REGION OF WATERLOO

AND AREA MUNICIPALITIES

DESIGN GUIDELINES

AND SUPPLEMENTAL SPECIFICATIONS

FOR MUNICIPAL SERVICES

PART E

STANDARD DRAWINGS

& DESIGN SHEETS

REVISED: February 2012

STANDARD DRAWINGS AND FORMS

Note: For municipal servicing other than storm, sanitary and watermain, refer to the applicable municipal standard drawings.

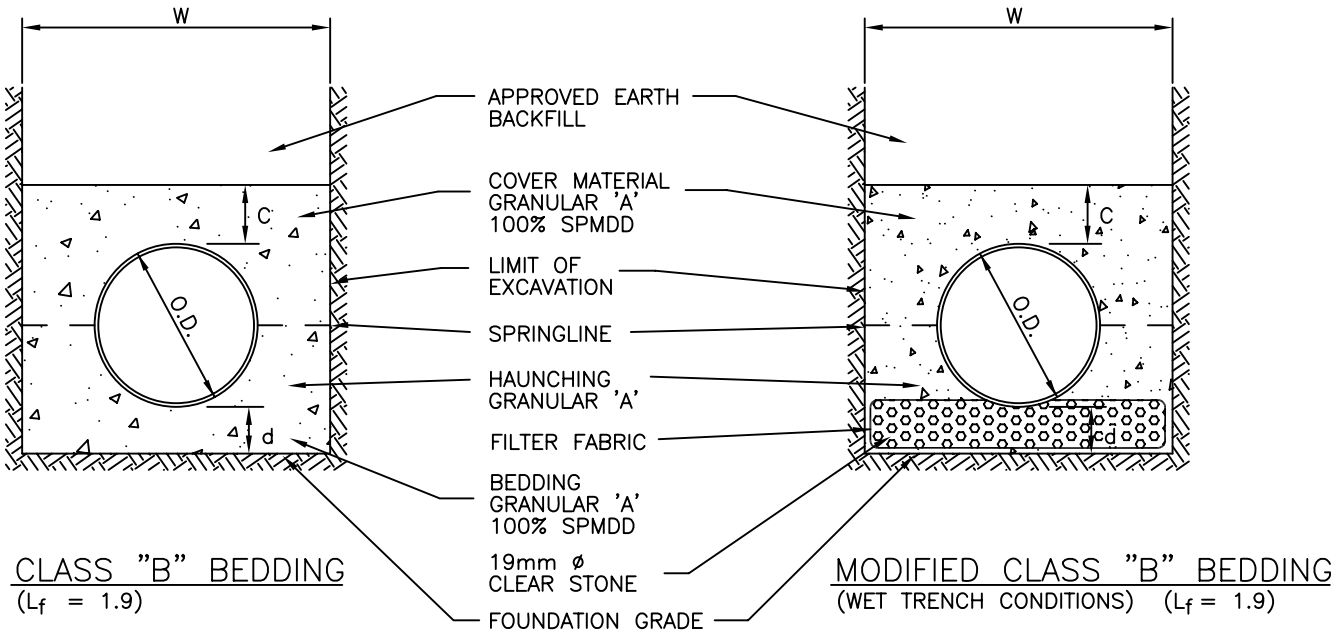
LIST OF DRAWINGS

NUMBER	DESCRIPTION
E1-01	Standard Bedding For Sewers and Watermains
E1-02	Maximum Pipe Sizes for Manholes
E2-01	Hydrant Installation **Revised February 2012**
E2-02	Valve and Box Installation Detail (up to 300 mm Ø) **Revised February 2012**
E2-04	Standard Water Service Connection Detail for Metallic Services (19 & 25 mm Ø)
E2-05	Standard Water Service Connection Detail for Non-Metallic Services (19 & 25 mm Ø) **Revised February 2012**
E2-06	Water Service Connection Detail (35 & 50 mm Ø Sizes) **Revised February 2012**
E2-07	Water Service Connection Detail (100 mm Ø or Larger) **Revised February 2012**
E2-09	Drain and/or Swab Retrieval Chamber (for PVC and Ductile Iron Pipe)
E2-10	Drain Chamber (for Concrete Pressure Pipe)
E2-11	Vent and Drain Detail
E2-12	Air & Vacuum Release Valve Chamber
E2-13	Flushing and Swab Retrieval Outlet (up to 300mm Ø)
~~E2-14~~	~~Standard Cadweld Connection~~ **Deleted February 2012**
E2-15	Anode Installation and Wire Connections Revised Jan. 2010
E2-16	Typical CPP Shop Drawing Minimum Detail Required
E2-17	Typical Water Connection Schematic
E4-01	Catchbasin Frame with Fish Pattern
E4-02	Catchbasin with Slotted Drain
E4-03	Side Inlet Catchbasin Revised Jan. 2010
E4-041	Side Inlet Catchbasin Frame and Cover Detail
E4-042	Side Inlet Catchbasin Cover (Fish Pattern)
E4-05	Internal Grate for Concrete Pipe
E4-06	Rodent Grate for Attachment to Outlet

LIST OF DESIGN SHEETS

NUMBER	DESCRIPTION
E-DS1	Hydrostatic Pressure Test Template
E-DS2	Tracer Wire Conductivity Test Template
E-T1	Watermain Commissioning Plan

NOMINAL PIPE INSIDE DIAMETER D (mm)	MINIMUM TRENCH WIDTH W (mm)	MINIMUM BEDDING BELOW d (mm)	MINIMUM COVER OVER PIPE C (mm)
RIGID PIPE			
675 or less	O.D. + 600	150	300
greater than 900 to less than 2100	O.D. + 600	0.15 + 1/2 O.D.	300
2100 & over	O.D. + 1000	300	300
FLEXIBLE PIPE			
Under 1200	O.D. + 600	150	300



BEDDING FOR RIGID AND FLEXIBLE PIPE SEWERS

NOTES:

1. O.D. = OUTSIDE DIAMETER OF PIPE.
2. IN ROCK TRENCHES, BEDDING DEPTH (d) BELOW WATERMAINS AND SEWER PIPES SHALL BE INCREASED TO 300mm.
3. FOR PURPOSE OF CONTRACT SPECIFICATIONS BEDDING INCLUDES BEDDING HAUNCHING & COVER MATERIAL.
4. IN WET TRENCH CONDITIONS 19mm ø CLEAR STONE MAY BE USED TO INVERT OF PIPE. THE BEDDING BELOW INVERT SHALL BE WRAPPED IN FILTER FABRIC (TERRAFIX 270 R OR APPROVED EQUAL) WHERE DIRECTED BY THE ENGINEER.
5. GRANULAR "A" BEDDING SHALL NOT CONTAIN RECYCLED ASPHALT

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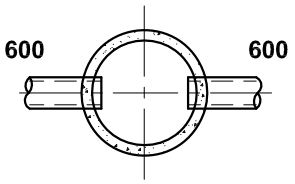
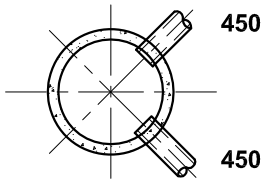
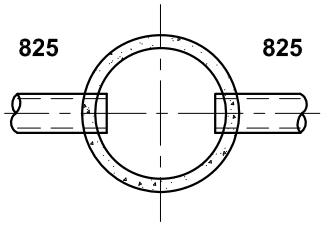
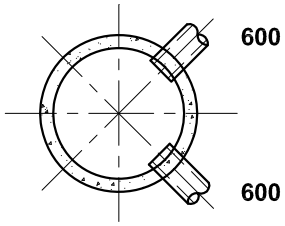
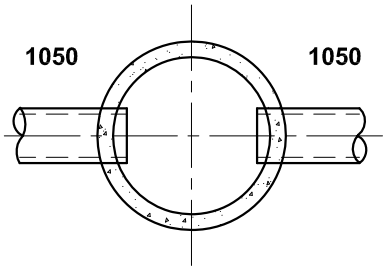
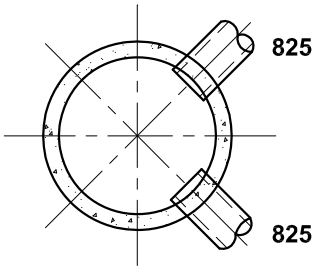
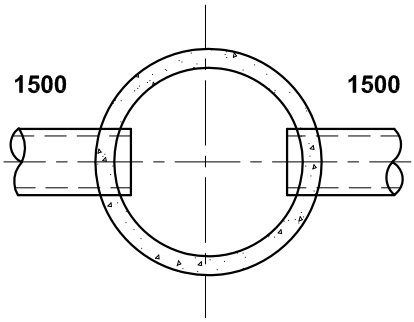
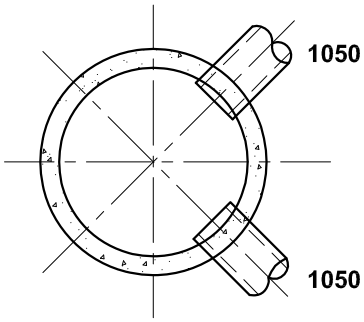
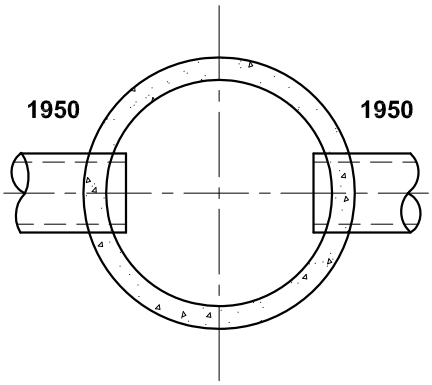
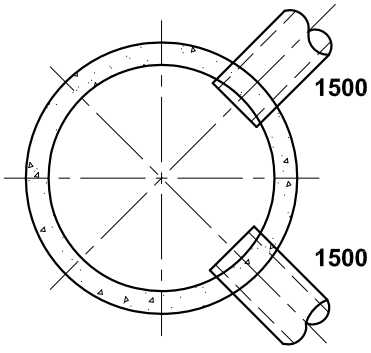
STANDARD BEDDING FOR SEWERS AND WATERMAINS

SSMS

E1 - 01

Maintenance Hole Inside Diameter (mm)	Max. Pipe Size for Straight Through Installation (mm)	Max. Pipe Size for Right Angle Installation (mm)	Remarks
1200			ALL DIMENSIONS ARE FOR CONCRETE PIPE KNOCKOUTS FOR SMALL DIAMETER LATERALS (i.e. 250mm or 300mm) COULD BE PROVIDED IN ADDITION TO WHAT IS SHOWN
1500			
1800			
2400			
3000			

