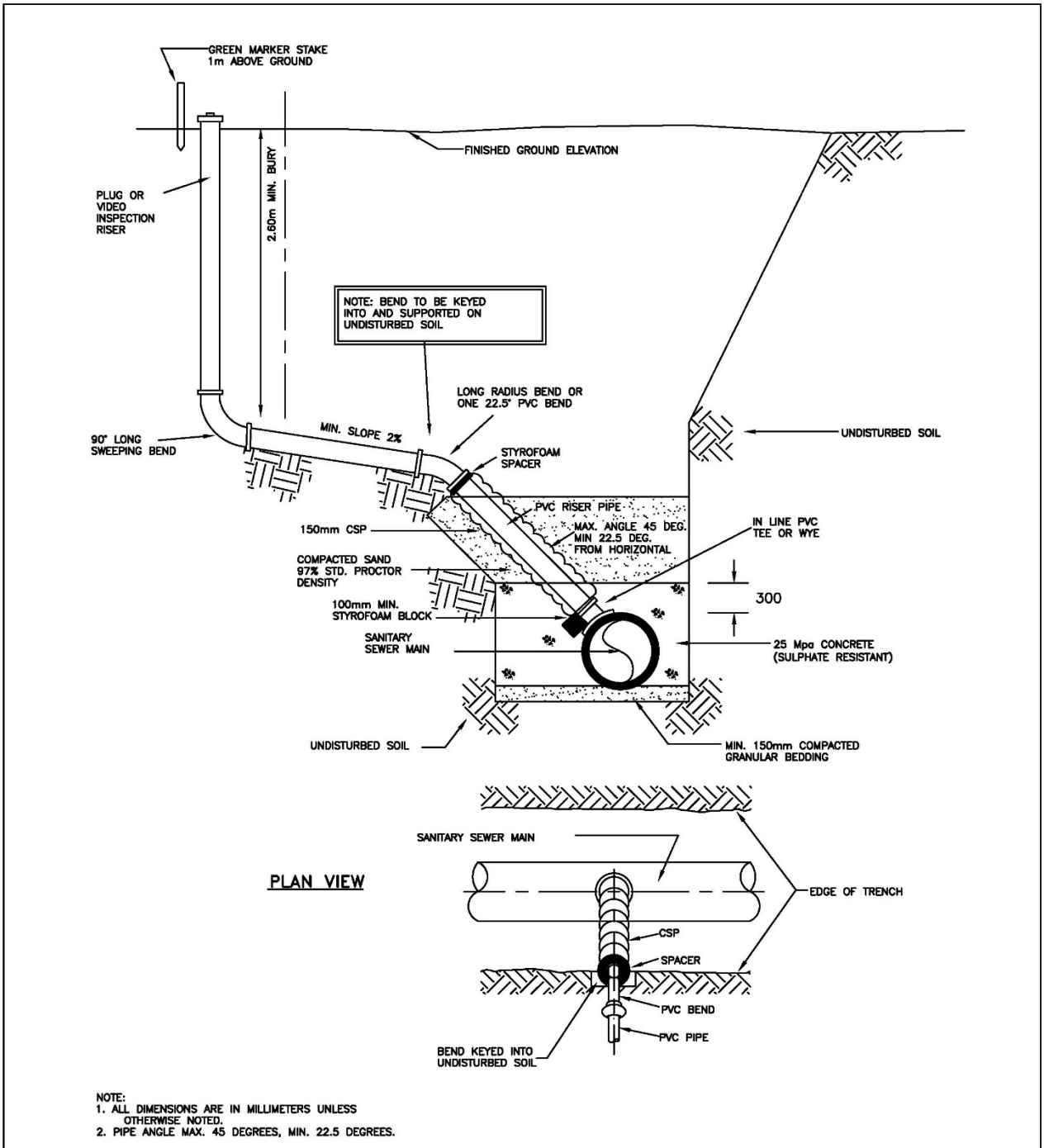
Revisions	
Date	Details
11/26/13	IMPROVED LONG SWEEPING BEND DETAIL
11/26/13	INCREASED DETAIL FOR THE CRIMPED WATER LINE
10/15/15	REMOVE CITY FILE #
10/14/17	MATCHED MIN. DEPTH, ADDED LONG SWEEP SANITARY
12/04/18	MODIFY CC HEIGHT, ADD NOTE 2–5, ADD CLEAN OUT CAP & CLEVIS DIAGRAM, REMOVE PERMIT# TS
11/20/19	MODIFY TITLE TS

