City of Langley

WATER METER SPECIFICATIONS

January 2010

CONTENTS

1. Preamble

The following specifications detail the City's requirements for the installation of meters on City water services.

An applicant is responsible for the supply and installation of meters and associated piping, chambers and equipment on metered water services. The meter information must be provided to the City for our review and acceptance prior to the installation and activation of the service.

The specifications detail acceptable water meter types, location and installation requirements.

2. Definitions

ANSI: American National Standards Institute.

ASTM: American Society for Testing and Materials.

AWWA: American Water Works Association

Activation: Opening of the service valve to permit the flow of water.

Applicant: A person, company or agency that makes application for a water service from the City water system as required by the City's Waterworks Regulation Bylaw 2404.

City The municipal area comprised within the boundaries of the City of Langley.

Director of Engineering, Parks and Environment The Director of Engineering, Parks and Environment of the City and his designates.

Engineer: A professional engineer registered in the province of British Columbia practicing in the field of Civil or Mechanical Engineering.

FM: Factory Mutual Engineering and Research Organization, a research and testing agency accepted by the Insurance Industry.

UL: Underwriters' Laboratories, a research and testing agency accepted by the Insurance Industry.

Water Bylaw: Refers to the City of Langley Waterworks Regulation Bylaw 2404 as amended.

3. Services to be Metered

The Waterworks Regulation Bylaw identifies services that require meters. This includes but is not limited to all property intended for residential, commercial, industrial, institutional and agricultural or public use.

All services to such properties including fire, domestic services and water meter bypass services shall have meters.

4. Location of Meters

Meters shall be placed at the interface between the City and private water system. In most circumstances the interface occurs at the property line of the site within the municipal right-of-way. Alternate water meter locations must be approved by the Director of Engineering, Parks and Environment.

Where a City Water main is within private property in a right-of-way, place the meter within the right-of-way at the boundary line.

5. Meter Types

There are two types of cold water meters accepted for use by the City. These are positive displacement and compound types.

The actual meter or combination of meters accepted for use must accurately account for the total water use of the property serviced. All meters must be new; used or reconditioned meters are not acceptable and conform to NSF 61 standards.

Positive Displacement meters are to be either oscillating piston or nutating disc type to AWWA C-700. Meters are to have a bronze case with cast iron or plastic frost protection cover. Meters 38mm in size are to have oval two bolt flanged ends.

Compound meters are to conform to AWWA C-702. All compound meters are to have a bronze case and flanged connections. Meters 50mm in diameter are to have oval two bolt flanges.

Acceptable meters are: Neptune (Jan. 1, 2008)

Alternative meters may be accepted at the discretion of the Director of Engineering, Parks and Environment.

6. Registers

All meters are to have direct reading, sealed encoder and remote registration. All registers are to have a sweep test hand or electronic flow indication. All registers shall be minimum 6-wheel high-resolution type. The unit of measure shall be cubic metres (m^3). Registers must be new; used or reconditioned registers are not acceptable. Registers must be compatible with interrogation equipment used by the City.

Registers shall have a receptacle that will allow electronic reading of the meter with a portable data acquisition unit. The receptacle shall be designed for wall mounting or mounting in the meter chamber lid, as appropriate. The unit must, in a digital format simultaneously encode at least six significant digits of the meter reading for transmission through the remotely located receptacle. A unique meter identification number must also be provided with each read.

Registers must be easily upgraded to Automated Meter Reading (AMR) by substitution of the remote receptacle with a Radio Meter Interface Unit.

All registers must be provided with moisture protection for internal components when operating under flooded pit conditions. The materials employed for contacts and connectors must inhibit corrosion and must suffer minimal effect from environmental conditions to which they are exposed.

7. Remote Receptacles

Remote receptacles must be available in both wall and pit mount style. No Identity number storage is permitted at the remote receptacle. The materials employed must be corrosion resistant, resistant to ultraviolet degradation, unaffected by weather or condensation.

Pit mounted receptacles must be mounted to the meter box lid mounted in a single 45mm diameter hole. Wall mounted receptacles must be designed for terminal screw connection before being fastened to the wall. The design of the unit must be such that it provides for mechanical and electrical connection between the receptacle and interrogation equipment. Interrogation must be achieved by inductive coupling without physical connection of the reading device (touch pad), or for radio reads (R900i technology).

7A. Remote Radio Read Equipment

Installations for Industrial/Commercial/Institutional and Multi-family residential properties shall be radio read type meters.

Accepted Devices: Neptune E-Coder R900i
For Pit applications – must be Neptune E-Coder R900i pit version c/w external antenna 7.62 m in length.

8. Meter Selection

The type or combination of types of meters selected for recording water consumption from a service must accurately record consumption for the expected range of flow. The size selected must ensure pressure losses are within acceptable limits and provide long meter life. The Applicant's Engineer must ensure that the meter selection and installation requirements are adequate for the design application.

A meter may be one pipe size smaller than the service except for bypass meters. The Applicant's Engineer must ensure that the reduction neither compromises the operating range of the meter nor results in unacceptable head losses. The size selected shall ensure pressure losses are within acceptable limits and provide long meter life.

The following table provides a guide for acceptable meter types and sizes for a range of uses and flows. Flow rates are in accordance with AWWA specifications.

WATER USE	LAND USE	SIZE		ACCEPTABLE METER TYPE	FLOW RATES(m3/h)		
		mm	in		Norm Op Range	Normal Flow	Max Cont Flow
Domestic	Commercial	16	5/8	Positive Displacement	0.2-4.5	4.5	2.3
	Institutional	19	¾	Positive Displacement	0.5-6.8	6.8	3.4
	Industrial	25	1	Positive Displacement	0.7-11.4	11.4	5.7
		38	1 ½	Positive Displacement	1.1-22.7	22.7	11.3
		50	2	Positive Displacement	1.8-36.3	36.3	18.2
		50	2	Compound	0.23-36.0	36.0	18.0
		75	3	Compound	0.45-79.0	79.0	40.0
		100	4	Compound	0.68-136.0	136.0	68.0
		150	6	Compound	1.1-307.0	307.0	153.0
Irrigation	Agricultural	38	1 ½	Positive Displacement	1.1-22.7	22.7	11.3
Bulk	Golf Courses	50	2	Compound	0.23-36.0	36.0	18.0
Water	Some	100	4	Compound	0.68-136.0	136.0	68.0
Use	Industrial	150	6	Compound	1.1-307.0	307.0	153.0
	Uses	200	8	Compound	3.6-360.0	360.0	204.0

9. Dedicated Fire Services

Fire services are to be metered to detect unauthorized use and leaks in the system. Provide all fire services with a detector check valve with meter trim package in combination with an appropriately sized "tattle tail" displacement type meter on a bypass. Install tattle tail meters in accordance with these specifications. An approved double detector check assembly with a "tattle tail" meter may be used in place of the detector check valve, to satisfy fire sprinkler system back-flow prevention requirements.