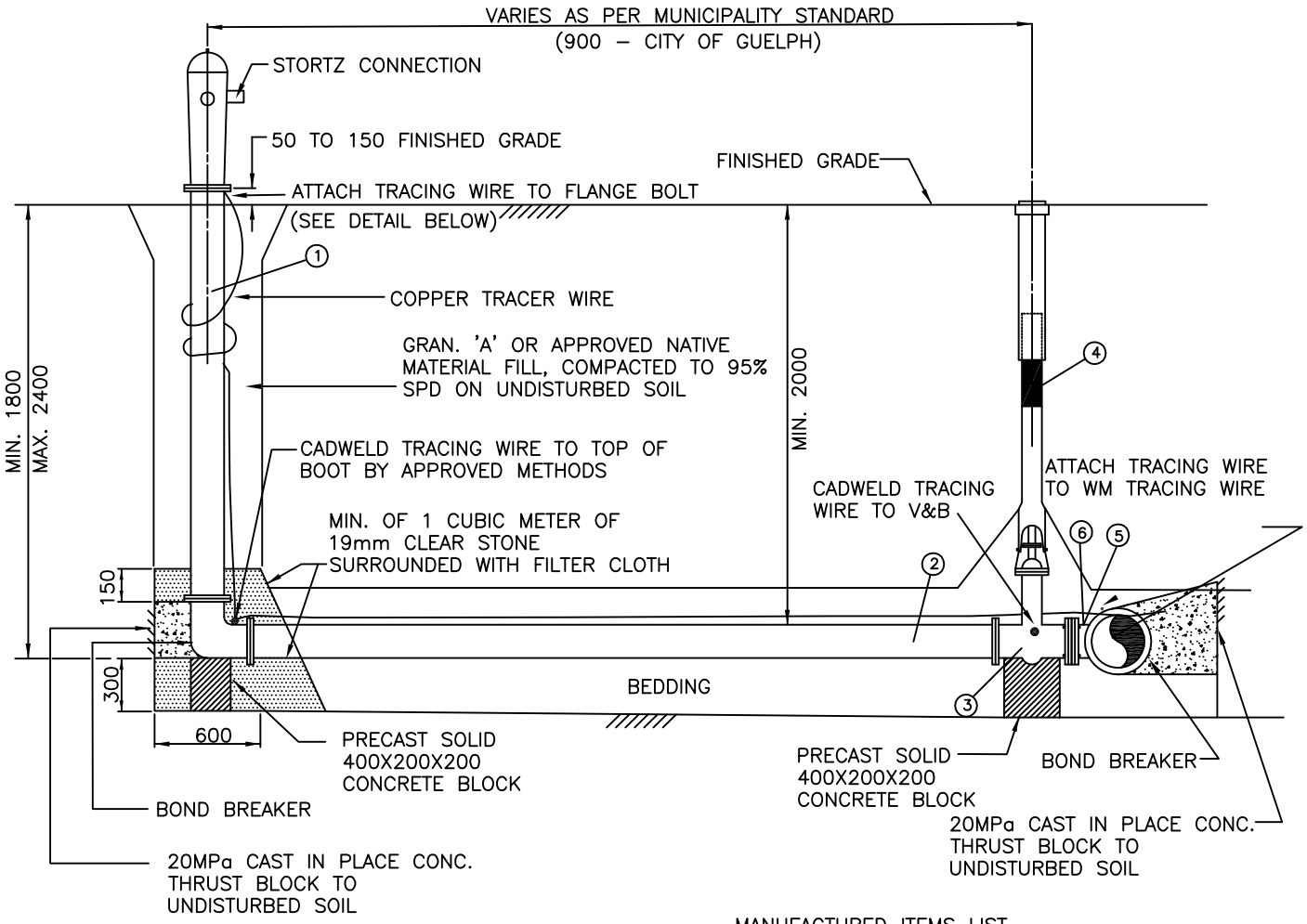
REGION OF WATERLOO AND AREA MUNICIPALITIES STANDARD DRAWINGS

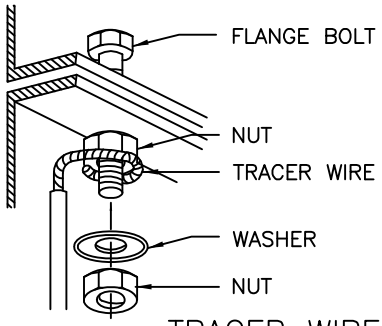
REVISION DATE: FEB. 2008

MAXIMUM PIPE SIZES FOR MANHOLES

SSMS

E1 - 02





TRACER WIRE DETAIL

MANUFACTURED ITEMS LIST

① REGULAR 150mmø BARREL, USE EXTENSION IF REQUIRED.
② MINIMUM DIA. PIPE FOR HYDRANT LEADS TO BE 150mmø.
③ MINIMUM SIZE M.J. GATE VALVE TO BE 150mmø.
④ VALVE BOX
⑤ USE ANCHOR TEE UP TO AND INCLUDING 450mmø (EXCEPT IN GUELPH).
⑥ ALL TEES, USE MECHANICAL RESTRAINTS.

NOTES:

1. HYDRANT TO BE SET PLUMB WITH STEM EXTENSIONS TO SUIT DEPTH OF BRANCH. BRANCH TO BE SET LEVEL. EXTENSIONS TO BE INSTALLED BETWEEN UPPER AND LOWER BARREL SECTION. ONLY ONE EXTENSION (MAX. 1.0m LONG) PER HYDRANT. IF MORE HEIGHT IS REQUIRED, THEN A LONGER BARREL SHALL BE USED.
2. ALL BLOCKING TO BE AGAINST UNDISTURBED TRENCH WALL.
3. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SPECIFIED.
4. BOND BREAKER TO BE USED BETWEEN CONCRETE AND FITTINGS.
5. CORROSION PROTECTION SHALL BE AFFIXED AS PER STANDARD SPECIFICATIONS FOR WATERMAIN CONSTRUCTION.
6. NO BENDS ON HYDRANT LEADS UNLESS APPROVED.
7. ALL JOINTS TO BE FULLY RESTRAINED FROM HYDRANT BOOT TO TEE.
8. PLUG DRAIN HOLE IN HIGH WATER TABLE.
9. HYDRANTS SHALL BE CLEAR OF OBSTRUCTIONS FOR A DISTANCE OF 0.6m REAR, 2.0m ON SIDES AND CLEAR TO CURB IN FRONT.
10. SEE DRAWING **203** FOR CITY OF KITCHENER HYDRANT INSTALLATION.

REGION OF WATERLOO AND AREA MUNICIPALITIES STANDARD DRAWINGS

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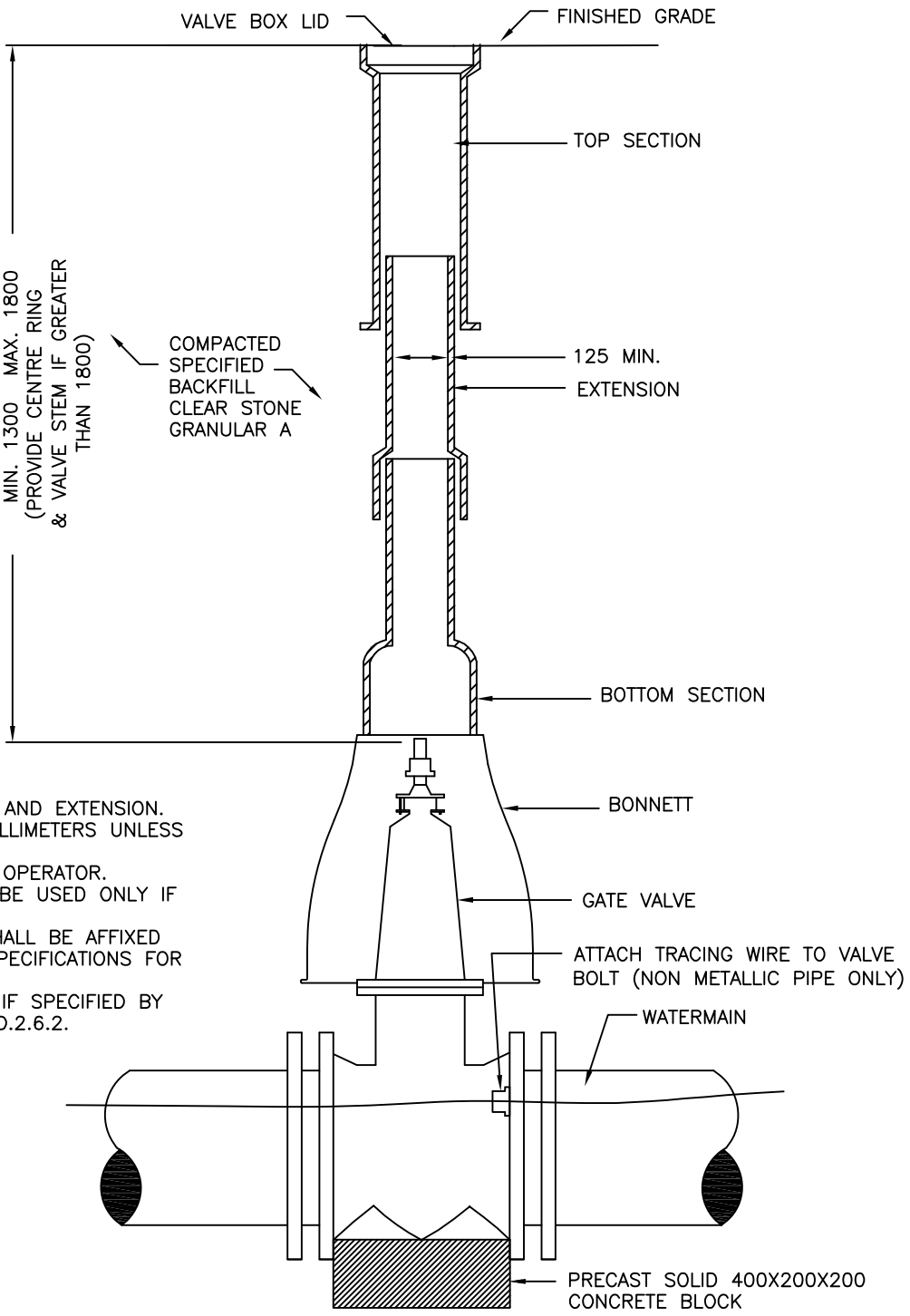
HYDRANT INSTALLATION

SSMS

E2 - 01



NOTES:
1. PROVIDE SCREW TYPE BOX AND EXTENSION.
2. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SPECIFIED.
3. INSTALL BOX PLUMB OVER OPERATOR.
4. VALVE BOX EXTENSION TO BE USED ONLY IF REQUIRED.
5. CORROSION PROTECTION SHALL BE AFFIXED AS PER SSMS STANDARD SPECIFICATIONS FOR WATERMAIN CONSTRUCTION.
6. TRACER WIRE TO SURFACE IF SPECIFIED BY THE MUNICIPALITY AS PER D.2.6.2.