AQUATERA

RESIDENTIAL SERVICE CONNECTION

Approved by Brad Vall C.E.T.	Date 12/06/12
Checked by TROY SMITH C.E.T.	Scale N.T.S.
Drawn by Scott Walls	

Standard Detail
67–02



NOTE:
1. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE NOTED.
2. PIPE ANGLE MAX. 45 DEGREES, MIN. 22.5 DEGREES.

Revisions	
Date	Details
12/06/12	ADJUSTED LOCATION OF MARKER STAKE
11/26/13	IMPROVED LONG SWEEPING BEND DETAIL
11/26/13	RENAMED TITLE FROM SERVICE CONNECTION TO RISER
10/15/15	CHANGE ANGLE OFF SERVICE, REMOVE CITY FILE #
03/28/16	REMOVE 45 BEND OPTION

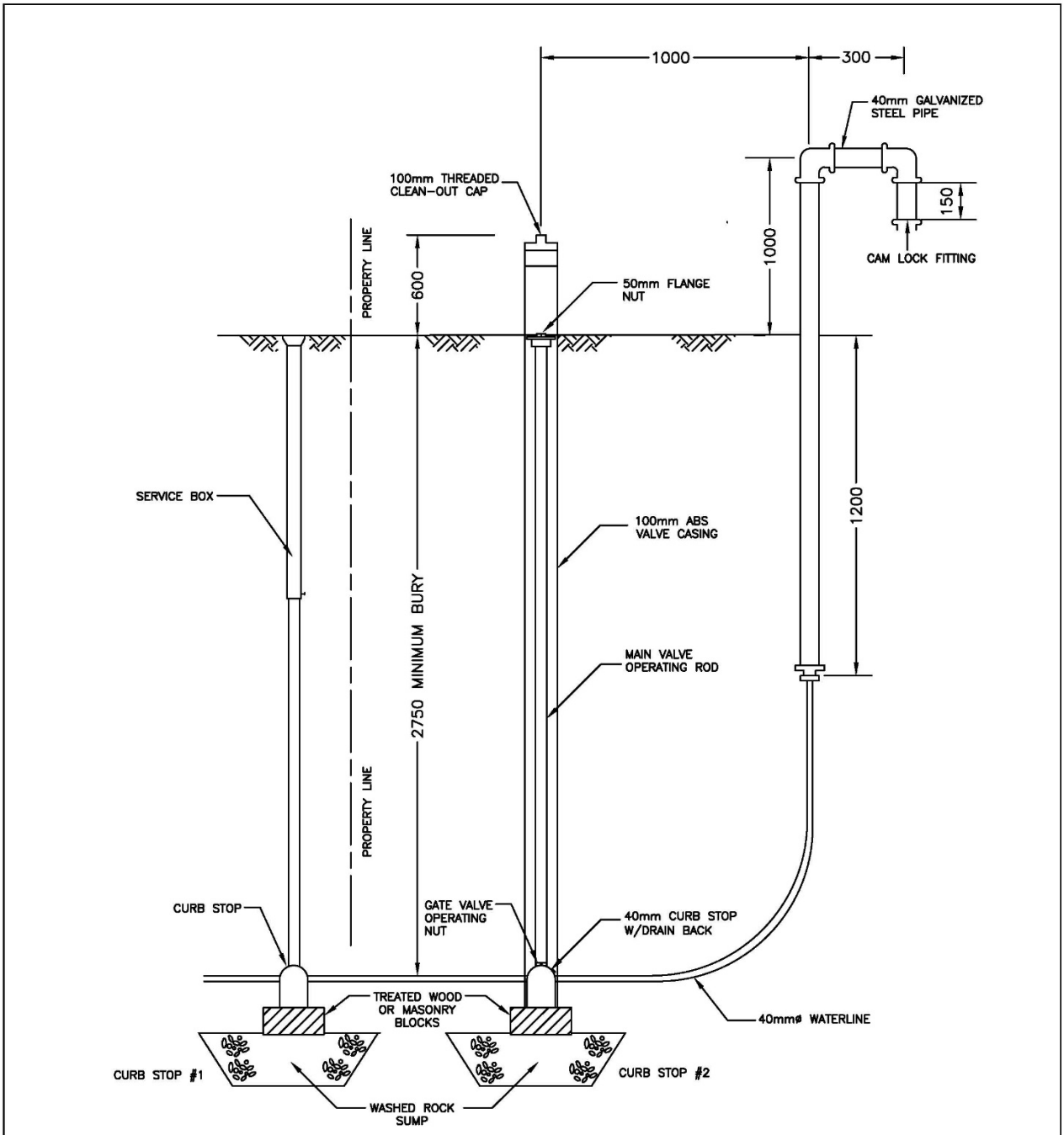
SERVICE RISER

Approved by Timothy Lau P.Eng.	Date 12/06/12	Standard Detail 67–03
Checked by Brad Vail C.E.T.	Scale N.T.S.	