9A. Water Meter Bypass Lines

All water meter bypass lines shall have a line-sized water meter installed to detect unauthorized use. The meter shall be equipped with a register (see Section 6) and Radio Read transmitter (see Section 7A).

10. Installation Requirements

Installation requirements are summarized on the following table and illustrated on the appended typical drawings.

Size mm	Type	By pass* Required	By pass* Size	Strainer Required	Chamber[2] Type	Chamber[2] Size mm	Chamber[2] Model
16	Positive Displacement	No	-	No	Meter Box	300x500	Brooks 37
19	Positive Displacement	No	-	No	Meter Box	300x500	Brooks 37
25	Positive Displacement	No	-	No	Meter Box	425x750	Brooks 66
38	Positive Displacement	Yes[1]	25 mm	No	Meter Box	600x900	AEC 5686
50-75	Compound	Yes[1]	25 mm	Yes	Vault	1220x2000	AEC 2121
100	Compound	Yes[1]	50 mm	Yes	Vault	3260x1760	AEC 3151
150	Compound	Yes[1]	50 mm	Yes	Vault	3260x1760	AEC 3151
100-150	Detector Check	No	-	No	Vault	1220x2000	AEC 2121
200	Detector Check	No	-	No	Vault	3260x1760	AEC 3151

Note * A by pass is not required for dedicated irrigation meters.
Note [1] Bypass size to be determined by Applicant's Engineer.
Note [2] Chamber Lids are to be pre-drilled with a 45mm dia. remote receptacle hole. Meter pits should not be installed in vehicular traveled areas.
Installations for meters not shown on the above table must be designed by the applicant's engineer.

Installation and Piping Requirements:

Contractor shall install meters horizontally with register casings plumb, facing upward. Where installed in a meter box, centre meter in box.

All connecting piping valves and fittings shall be equal to the diameter of the meter for a distance of at least 3 pipe diameters up stream of the meter.

Where required, contractor shall install strainers immediately upstream of the meter using a flanged connection. Strainers shall be 'straight' type from the same manufacture and size as the meter.

Contractor shall provide isolation valves upstream and downstream of the meter, 50mm and larger, to allow removal of meter and strainer cases. Where required, install one valve upstream and one valve downstream of the water meter on bypasses. Provide a lockwing on the operating nut of the bypass valves.

For all compound meter installations the contractor shall provide a straight section of horizontal pipe, five pipe diameters in length, between the strainer and the upstream isolating valve or any other appurtenances (i.e. bends, elbows, reducers, etc.). A straight section of horizontal a minimum of three pipe diameters in length shall be provided after the water meter.

In the absence of a test plug on the meter case, install a testing tee with a 50mm diameter threaded nipple and cap between the meter and the downstream isolating valve.

For meters 50mm in diameter and larger the contractor shall provide a mechanical flange adapter on the downstream side of the meter to provide flexibility for meter and strainer case removal.

Contractor must provide adequate insulation for the meter in applications where there is a possibility of the meter freezing.

Contractor shall support all meters, valves and bypasses within chambers with adjustable pipe stands. Bricks, concrete or wood blocking are not acceptable means of support.

Receptacle Installation:

A remote reading receptacle(s) shall be installed by the contractor. A maximum of two registers may be networked per receptacle. In non-traffic areas mount remote register receptacles in the meter box, vault or chamber lid in accordance with the manufacturer's instructions. Where the lid is in a high traffic area, mount the receptacle on the exterior wall of the serviced building or in a Brooks #37 Box complete with metal lid adjacent to the chamber away from vehicular traffic. Remote wiring connections shall be either factory or field sealed to ensure connections are waterproof. Field seals shall be in accordance with the manufacturer's instructions.

Wall mounted remote receptacles must be located at or near 1.2 metres above grade and easily accessible for reading. The Communication cable from the meter to the receptacle must be installed in accordance with the manufacture's instructions. Wire to be run in horizontal or vertical directions only. Where possible, run wire inside the building. Provide 10mm diameter hole sealed with sealing compound at external face to receptacle.

11. Pipe and Appurtenances

Piping and Fittings
All piping, pipe fittings and jointing methods must comply with the latest requirements of the B.C. Plumbing Codes and AWWA Standards.

Valves
All valves are to be suitable for buried service. Valves on domestic services up to 50mm in diameter shall be bronze ball or cylinder corporation style valves meeting AWWA C-800. Valves shall have rubber O-ring seals. Connections shall be threaded, compression type or lockwing on the operating nut and case of all bypass valves.

Valves on domestic services 75mm to 250mm in diameter are to be cast iron, resilient seat, NRS gate valves to AWWA C-509 with flanged ends. Stem seal to be O-ring type. Actuation of buried valves or valves in vaults shall be by a standard 50mm square operating nut. Valves within man entry chambers shall be operated by hand wheel. Provide a Robar style valve box over buried valves.

Fire Service valves within vaults or chambers shall be resilient seat, OS&Y or NRS gate valves to AWWA 509.

Detector Check Valves
An approved detector check valve or double detector check valves, with meter trim package are to comply with AWWA C-510. Detector check valves for fire service use must be FM and UL approved.

Flange Adapters
Mechanical Flange adapters for 38mm to 200mm sizes shall be to AWWA C219.

Connections between flanged fittings and Ductile Iron or Steel piping may be made with "Uniflange" adapters.

Bolts and Nuts
Bolts and nuts are to be stainless steel to ASTM F-599 or F-731 for bolts and ASTM F574 or F836 for heavy hex nuts. Rolled threads, fit and dimension to AWWA C-111.

Communication Conduit
Communication conduit is to be Schedule 40 rigid PVC with solvent welded joints. Minimum cover required over the conduit is 600mm. Minimum radius for a 90 degree bend is 400mm. There shall be no more than two 90 degree bends between the meter box or vault and the terminal junction box. Use 3mm braided nylon rope for the pull string. Secure the pull string at both entrances to conduit to prevent accidental withdrawal. Cleat surface mounted conduit to the exterior of the building at 750mm intervals.

The maximum length of conduit without a pull box is 60m. Pull boxes are to be concrete, Brooks 37 style with steel lid.

Meter Boxes
The box, vault or chamber shall be pre-cast concrete to the dimensions provided in the table above. The minimum head room for man entry chambers shall be 2.0 metres.