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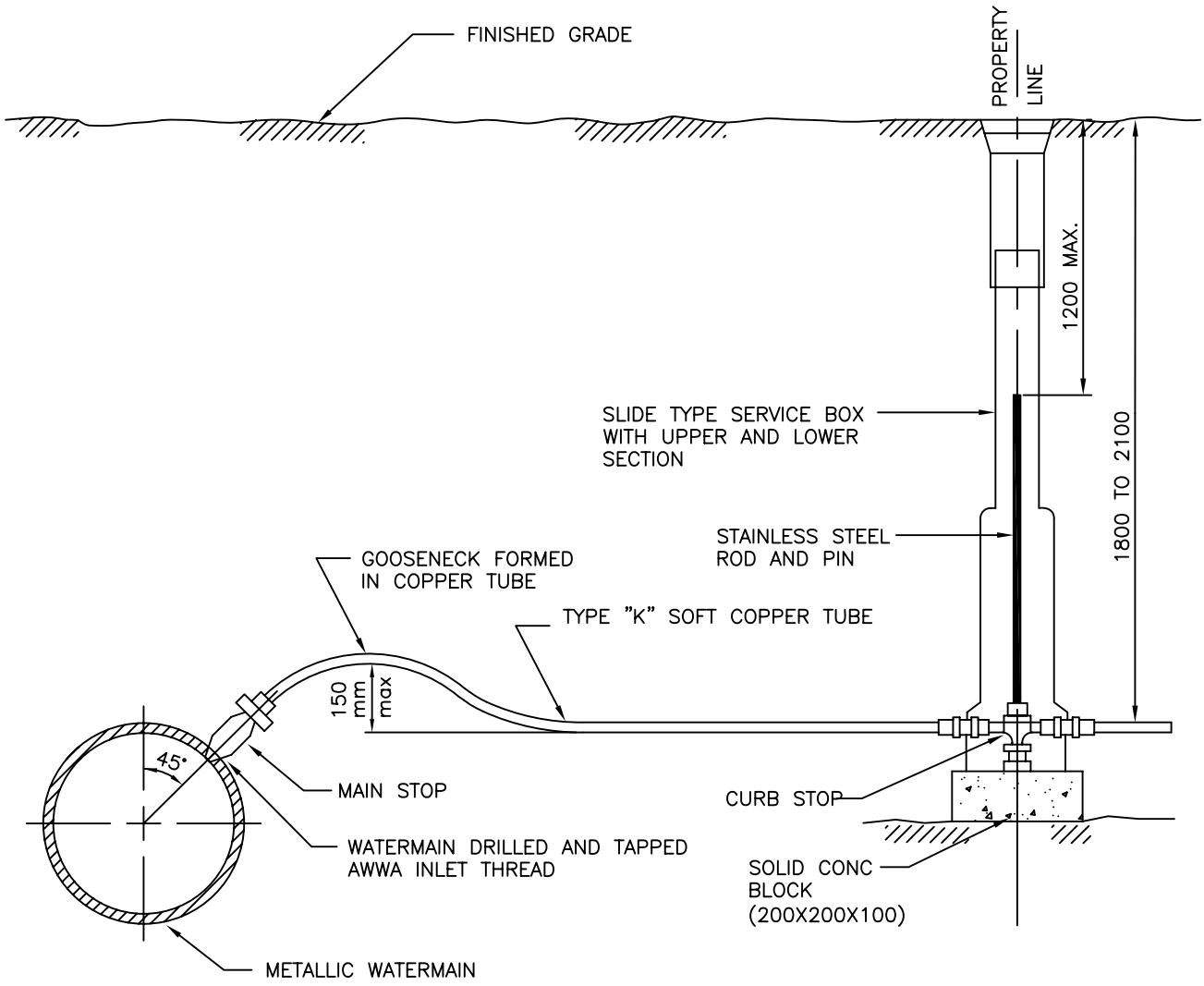
VALVE AND BOX INSTALLATION DETAIL (UP TO 300mm DIAMETER)

SSMS

E2 - 02



NOTES:
1. UNION COUPLINGS WILL NOT BE PERMITTED UNLESS THE SERVICE LENGTH EXCEEDS 20M AND UNIONS SHALL NOT BE PLACED UNDERNEATH ROADWAYS.
2. ALL WATER SERVICES TO BE INSTALLED 90° TO THE LONGITUDINAL AXIS OF THE WATERMAIN.
3. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SHOWN.
4. CORROSION PROTECTION SHALL BE AFFIXED AS PER SSMS STANDARD SPECIFICATIONS FOR WATERMAIN CONSTRUCTION.

REGION OF WATERLOO AND AREA MUNICIPALITIES STANDARD DRAWINGS

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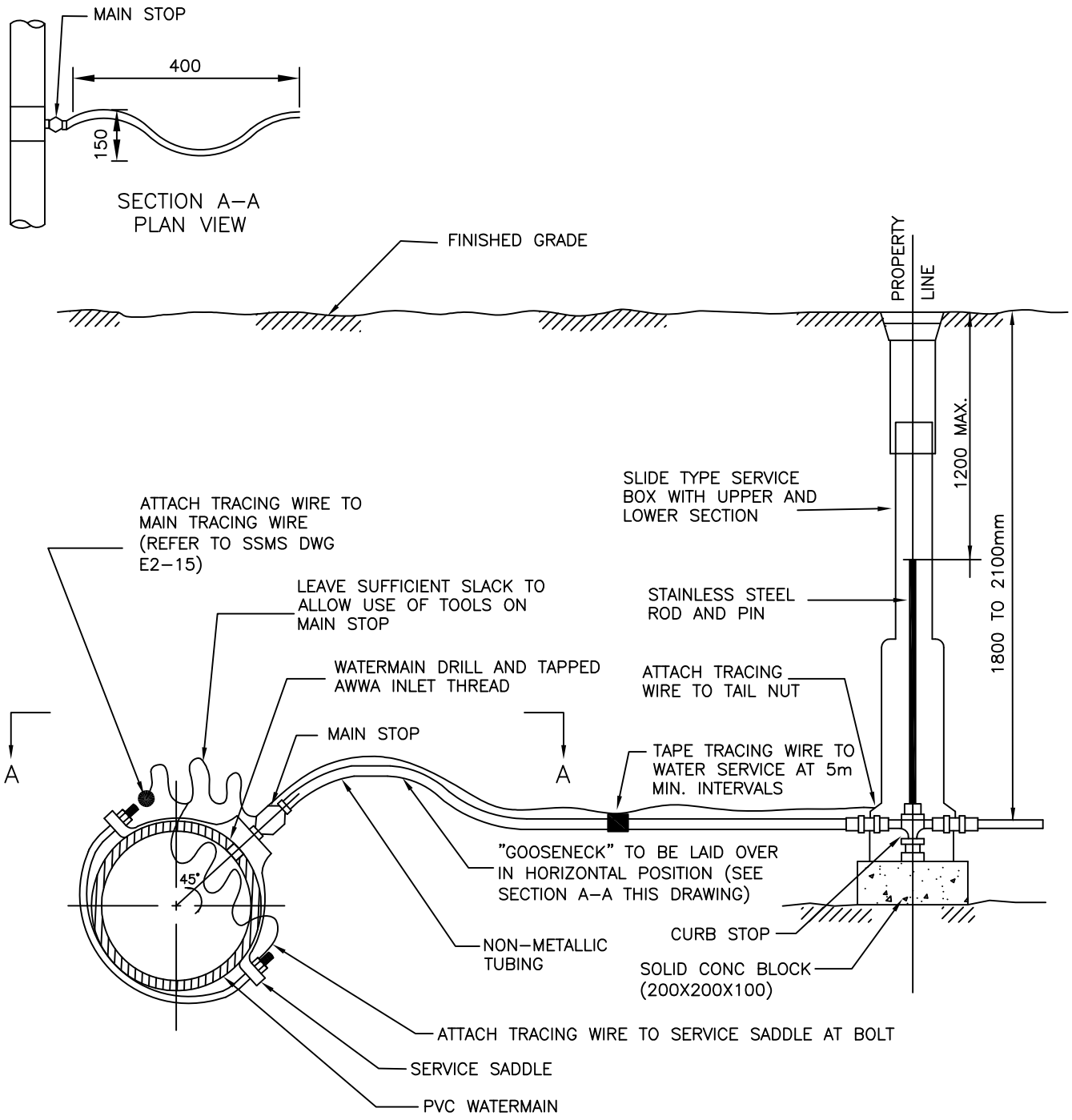
STANDARD WATER SERVICE CONNECTION DETAIL FOR METALLIC SERVICES 19mm AND 25mm DIAMETER SIZES

SSMS

E2 - 04



NOTES:

1. CONNECTIONS TO PLASTIC MAINS TO BE MADE USING SERVICE SADDLES OR FACTORY MADE TEES.
2. UNION COUPLINGS WILL NOT BE PERMITTED UNLESS THE SERVICE LENGTH EXCEEDS 20M AND UNIONS SHALL NOT BE PLACED UNDERNEATH ROADWAYS.
3. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SHOWN.
4. CORROSION PROTECTION SHALL BE AFFIXED AS PER SSMS STANDARD SPECIFICATIONS FOR WATERMAIN CONSTRUCTION.
5. THE TRACING WIRE IS TO BE CONNECTED AT THREE LOCATIONS: THE MAIN TRACING WIRE, THE SADDLE/MAIN STOP (AT BOLT) AND THE CURB STOP (AT TAIL NUT).

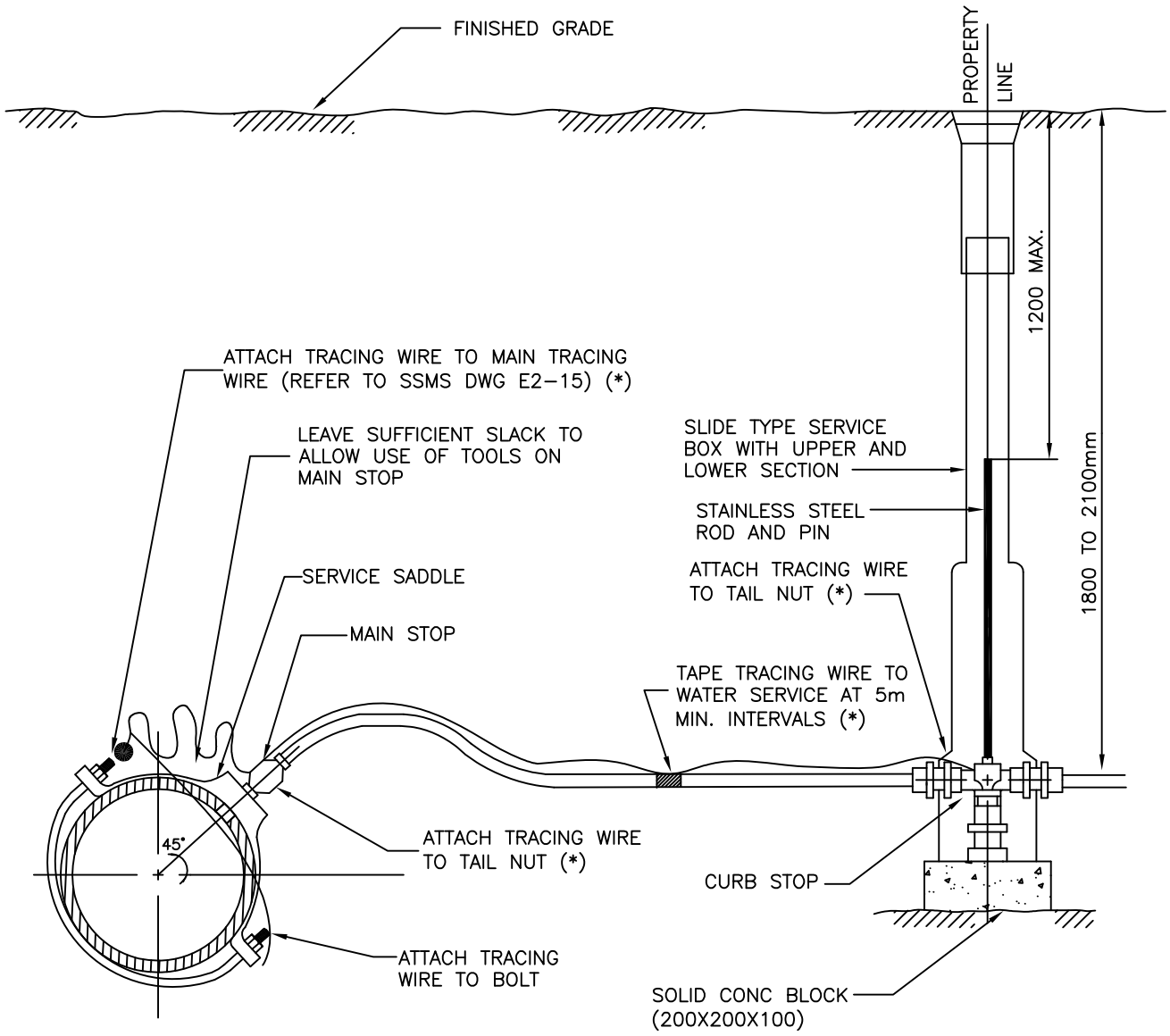
REGION OF WATERLOO AND AREA MUNICIPALITIES STANDARD DRAWINGS

REVISION DATE: FEB 2012

STANDARD WATER SERVICE CONNECTION DETAIL FOR NON-METALLIC SERVICES 19mm AND 25mm DIAMETER SIZES

SSMS

E2 - 05



(*) TRACING WIRE TO BE USED ONLY ON PLASTIC SERVICE CONNECTIONS

NOTES:
1. ANY JUNCTION MADE IN SERVICE PIPE BETWEEN MAIN STOP AND CURB STOP TO BE MADE WITH APPROVED COUPLINGS.
2. ALL WATER SERVICES TO BE INSTALLED 90° TO THE LONGITUDINAL AXIS OF THE WATERMAIN.
3. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SHOWN.
4. CORROSION PROTECTION SHALL BE AFFIXED AS PER SSMS STANDARD SPECIFICATIONS FOR WATERMAIN CONSTRUCTION.
5. THE TRACING WIRE IS TO BE CONNECTED AT THREE LOCATIONS: THE MAIN TRACING WIRE, THE SADDLE/MAIN STOP (AT BOLT) AND THE CURB STOP (AT TAIL NUT).