Drawn by Scott Walls	Permit Number P09242	File Number

LOT No.	BLK No.	INVERT ELEV. AT SANITARY SERVICE		LOCATION			
		AT STUB	AT MAIN	SADDLE TO M.H.	M.H. No.	F.O.C. TO C.C.	

(NOTE: TO BE COMPLETED AND INCLUDED AS PART OF THE RECORD DRAWING SUBMISSION)

Revisions			SERVICE CONNECTION INFORMATION SCHEDULE		Standard Detail
Date	Details		Approved by Timothy Lau P.Eng.	Date 12/07/12	67–04
10/15/15	REMOVE CITY FILE #		Checked by Brad Vail C.E.T.	Scale N.T.S.	
			Drawn by Scott Walls	Permit Number P09242	File Number



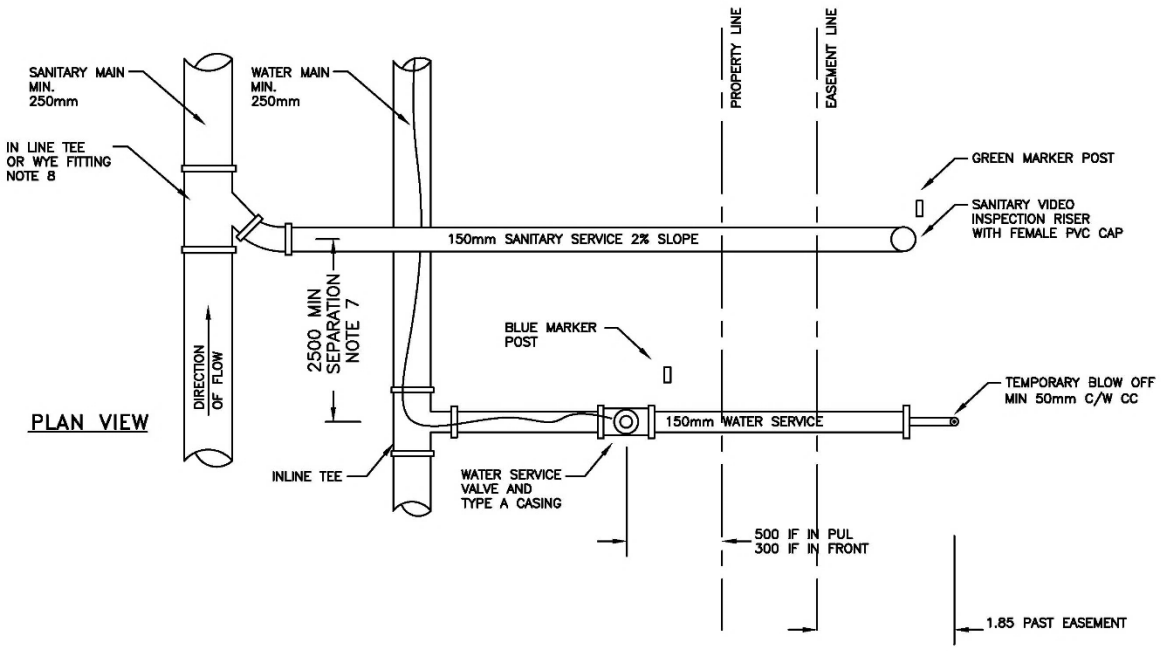
NOTE:
1. INSTALL CURB STOP AT 300mm FROM PROPERTY LINE OF THE PARK SPACE OR MUNICIPAL RESERVE.
2. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE NOTED.