Boxes shall have steel or iron lids capable of withstanding H-20 loading. 1200 x2000 vaults shall have two hinged galvanized steel lids providing a 880mm x 1790mm opening. 1760 x 3260. Vaults shall have three hinged galvanized steel lids providing a 810mm x 2590mm opening. Lids of man entry chambers shall be l200mm x 1200mm or 1500mm x 1500mm square split hinged galvanized steel. Vault and chamber lids shall be capable of withstanding H-20 loading. Lids for boxes, vaults and chambers in non-traffic areas shall have pre-drilled 45mm diameter hole for remote reading receptacles.

Damp proof the exterior of all man entry chambers by applying asphalt emulsion coating to all exterior surfaces. Make construction joints water tight with an appropriate sealant.

Access lids, latches and ladders must comply with the most current requirements of the Workers' Compensation Board.

12. Inspection Procedure

A request for water service is initiated by application for a Plumbing Permit through the City's Development Services Department.

The Applicant's Engineer shall determine the size of the meter and shall select the appropriate meter type for the intended use in accordance with the City's Water Meter Specifications. Plans submitted, as part of the Plumbing Permit Application must indicate the meter size, type and chamber location. The plans shall also indicate the expected range of flows and the average expected flow for the proposed installation.

For non-typical meter installations, or for meters of 200mm diameter and greater, the applicant's Engineer must provide detailed drawings giving complete details of the installation.

Applicant must provide information set forth on the City's water meter installation form provided with these specifications prior to the installation of the meter.

The City's Engineering and Development Services Departments will inspect the meter installation to ensure conformance to this specification and the B.C. Plumbing Code.

Upon approval of the installation, the City Operations Department will lock the bypass valve (where applicable), take the initial meter reading and activate the service.

13. Temporary Water Services

Temporary water services required during construction phase of a development project must also be metered. Meters installed on temporary services are to conform to the requirements of this specification in all respects. The meter must be in place prior to the activation of the service. Temporary services may only be deactivated by City Operations personnel. Contact the City Engineering Department at 514-2924 prior to removing a meter from a temporary service.

THE CITY OF LANGLEY - ENGINEEERING DEPARTMENT

WATER METER INSTALLATION FORM

INSTALLATION DATE: _____ WORK ORDER NO. _____

PROJECT ADDRESS: _____

CONTRACTOR NAME: _____ PHONE NO. _____

INSTALLER'S NAME: _____ SIGNATURE: _____

WATER METER INFORMATION

METER SIZE: 5/8" ☐ 5/8" x 3/4" ☐ 3/4" ☐ 1" ☐ 1 1/2" ☐ 2" ☐

OTHER SIZE: _____

LINE SIZE: 1/2" ☐ 5/8" ☐ 3/4" ☐ 1" ☐ 1 1/2" ☐ 2" ☐

OTHER LINE SIZE: _____

MATERIAL: COPPER ☐ BRASS ☐ OTHER: _____

MANUFACTURER: NEPTUNE

METER TYPE: POSITIVE DISPL. ☐ COMPOUND ☐ OTHER: _____

METER SERVICE: DOMESTIC ☐ FIRE ☐ DOMESTIC & FIRE ☐ BYPASS ☐

METER LOCATION: _____

METER SERIAL NO.: _____ REGISTER SERIAL NO.: _____

TOUCH PAD (RECEPTACLE) LOCATION _____

INITIAL METER READING: _____ (i.e.: 00000.0)