REGION OF WATERLOO AND AREA MUNICIPALITIES STANDARD DRAWINGS

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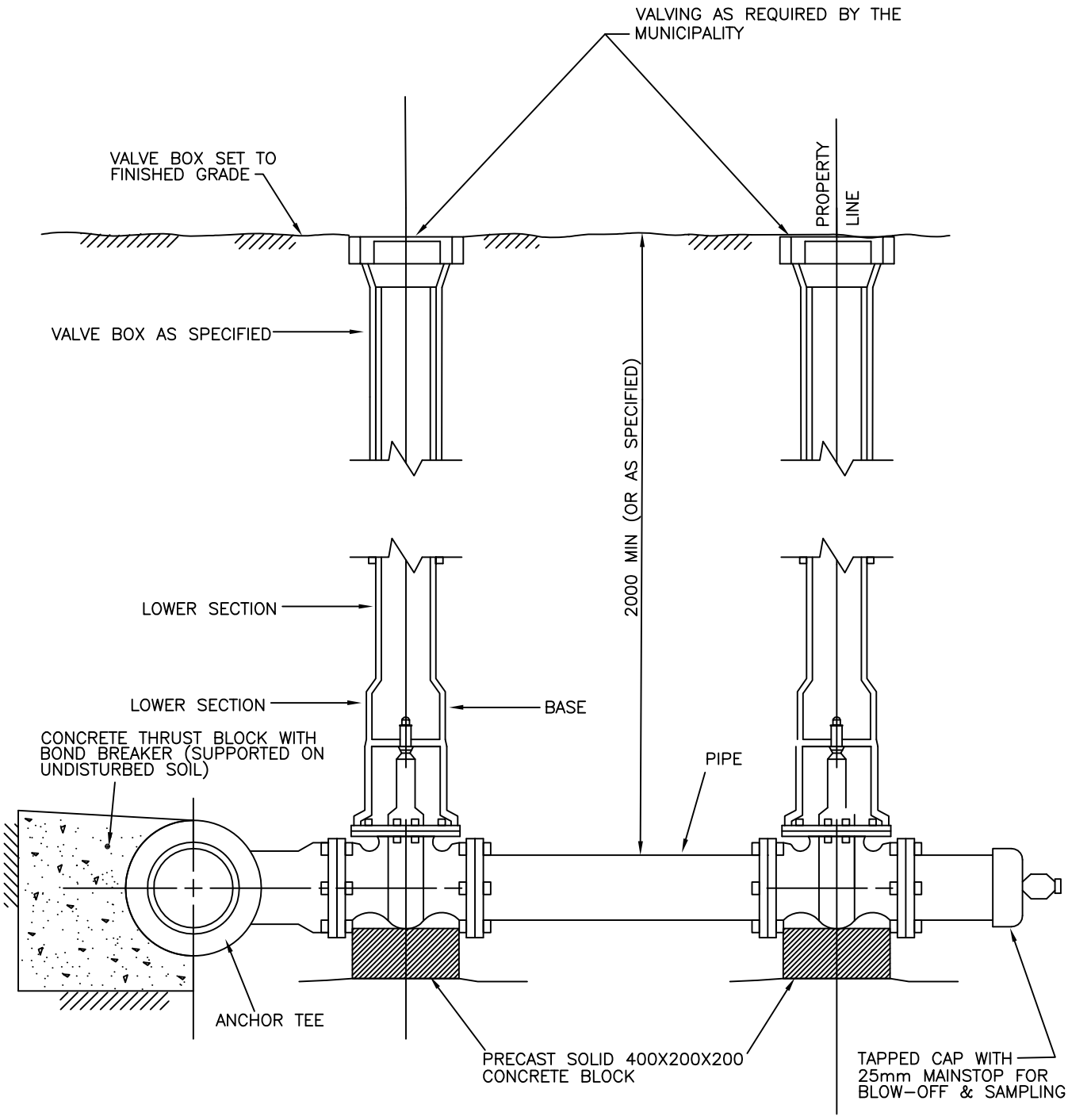
WATER SERVICE CONNECTION DETAIL
38mm AND 50mm DIAMETER SIZES

SSMS

E2 - 06



NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE SPECIFIED.
2. CONCRETE STRENGTH TO BE NOT LESS THAN 20MPa FOR THRUST BLOCKS.
3. FULLY RESTRAIN FROM WATERMAIN TO VALVE & BOX AT PROPERTY LINE.
4. ALL TEES, USE MECHANICAL RESTRAINTS. VALVE TO BE INSTALLED WITHIN 1m IN DISTANCE FROM MAIN.

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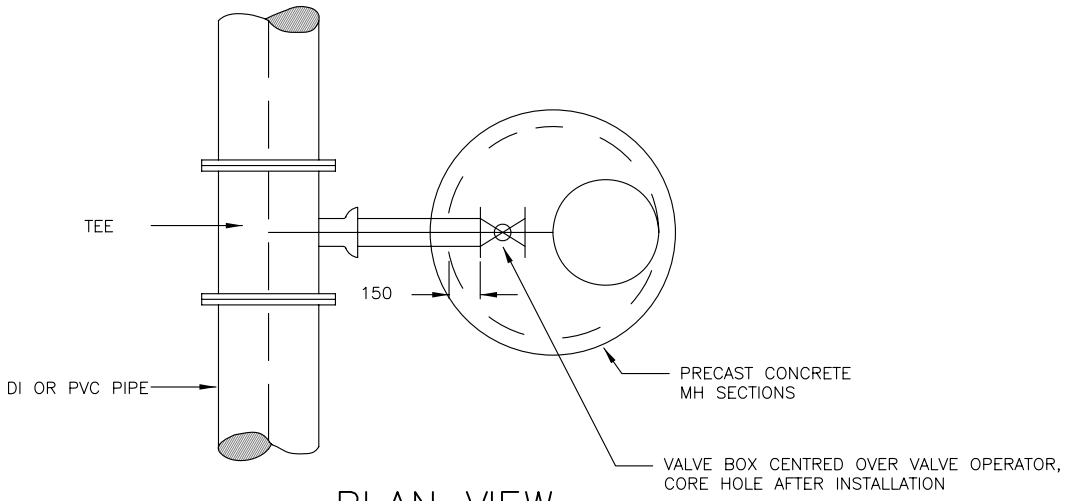
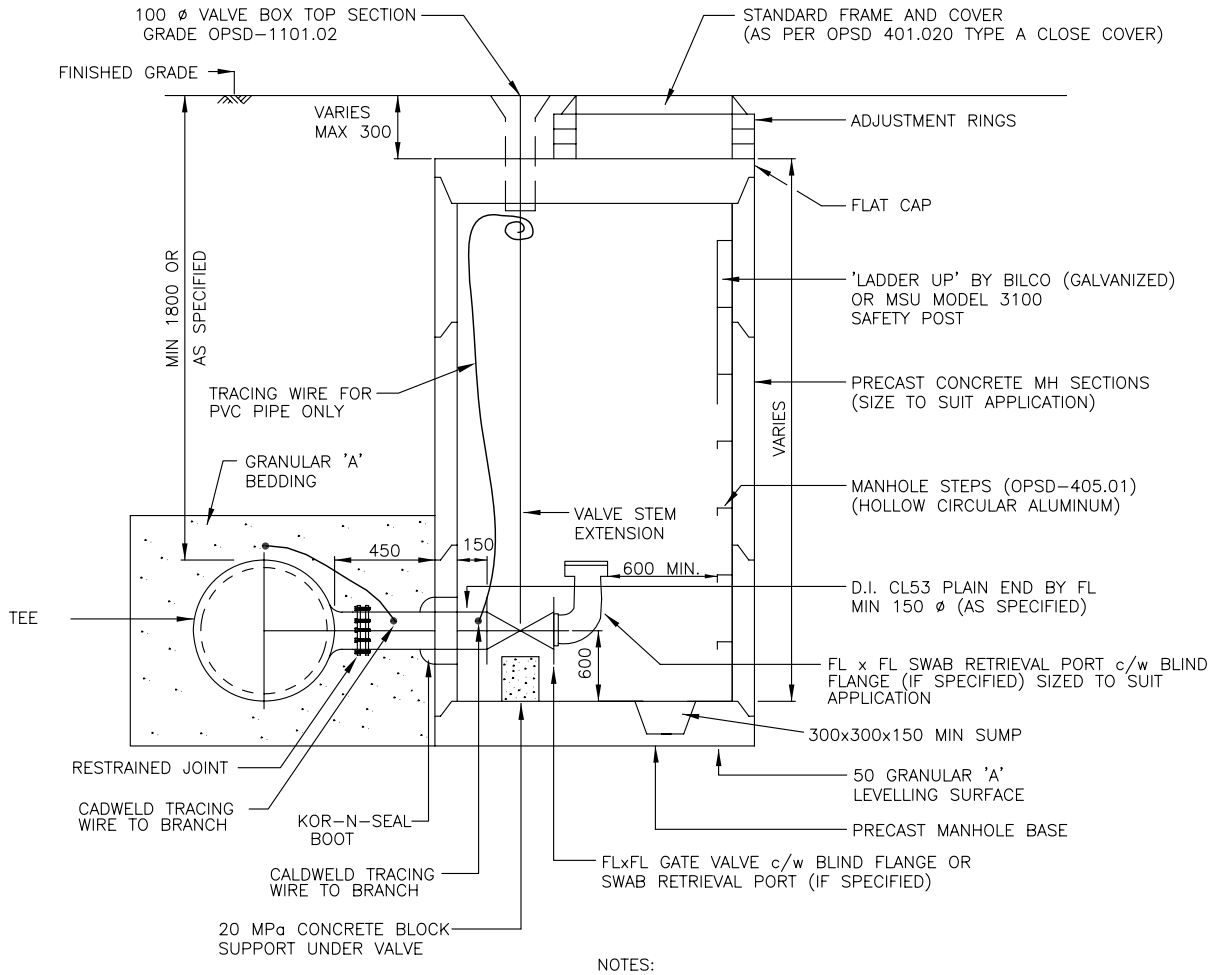
WATER SERVICE CONNECTION DETAIL 100mm OR LARGER

SSMS

E2 - 07



PLAN VIEW



SECTION

NOTES:
1. CHAMBER TO HAVE KOR-N-SEAL BOOT.
2. BACKFILL WITH SELECT SUBGRADE MATERIAL IN ACCORDANCE WITH OPSS 1010 AND COMPACT TO 95% S.P.D.
3. ALL JOINTS AND LIFTING HOLES TO BE SEALED WITH NON-SHRINK GROUT, INSIDE AND OUTSIDE.
4. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SPECIFIED.
5. ALL JOINTS TO BE FULLY RESTRAINED.
6. FOR DRAIN CHAMBER USE ONLY A 1200mmø CHAMBER AND 150mmø VALVE.