Revisions	
Date	Details
12/06/12	ADDED SPACING DIMENSION FROM VALVE TO OUTLET
12/06/12	ADDED GATE VALVE OPERATING NUT ON CURB STOP 2
11/26/13	ROTATED RINK HYDRANT 180°
11/26/13	IMPROVED ROCK SUMP LOCATION
11/26/13	IMPROVED FLANGE NUT DETAIL
1/30/14	REMOVED FORD ONLY CURB STOP
10/19/15	REMOVED CITY FILE #

RINK HYDRANT DETAIL

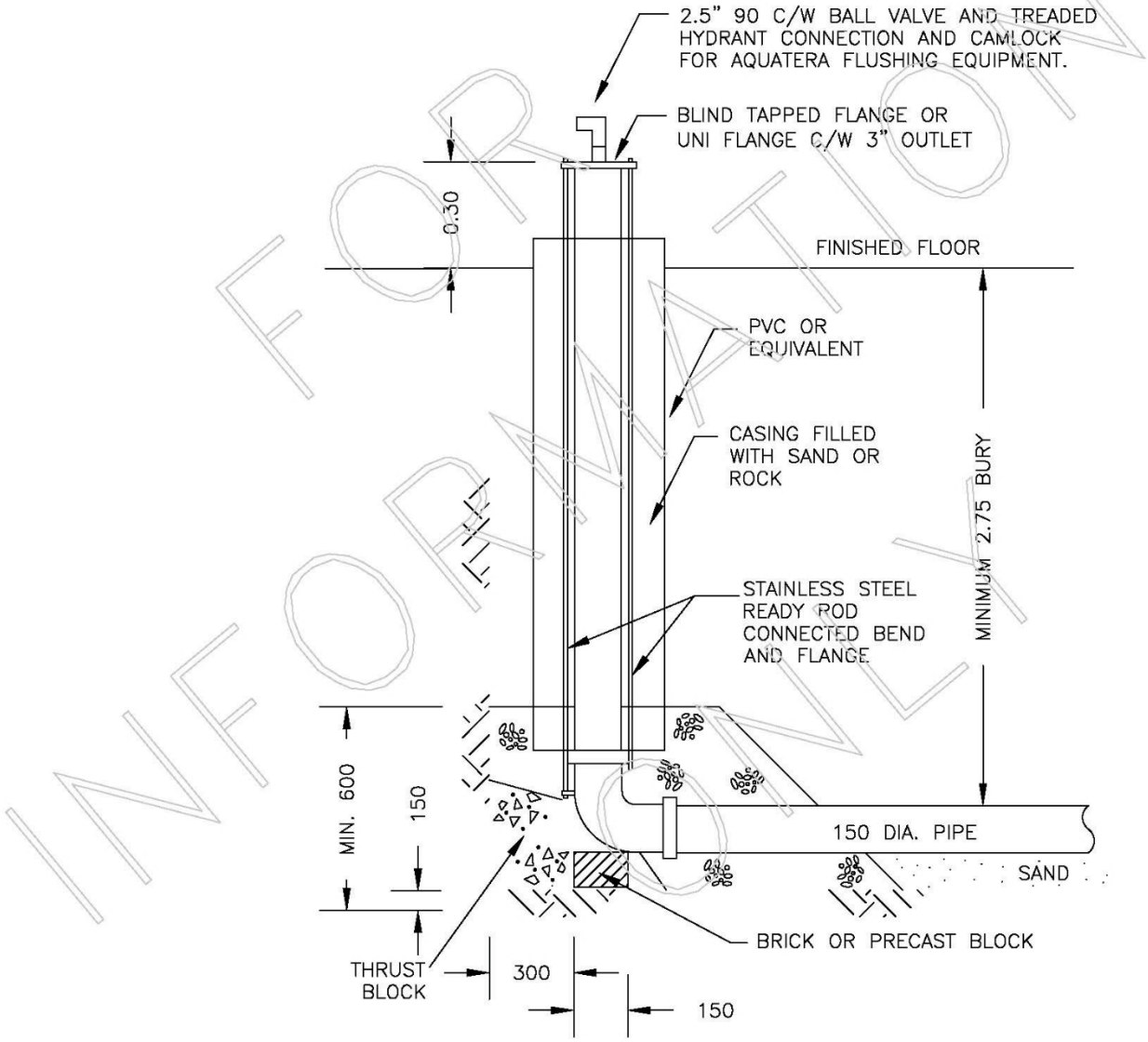
Approved by Timothy Lau P.Eng.	Date 12/06/12
Checked by Brad Vall C.E.T.	Scale N.T.S.
Drawn by Scott Walls	Permit Number P09242