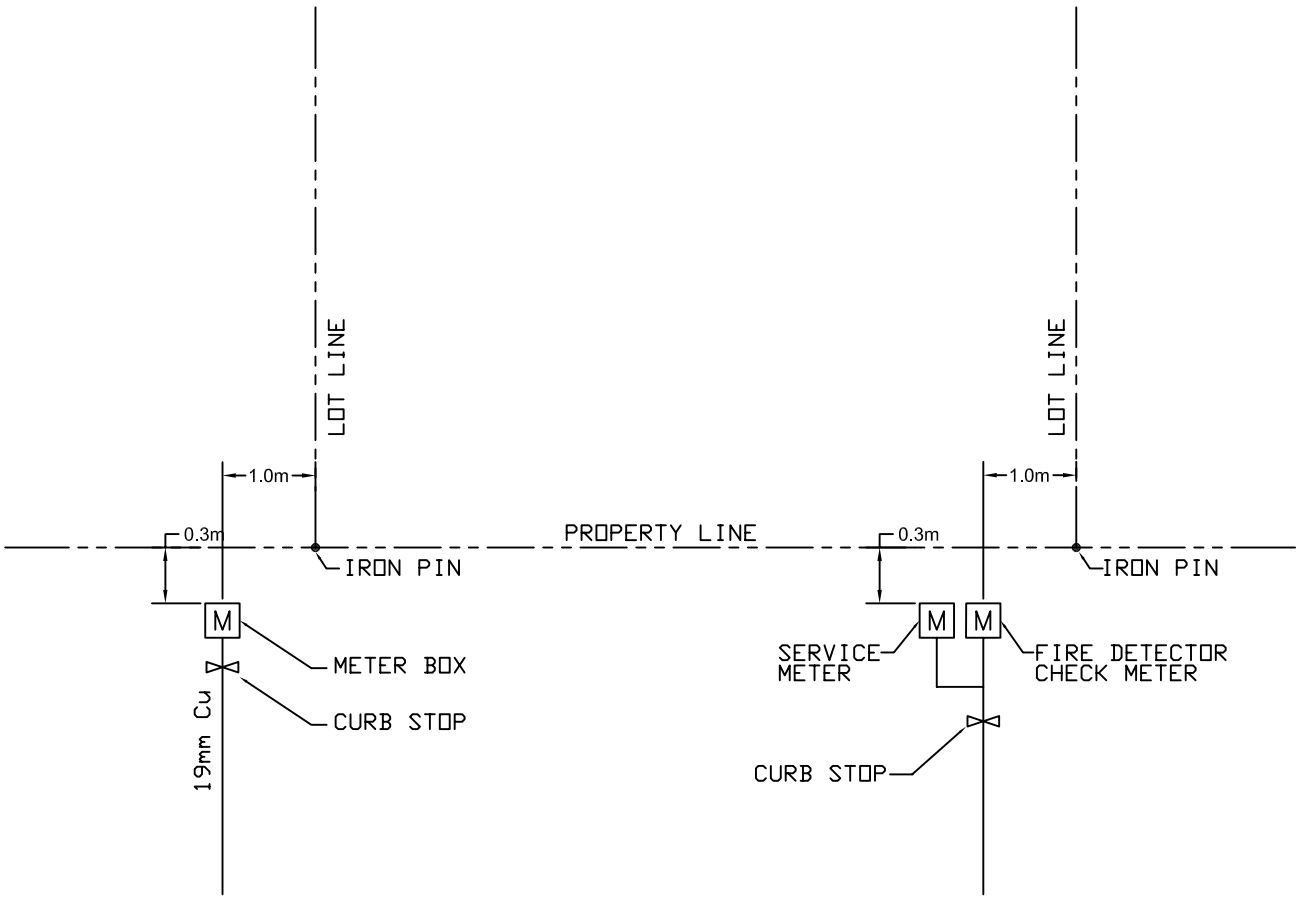
COMMENTS: _____

_____

_____

NOTE: CONTRACTORS MUST FILL IN THE REQUIRED DATA FIELDS IN ORDER TO PASS FINAL INSPECTION

OFFICIAL USE ONLY	DATE REC'D: _____ FOLIO NO.: _____
	ACC. NO.: _____ PROCESSED BY: _____



SINGLE DOMESTIC WATER SERVICE

COMMERCIAL/INDUSTRIAL/MULTI-FAMILY SERVICE WITH FIRE LINE

NOTES:
(1) CONNECTIONS GREATER THAN 75mm SHALL BE THRUST BLOCKED.
(2) ALL FITTINGS OVER 50 DIA SHALL HAVE FLANGE OR HUB JOINTS.
(3) FIRE LINES ARE FOR FIRE FIGHTING ONLY; NO OTHER USES ARE PERMITTED.
(4) CHAMBERS FOR METERS GREATER THAN 50 SHALL BE SUITABLY SIZED TO ALLOW ACCESS.
(5) FOR COMBINED SERVICE AND INSIDE APPLICATIONS SEE WTR-5.

City of Langley

Engineering Department

STANDARD DETAIL DRAWINGS

TYPICAL SERVICE INSTALLATION

DATE:	SCALE:
2008.03.28 REV. 02	NTS
APPROVED BY: FC	DRAWN BY: SJ / JQ
	DRAWING NO. WTR–1

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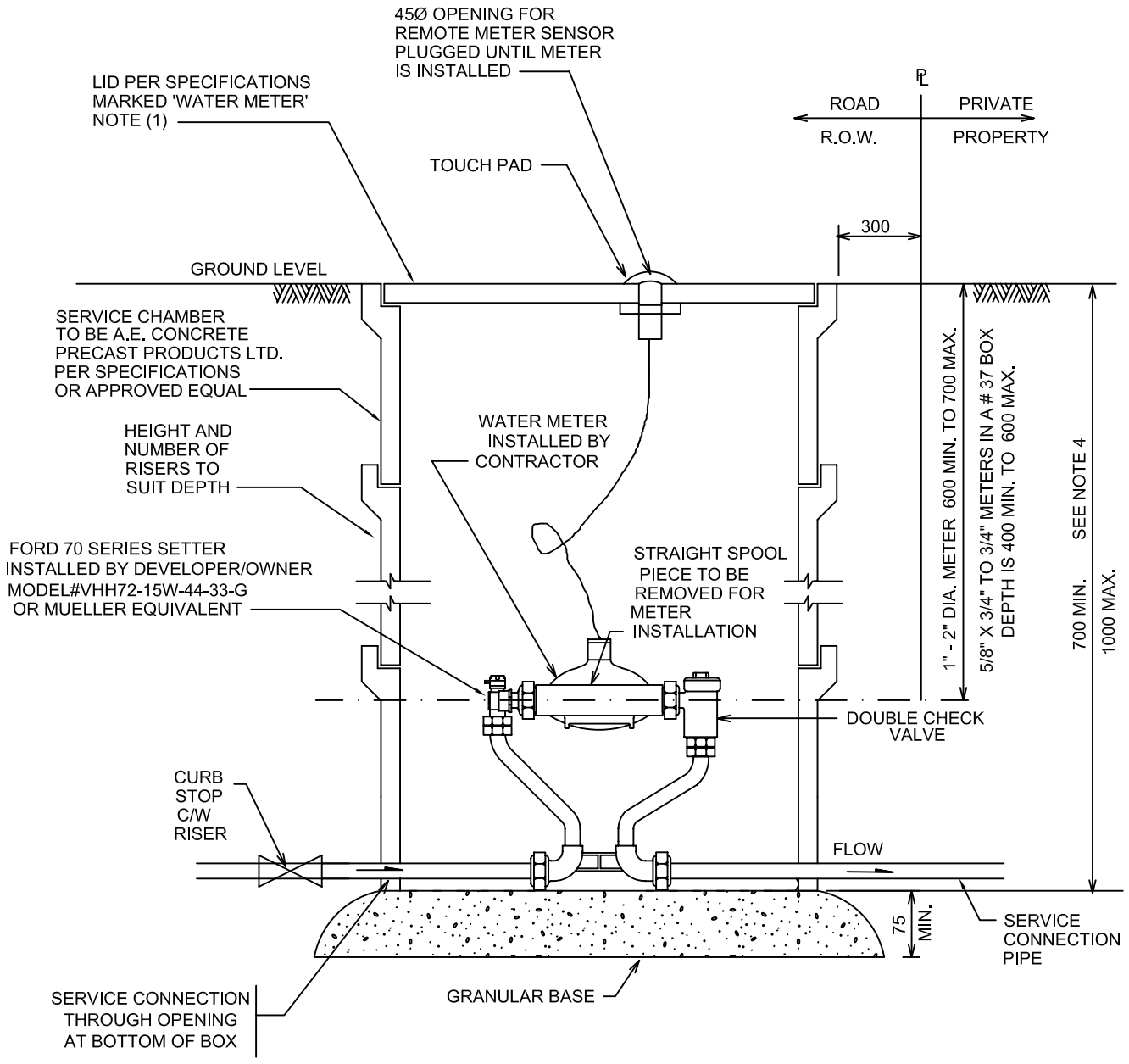

NOTES: (1) ALL CHAMBERS SHALL BE CONCRETE WITH DUCTILE IRON LID TO H-20 TRAFFIC LOADING A.E. CONCRETE PRECAST PRODUCTS LTD OR APPROVED EQUAL, TO BE INSTALLED & SUPPLIED BY THE DEVELOPER/OWNER

(2) FORD 70 SERIES OR MULLER EQUIVALENT SETTER, COMPLETE WITH DUAL CHECK VALVE TO BE INSTALLED & SUPPLIED BY DEVELOPER/OWNER

(3) MATERIALS AND CONSTRUCTION SHALL CONFORM TO CITY OF LANGLEY STANDARDS.