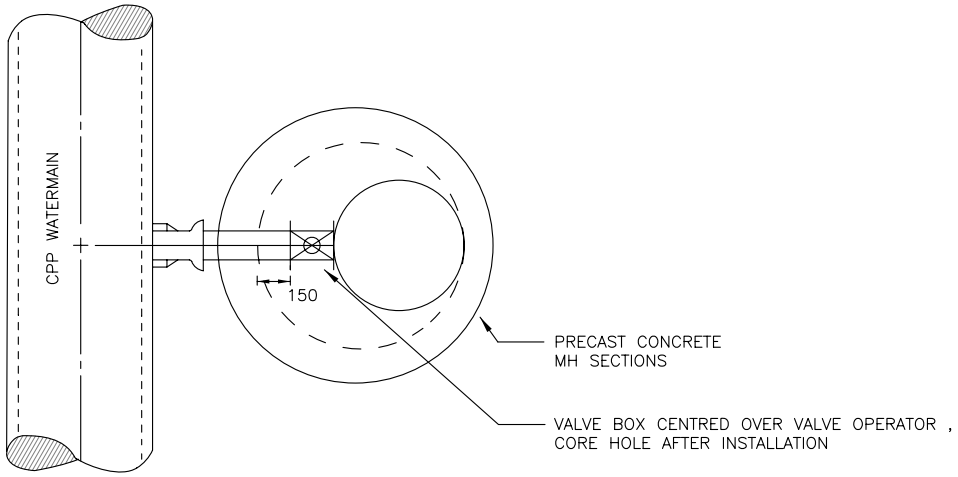
REGION OF WATERLOO AND AREA MUNICIPALITIES STANDARD DRAWINGS

REVISION DATE: FEB. 2008

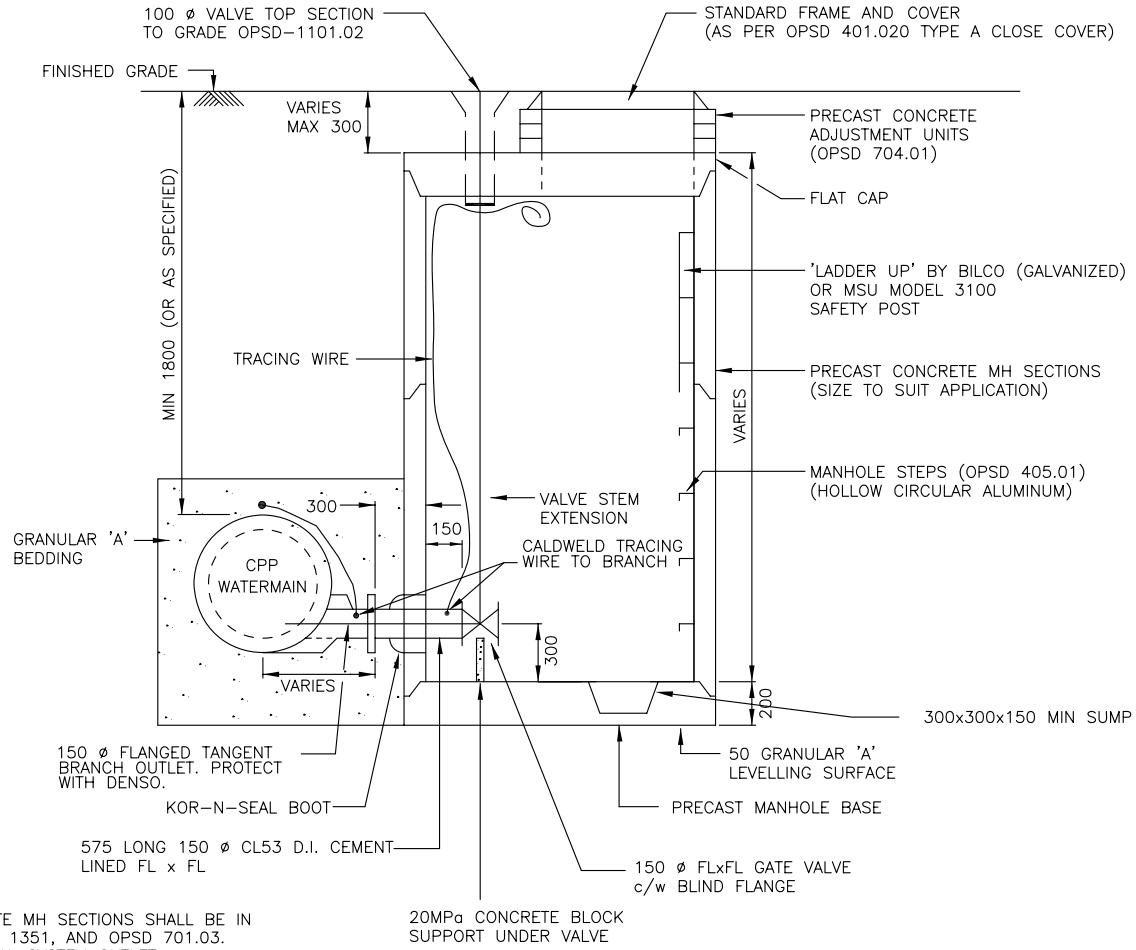
DRAIN AND/OR SWAB RETRIEVAL CHAMBER (FOR PVC AND DUCTILE IRON PIPE)

SSMS

E2 - 09



PLAN VIEW



NOTES:
1. REINFORCED PRECAST CONCRETE MH SECTIONS SHALL BE IN ACCORDANCE WITH OPSS 07 & 1351, AND OPSD 701.03.
2. CHAMBER TO HAVE KOR-N-SEAL SYSTEM OUTLET.
3. BACKFILL WITH SELECT SUBGRADE MATERIAL IN ACCORDANCE WITH OPSS 1010 AND COMPACT TO 95% S.P.D.
4. ALL JOINTS AND LIFTING HOLES TO BE SEALED WITH NON-SHRINK GROUT, INSIDE AND OUTSIDE.
5. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SPECIFIED.
6. ALL JOINTS TO BE FULLY RESTRAINED.

REGION OF WATERLOO AND AREA MUNICIPALITIES STANDARD DRAWINGS

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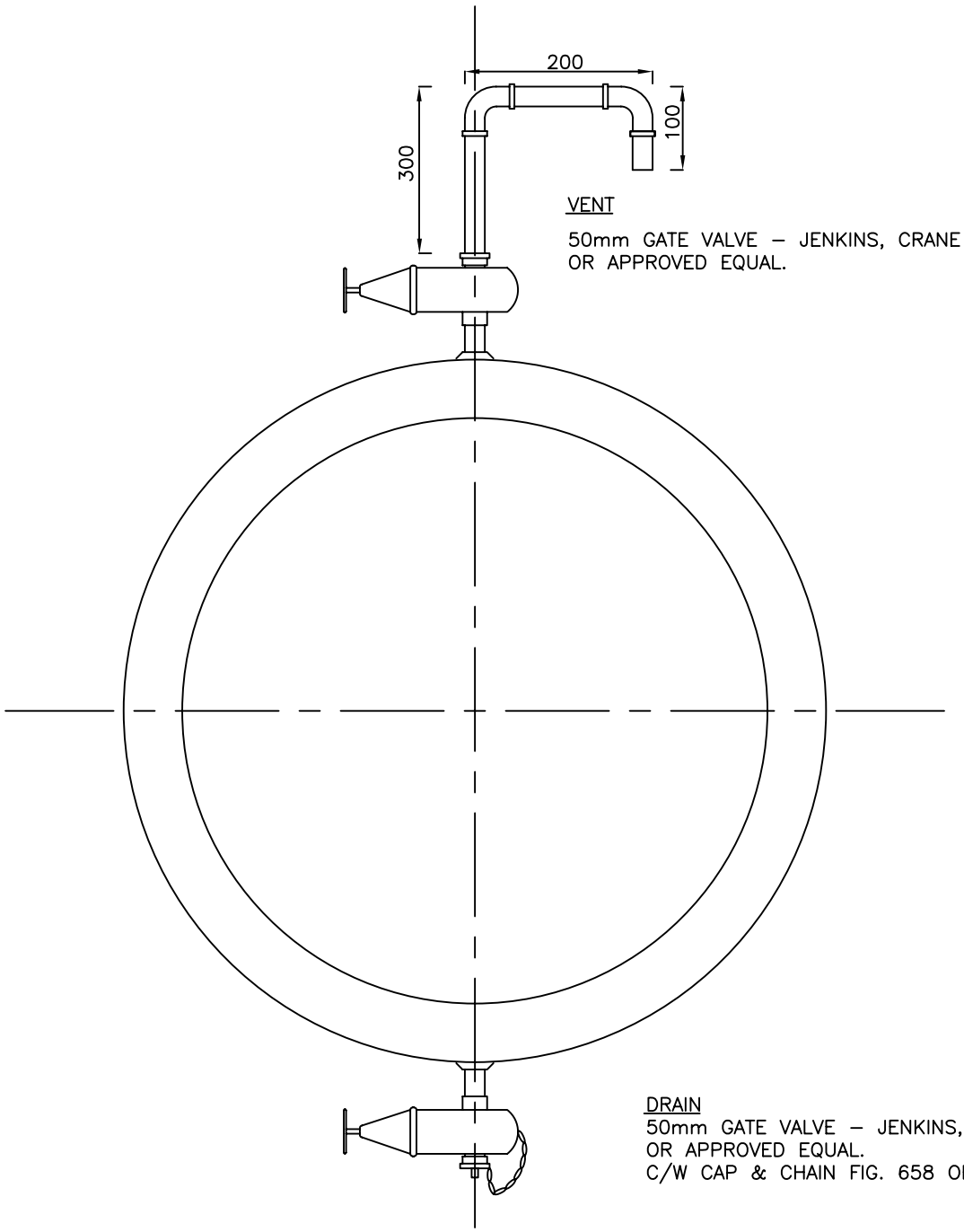
DRAIN CHAMBER (FOR CONCRETE PRESSURE PIPE)

SSMS

E2 - 10



VENT

50mm GATE VALVE – JENKINS, CRANE 1700
OR APPROVED EQUAL.

DRAIN

50mm GATE VALVE – JENKINS, CRANE 1700
OR APPROVED EQUAL.
C/W CAP & CHAIN FIG. 658 OR EQUAL.

PIPE

S.P.S. BRASS OR COPPER (THREADED)
MIN. WALL 4mm

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE SPECIFIED.