Standard Detail
67-05
File Number



NOTE:
1. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE NOTED.
2. VALVE CASING SHALL BE INSTALLED AT DESIGN ELEVATION AND SHALL BE ADJUSTED AT FAC TO FINAL LANDSCAPING.
3. TRACER WIRE SHALL BE FASTENED TO THE VALVE CASING.
4. ROD HEIGHT SHALL BE BETWEEN 300MM TO 900mm BELOW SURFACE.
5. SERVICES TO BE MIN OF 2.75 METERS BURY BELOW SURFACE TO TOP OF PIPES AND 2.6 METERS AT PROPERTY LINE.
6. MARKER POSTS SHALL BE INSTALLED AT A DISTANCE CLOSE TO THE VALVE BUT STILL ALLOWS VALVE OPERATION
7. 2.5 METER SEPARATION FOR JOINTED PIPE.
8. FOR EXISTING SANITARY MAINS, INSERTA TEES MAY BE USED FOR PVC AND FERNCO SADDLES FOR CLAY/AC PIPE.
9. WHEN CONNECTING TO MANHOLES CORE HOLES SHOULD BE MADE AND LINK SEALS OR GOUT ADAPTORS SHALL BE USED THROUGH MANHOLE WALLS.

Revisions			COMERCIAL SERVICE CONNECTION		Standard Detail
Date	Details				
–	–		Approved by Brad Vall C.E.T.	Date 11/19/19	67–06
			Checked by Markus Oeser	Scale N.T.S.	
			Drawn by Troy Smith C.E.T.		



NOTE:
1. ALL PRIVATE INFRASTRUCTURE TO BE DESIGNED AND APPROVED BY PRIVATE ENGINEER.
2. UNDER GROUND CONTRACTOR TO SCHEDULE FLUSHING AND TESTING PRIOR TO LEAVING SITE.
3. IF REQUIRED, 150mm WATER SERVICE RISER TO BE PUMPED OUT TO PROTECT FROM FREEZING.

Revisions				
Date	Details			
–	–			
		AQUATERA	COMMERCIAL WATER SERVICE TESTING RISER	Standard Detail 67–07
			Approved by Brad Vall C.E.T. / Date 11/18/19	
			Checked by Markus Oeser / Scale N.T.S.	
			Drawn by Troy Smith C.E.T. / Permit Number	File Number