(4) IF DEPTH EXCEEDS 1.0 m, A 1050 DIAMETER MANHOLE IS REQUIRED. LID TO BE MARKED "WATER METER" ; H-20 LOADING MANDATORY.

(5) DEVELOPER TO INSTALL SERVICE CHAMBER & SETTER C/W DOUBLE CHECK VALVES.

City of Langley

Engineering Department	DATE: 2001.08 REVISED: 2008.03.28 2010.01.15	SCALE: NTS
STANDARD DETAIL DRAWINGS	APPROVED BY: FC / GV	DRAWN BY: SJ / JQ
METER INSTALLATION 50mm ø AND UNDER		DRAWING NO. WTR–2

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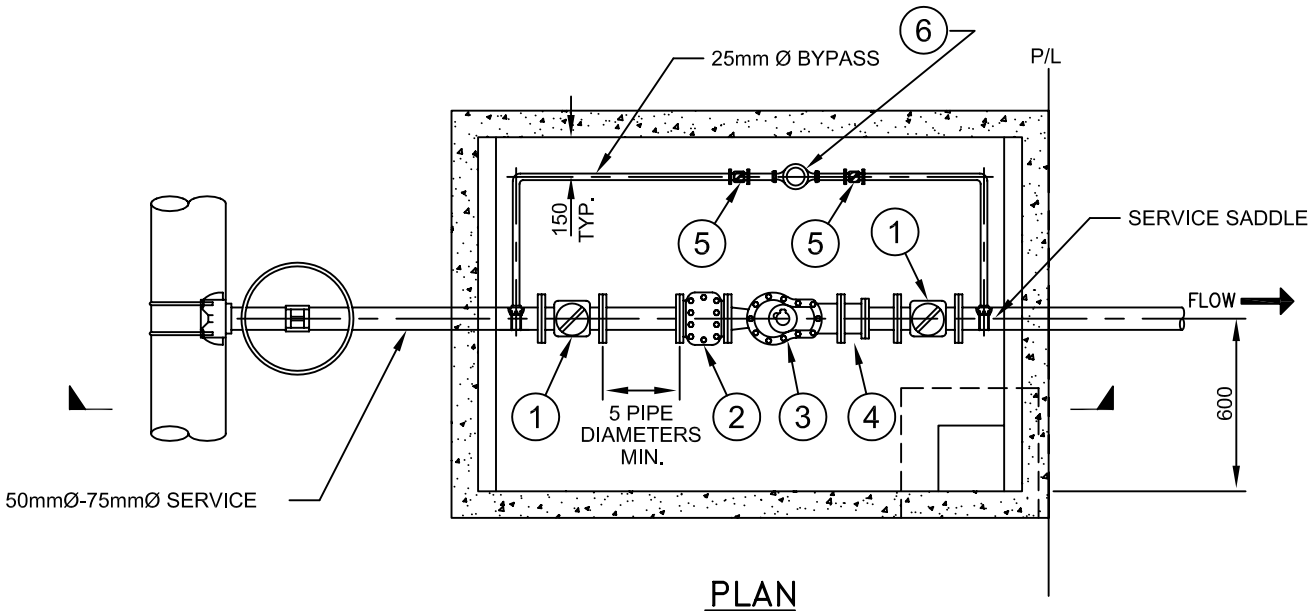
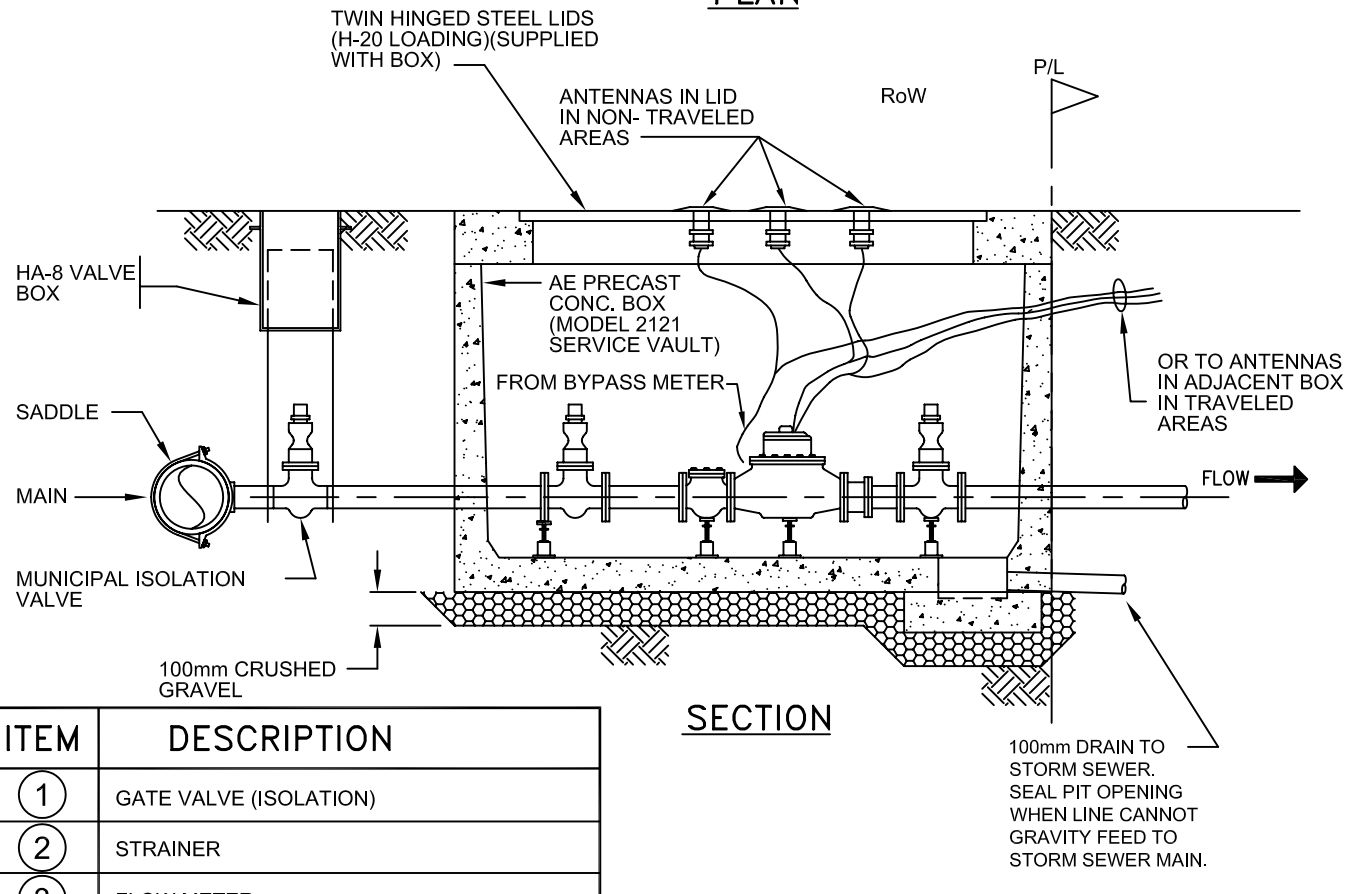