REGION OF WATERLOO AND AREA MUNICIPALITIES STANDARD DRAWINGS

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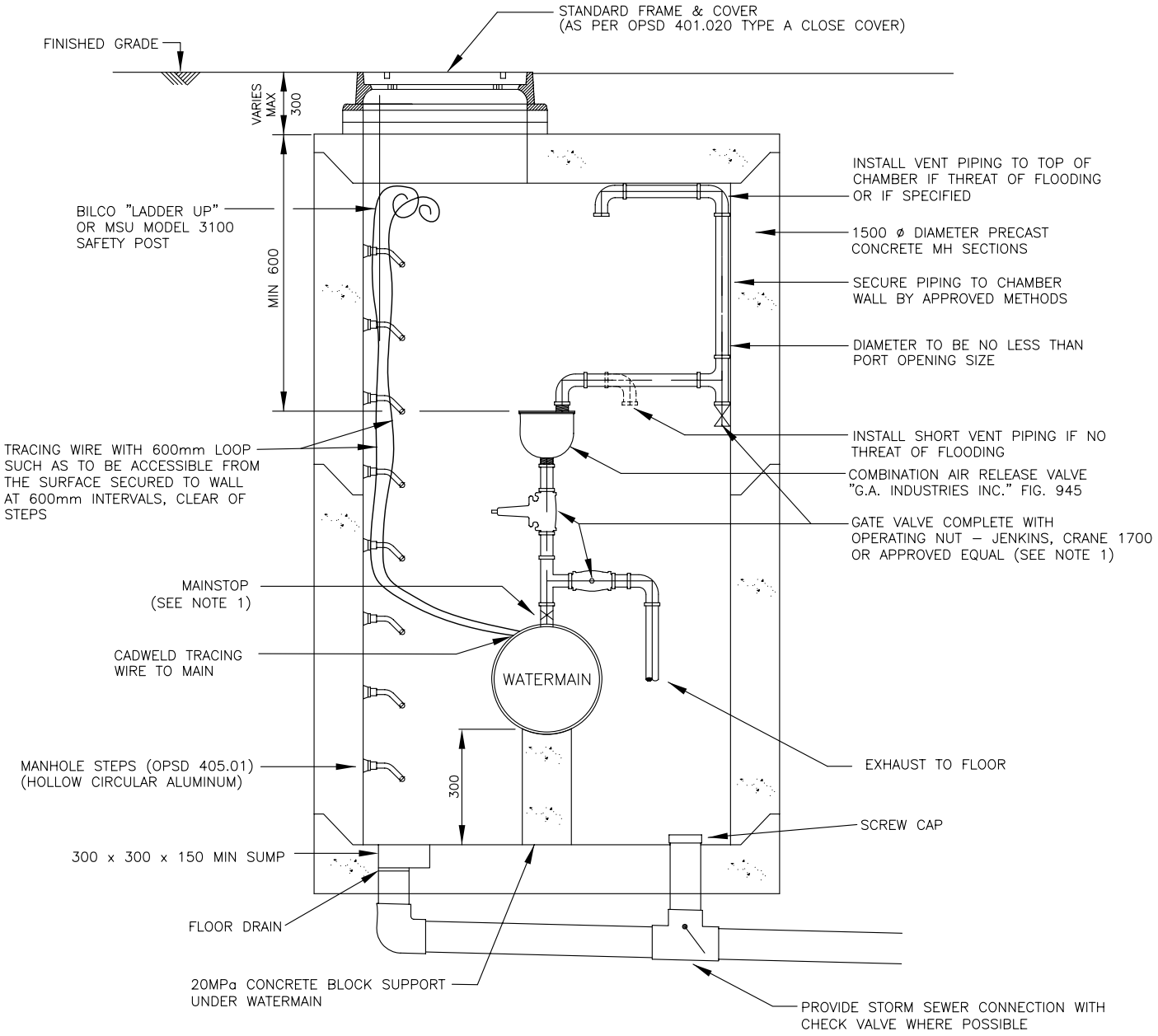
VENT AND DRAIN DETAIL

SSMS

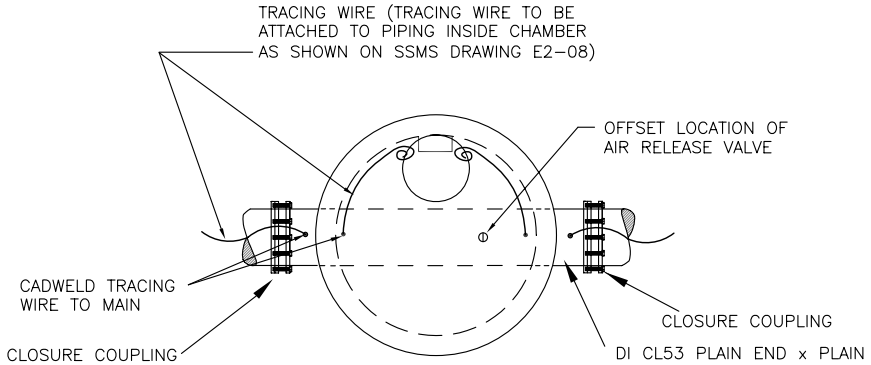
E2 - 11



SECTION

NOTES:

1. AIR RELEASE VALVE & PIPING SHALL BE 25mm DIAMETER FOR WATERMAINS UP TO & INCLUDING 300mm DIAMETER, AND 50mm DIAMETER FOR WATERMAINS LARGER THAN 300mm.
2. PIPING AND FITTINGS SHALL BE THREADED COPPER OR BRASS.
3. REINFORCED PRECAST CONCRETE MH SECTIONS SHALL BE IN ACCORDANCE WITH OPSS 407 & 1351, AND OPSD 701.04.
4. BACKFILL WITH SELECT SUBGRADE MATERIAL IN ACCORDANCE WITH OPSS 1010 COMPACTED TO 95% SPD.
5. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE SPECIFIED.



PLAN VIEW

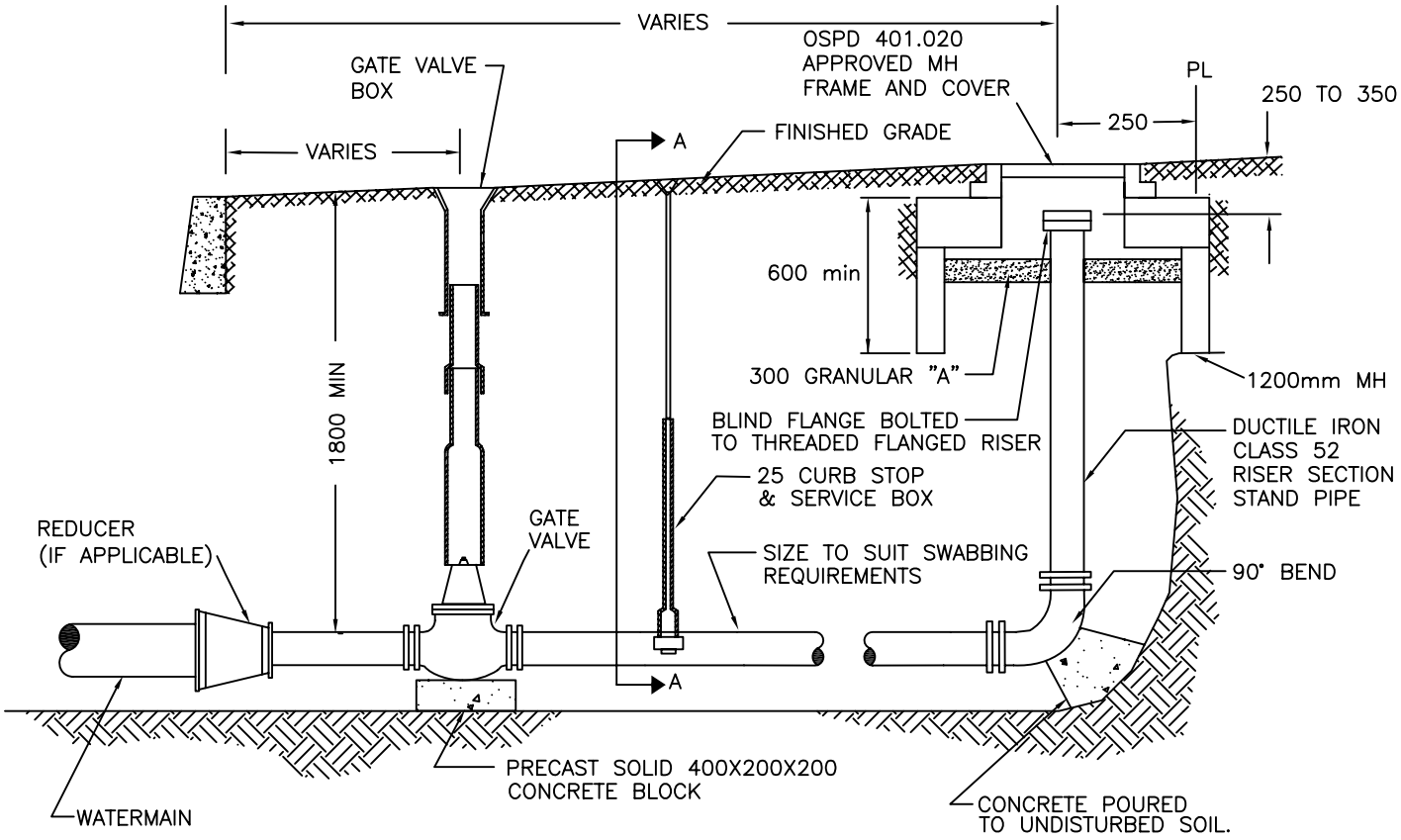
REGION OF WATERLOO AND AREA MUNICIPALITIES STANDARD DRAWINGS

REVISION DATE: FEB. 2008

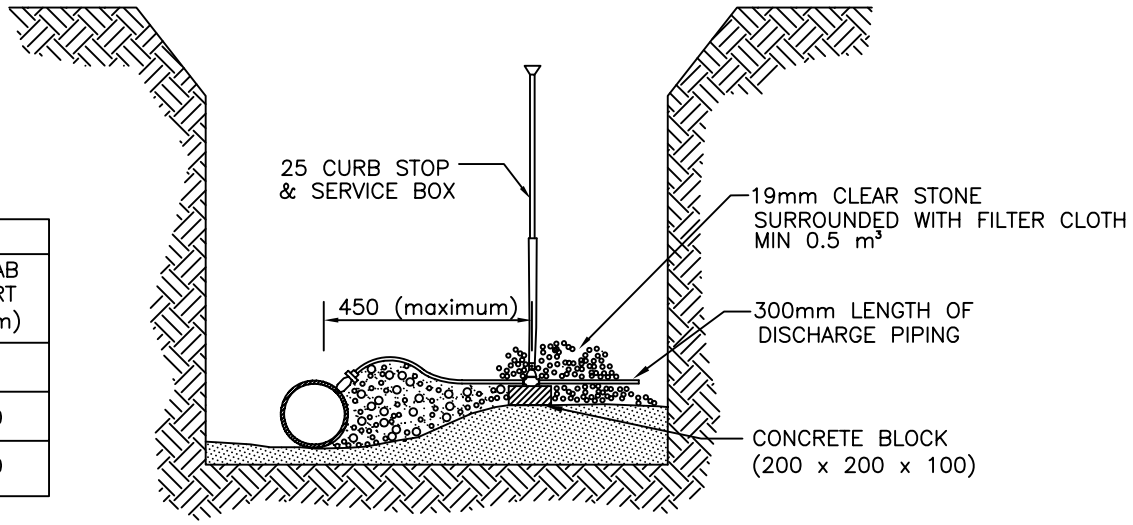
AIR & VACUUM RELEASE VALVE CHAMBER

SSMS

E2 - 12



ELEVATION



SIZES	
MAINLINE PIPE (mm)	SWAB PORT (mm)
300	150
400	200
450–600	300

SECTION A–A

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SPECIFIED.
2. CORROSION PROTECTION SHALL BE AFFIXED AS PER STANDARD SPECIFICATIONS FOR WATERMAIN CONSTRUCTION TO EACH COMPONENT OF THE FLUSHING OUTLET.
3. ALL JOINTS TO BE MECHANICALLY RESTRAINED.

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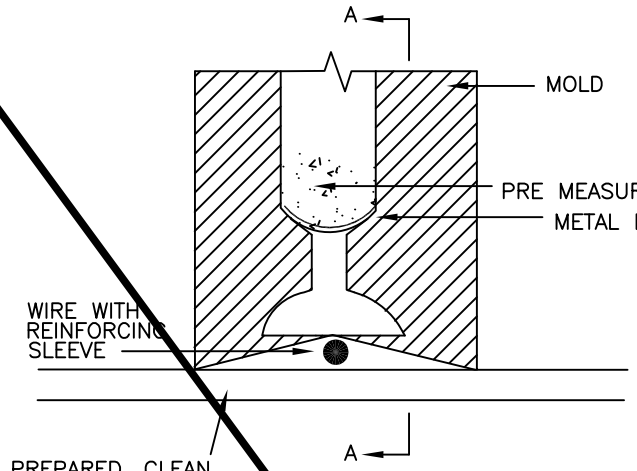
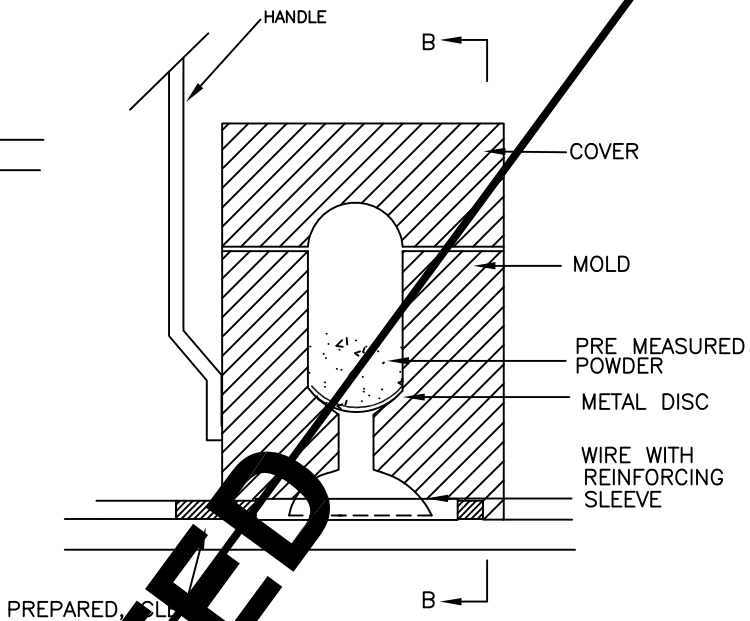
FLUSHING AND SWAB PORT (UP TO 300mm DIAMETER)

SSMS

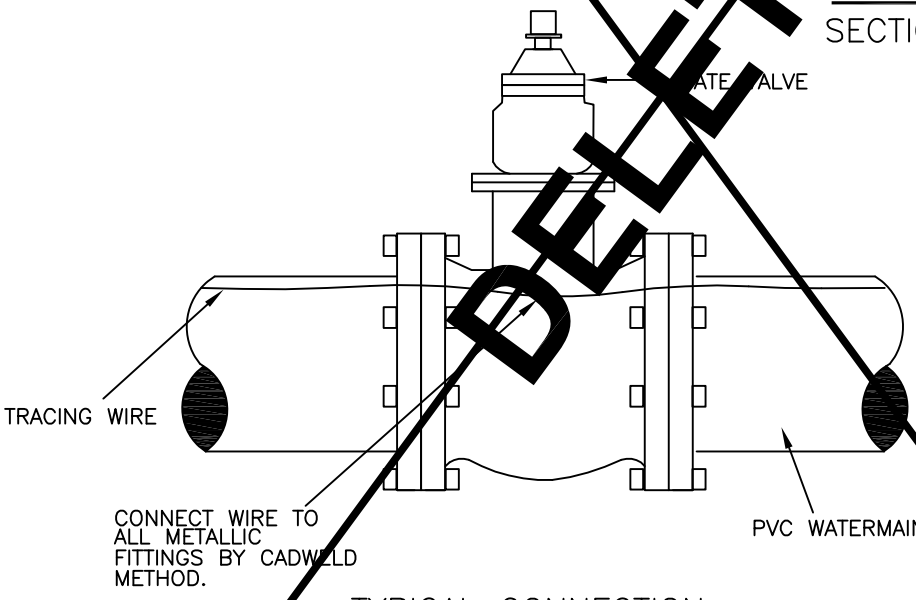
E2 - 13



DETAIL B
SECTION B–B



DETAIL A
SECTION A–A

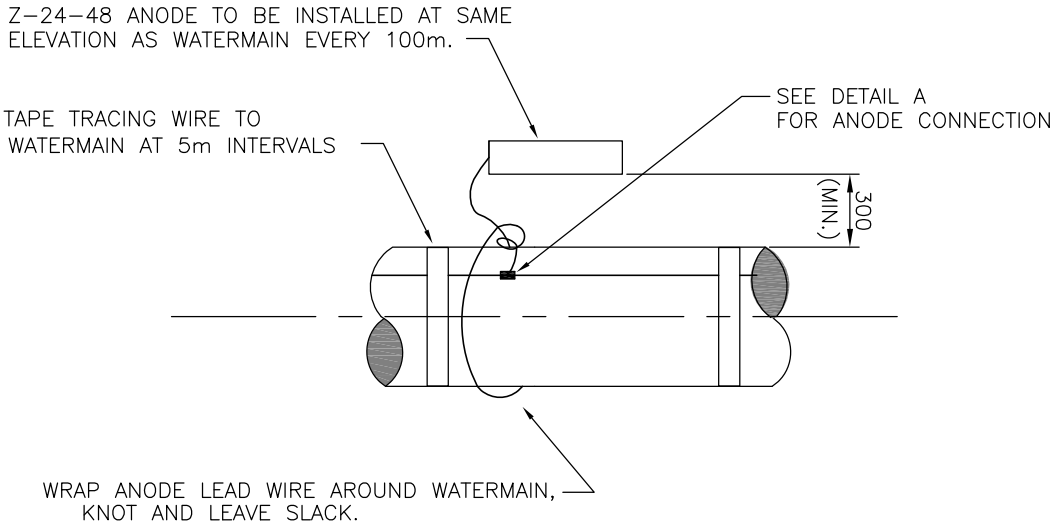


TYPICAL CONNECTION
TO ALL METALLIC FITTINGS
SEE DETAIL A&B

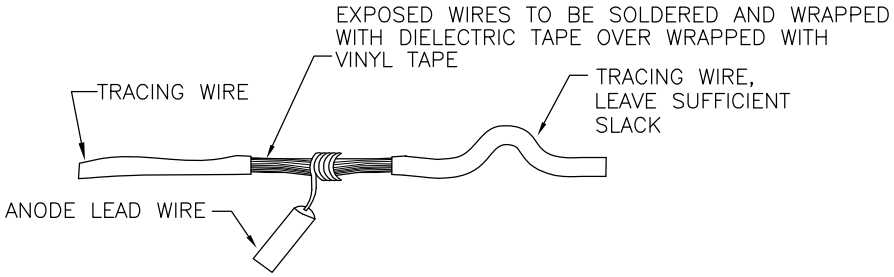
DELETED

NOTES:

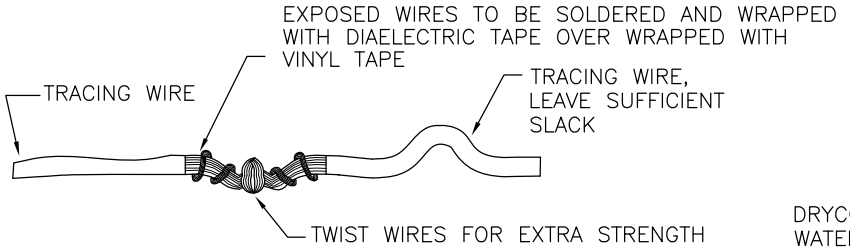
1. ALL SURFACES MUST BE CLEAN, DRY AND PREPARED TO ACCEPT THE CADWELD. THE PROPER PROCEDURES SHALL BE FOLLOWED.
2. ALL CADWELDS SHALL BE SEALED USING MASTIC AND APPROVED PETROLATUM TAPE SYSTEM AGAINST MOISTURE.



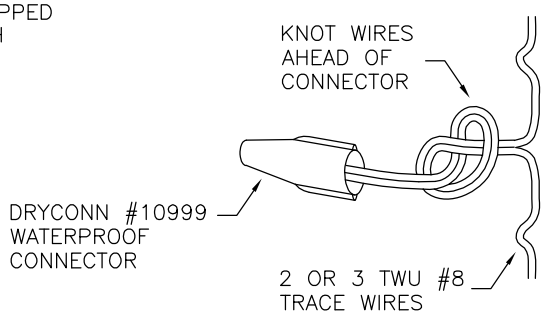
PLAN VIEW



DETAIL – A–1
ANODE CONNECTION



DETAIL – A–2
SOLDERED CONNECTION



DETAIL – B–1
TWISTED CONNECTION

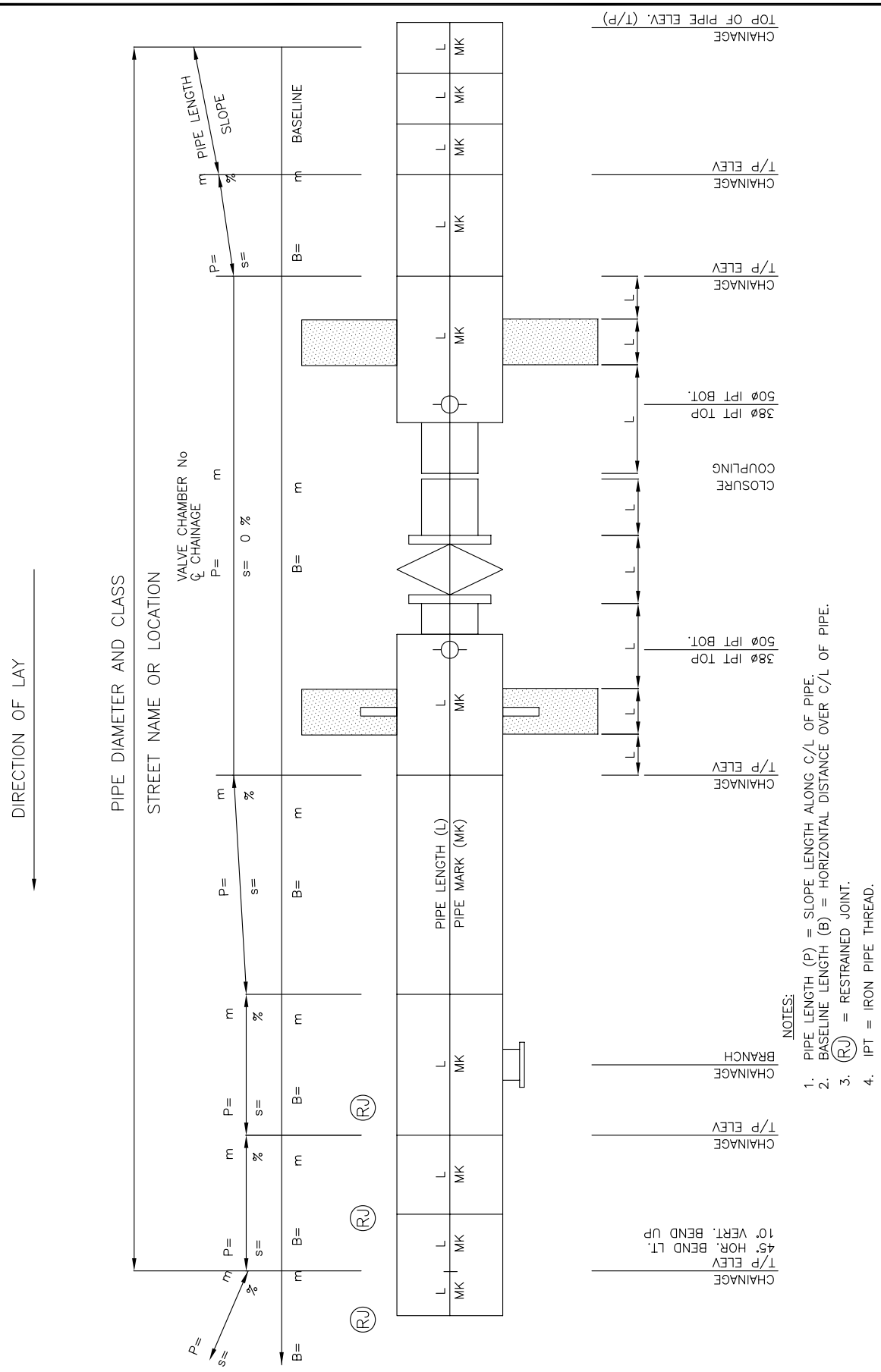
NOTES;
1. ANODES TO BE INSTALLED HORIZONTALLY BESIDE WATERMAIN TO ONE SIDE OR THE OTHER.
2. WHEN CONNECTION WIRES ENSURE THAT SUFFICIENT WIRE IS EXPOSED TO INTERLOCK AND SOLDER TOGETHER.
3. INSTALL DRYCONN CONNECTOR PER MANUFACTURING RECOMMENDATIONS.
4. BRASS SPLIT BOLTS MAY BE USED FOR TRACER WIRE CONNECTION AND WRAPPED.