PLAN



SECTION

ITEM	DESCRIPTION
1	GATE VALVE (ISOLATION)
2	STRAINER
3	FLOW METER
4	FLANGE ADAPTOR
5	BYPASS BALL VALVE
6	BYPASS LINE WATER METER (LINE SIZED)

NOTES

1. PIPE CONNECTIONS MAY BE THREADED OR FLANGED.
2. ALL PIPE TO BE BRASS OR COPPER TUBE.
3. TEST POINT REQUIRED FOR 75mm AND LARGER METERS.

City of Langley

Engineering Department

STANDARD DETAIL DRAWINGS

DATE: May 2001
REVISED: 2010-01

APPROVED BY: FC / GV

SCALE: NTS

DRAWN BY: SJ / JQ

METER INSTALLATION
50MM ø TO 75MMø – COMPOUND

DRAWING NO. WTR–3

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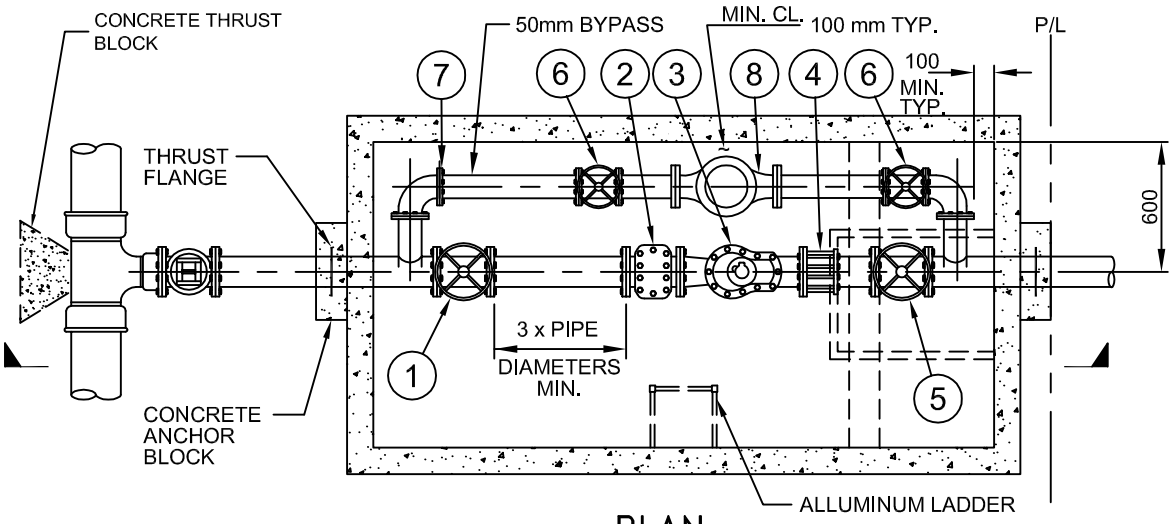

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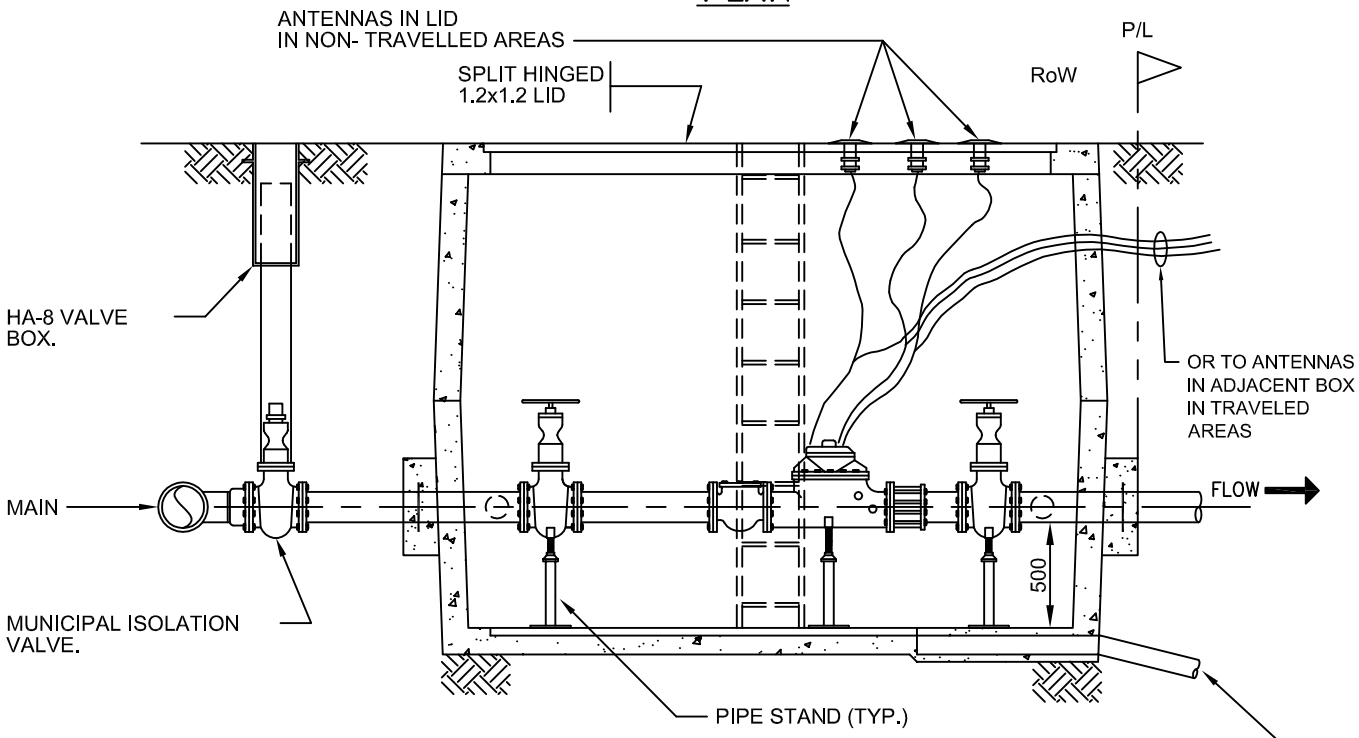

SECTION

NOTES

1. PIPING TO BE WELDED STEEL OR BRASS / COPPER.

ITEM	DESCRIPTION	ITEM	DESCRIPTION
1	UPSTREAM ISOLATION GATE VALVE	5	DOWNSTREAM ISOLATION GATE VALVE
2	STRAINER	6	BYPASS ISOLATION VALVE
3	COMPOUND WATER METER	7	VICTAULIC COUPLING OR APPROVED
4	FLANGE ADAPTOR	8	BYPASS WATER METER (LINE SIZE)

City of Langley

Engineering Department

STANDARD DETAIL DRAWINGS

DATE: August 2001
REVISED: 2010-01

APPROVED BY: FC/GV

SCALE: NTS

DRAWN BY: SJ / JQ

METER INSTALLATION 100mmø – 150mmø COMPOUND

DRAWING NO. WTR–4

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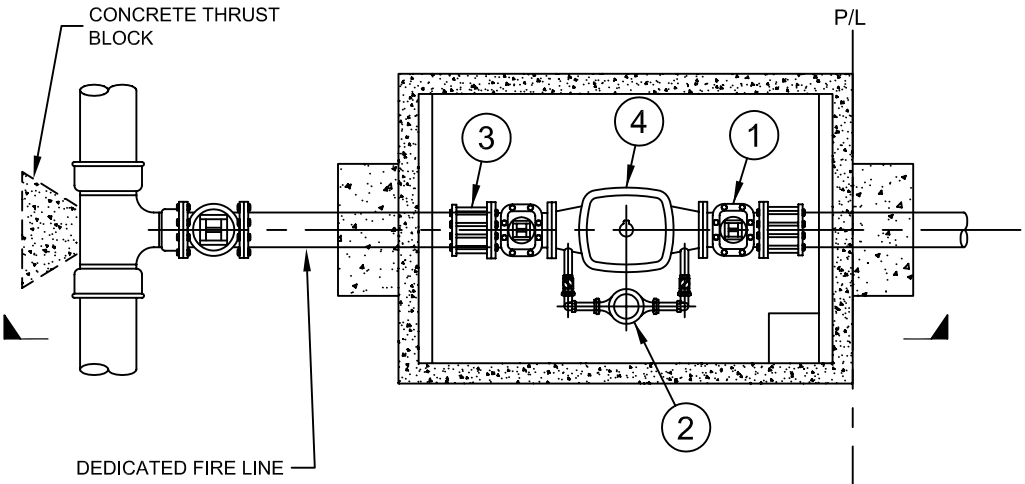

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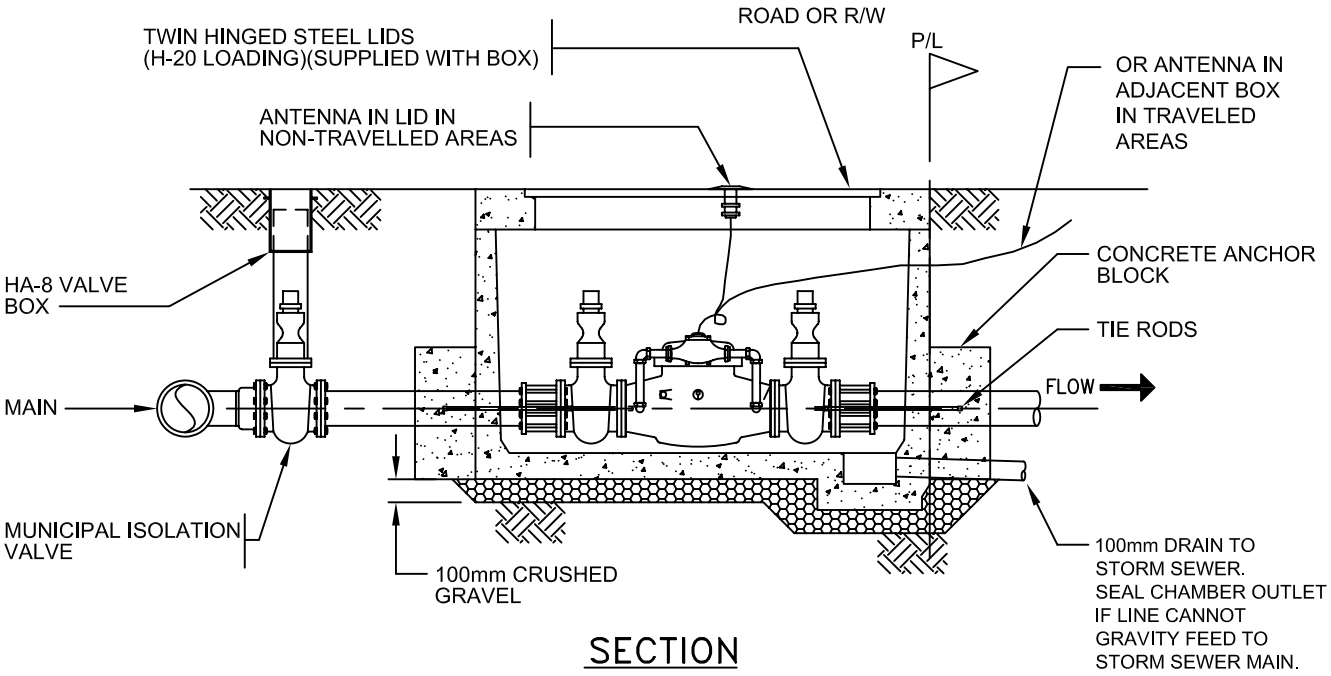

SECTION

ITEM	DESCRIPTION
1	GATE VALVE (ISOLATION)
2	NEPTUNE DETECTOR METER
3	FLANGE ADAPTOR
4	DOUBLE DETECTOR CHECK VALVE

VAULTS
100 - 150mm AE Concrete 2121 TYPE (SHOWN)
250mm AE CONCRETE 3151 TYPE

NOTES

1. ALL FITTINGS TO BE FLANGED.

City of Langley

Engineering Department

STANDARD DETAIL DRAWINGS

DATE: July 2003
REVISED: 2010-01

APPROVED BY: FC / GV

SCALE: NTS

DRAWN BY: SJ / JQ

DRAWING NO. WTR-5

100ø – 250ø
DEDICATED FIRE LINE ONLY w/ DETECTOR METER

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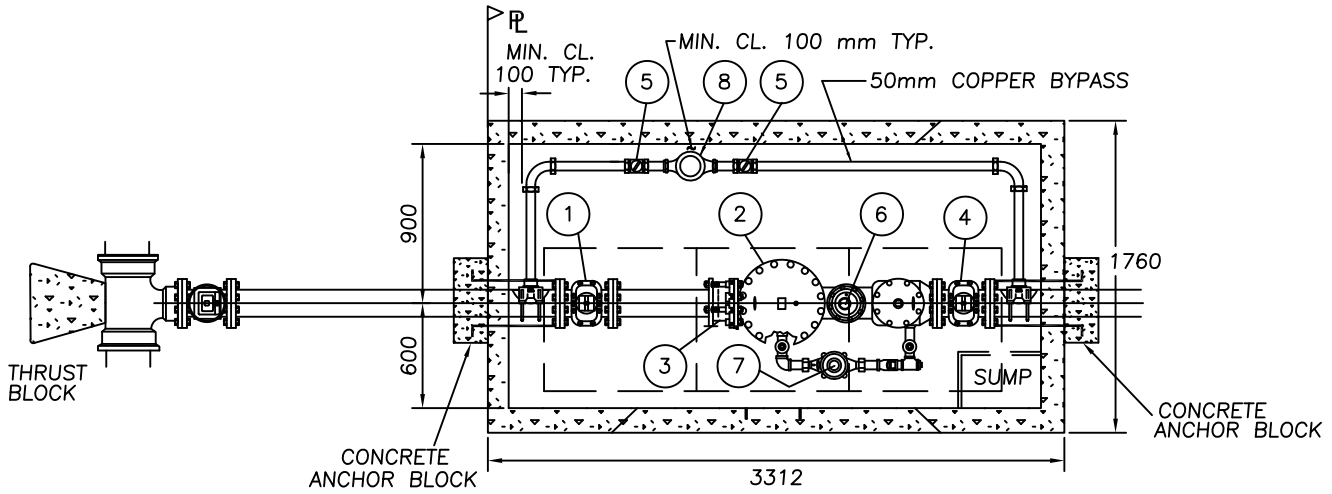

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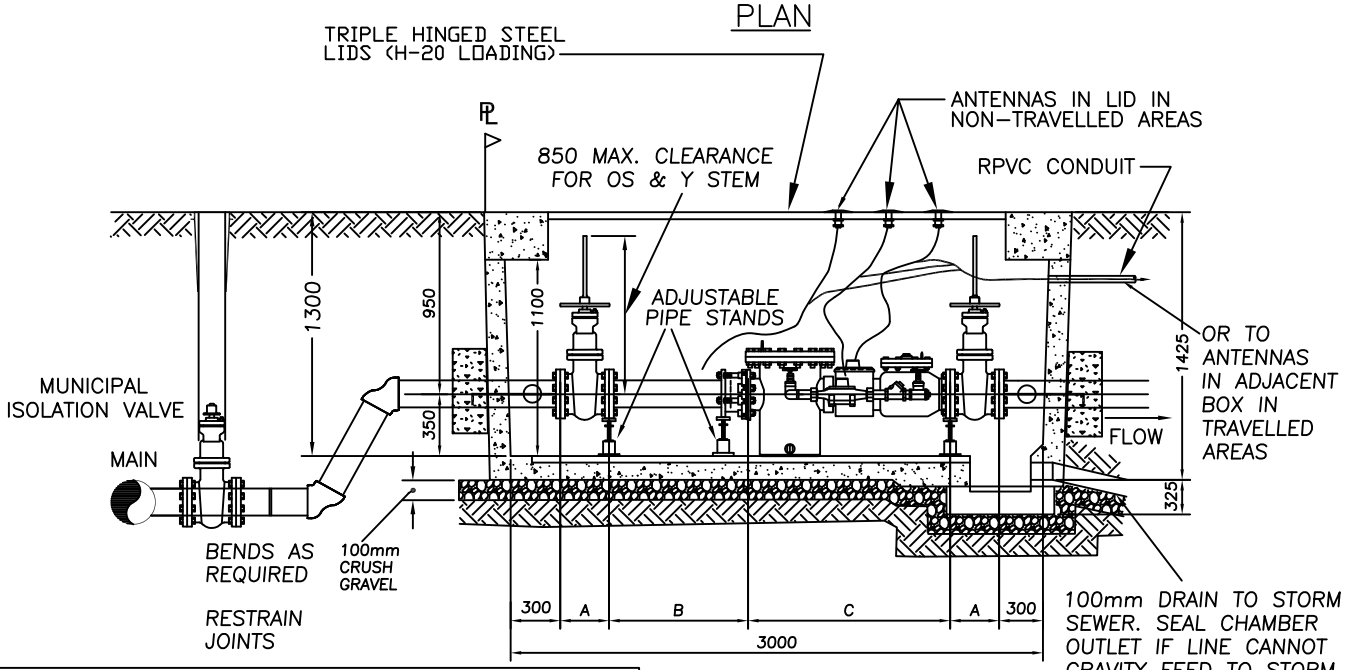

SECTION

No.	DESCRIPTION
1	UPSTREAM RESILENT SEAT GATE VALVE (OS & Y)
2	METER ASSEMBLY c/w BASKET STRAINER
3	MECHANICAL FLANGE ADAPTOR
4	DOWNSTREAM RESILENT SEAT GATE VALVE (OS & Y)
5	BYPASS BALL VALVE WITH LOCKWING
6	FIRE LINE METER
7	DOMESTIC LINE METER
8	BYPASS LINE METER (SAME SIZE AS BYPASS LINE)

DIMENSIONS	
METER	150ø
A	267
B	723
C*	1143

* VERIFY THIS DIMENSION WITH MANUFACTURER

NOTES

PIPE: TO BE TYPE K COPPER, BRASS EPOXY COATED WELDED STEEL, OR CEMENT LINED DUCTILE IRON

CONNECTIONS:

BRASS: IPT

COPPER: COMPRESSION OR VICTAULIC. NO SOLDER PERMITTED

STEEL & DUCTILE: FLANGED, "UNIFLANGE", "EZ FLANGE" OR VICTAULIC

VAULT:

1500mmx3000mm CHAMBER (AE CONCRETE, MODEL 3151)

City of Langley

Engineering Department

STANDARD DETAIL DRAWINGS

DATE: 2003-12
REVISED: 2010-01

APPROVED BY: FC GV

SCALE: NTS

DRAWN BY: ML/JQ

METER INSTALLATION
150mmø Fire/Domestic Meter

DRAWING NO. WTR-6

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