REGION OF WATERLOO AND AREA MUNICIPALITIES STANDARD DRAWINGS | REVISION DATE: JAN. 2010

ANODE INSTALLATION AND WIRE CONNECTIONS

SSMS

E2 - 15



NOTES:

1. PIPE LENGTH (P) = SLOPE LENGTH ALONG C/L OF PIPE.
2. BASELINE LENGTH (B) = HORIZONTAL DISTANCE OVER C/L OF PIPE.
3. (RJ) = RESTRAINED JOINT.
4. IPT = IRON PIPE THREAD.

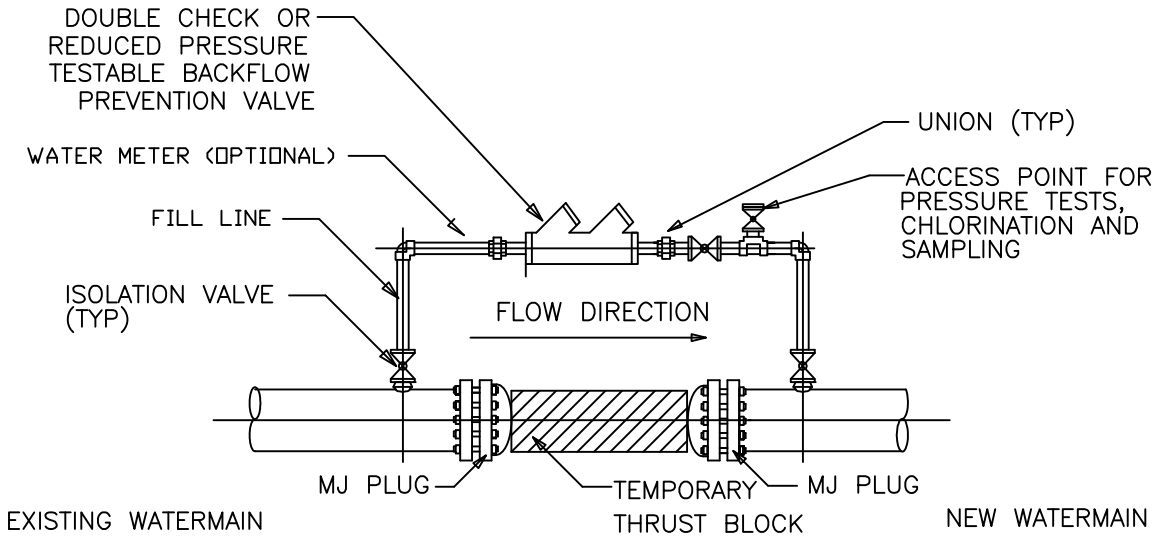
REGION OF WATERLOO AND AREA MUNICIPALITIES STANDARD DRAWINGS

REVISION DATE: FEB. 2008

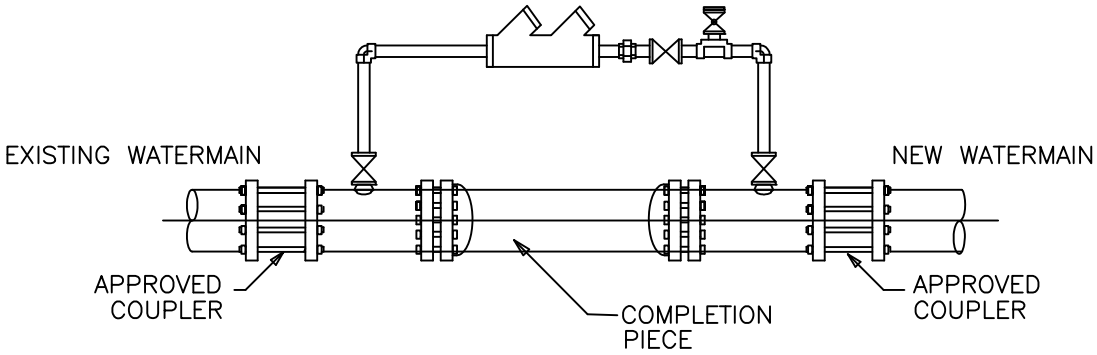
TYPICAL CPP SHOP DRAWING MINIMUM DETAIL REQUIRED

SSMS

E2 - 16



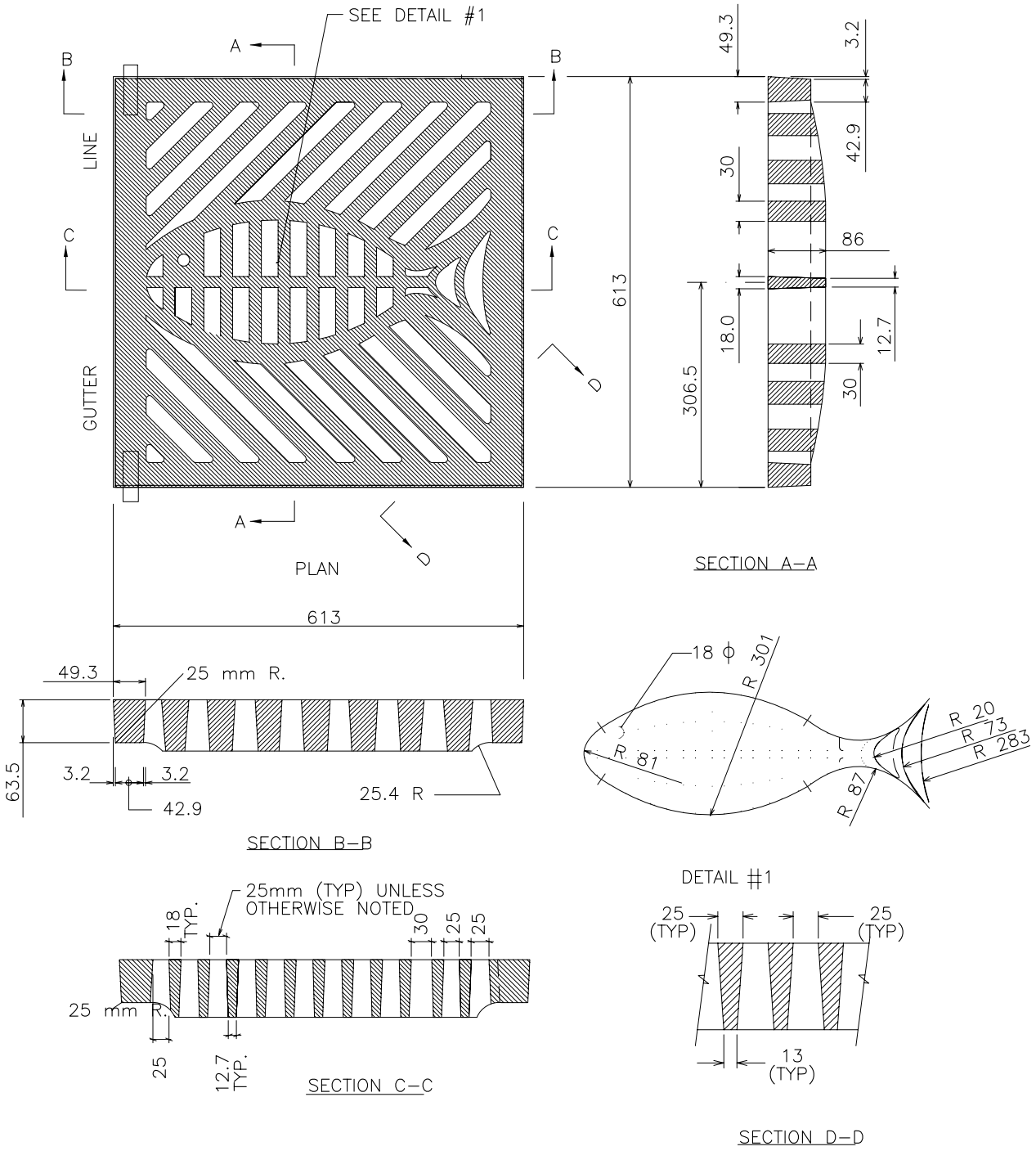
BACKFLOW PREVENTION VALVE ASSEMBLY



WATERMAIN COMPLETION ASSEMBLY

NOTES:

1. THE BACKFLOW PREVENTION VALVE ASSEMBLY SHALL BE REMOVED DURING WATERMAIN PRESSURE TESTS.
2. THE FINAL CONNECTION OF THE WATERMAIN SHALL BE COMPLETED ONLY AFTER AUTHORIZATION BY THE MUNICIPALITY.
3. THE WATERMAIN SHALL BE DRAINED BY CONTROLLED MEANS. SUFFICIENT TRENCH DEWATERING CAPACITY SHALL BE USED WHEN THE EXISTING AND NEW WATERMAINS ARE DRAINED PRIOR TO THE FINAL ONNECTION TO ENSURE NO BACKFLOW INTO EITHER WATERMAIN.
4. THE WATERMAIN SHALL BE CUT BACK TO REMOVE THE TAPPING POINTS OF THE BACKFLOW PREVENTION VALVE ASSEMBLY.
5. ALL NEW PIPING AND APPURTENANCES PLACED IN THE CONNECTION SHALL BE THOROUGHLY DISINFECTED WITH 1% SOLUTION OF SODIUM HYPOCHLORITE OR EQUIVALENT.
6. ON NON-METALIC WATERMAINS, THE TRACING WIRE SHALL BE CONNECTED TO THE COUPLER ONLY IF THE COUPLER IS NOT IN CONTACT WITH A METALIC WATERMAIN OTHERWISE TERMINATE TRACER WIRE WITH AN ANODE.
7. A PHYSICAL SEPARATION MUST BE MAINTAINED AT ALL CONNECTION POINTS OF NEW WATERMAINS TO THE EXISTING SYSTEMS UNTIL BACTERIOLOGICAL TESTS HAVE PASSED. A SAMPLING TAP MUST BE PROVIDED AT THE END OF EACH BRANCH OR STUB.
8. ONLY MUNICIPAL STAFF SHALL OPERATE MUNICIPALITY OWNED VALVES.
9. THIS DETAIL IS FOR SCHEMATIC INFORMATION ONLY. THE ACTUAL CONFIGURATION USED MUST SATISFY THE INTENT OF THIS DRAWING.



NOTES:

1. ALL DIMENSIONS SHOWN ARE FOR FINISHED CASTINGS ONLY, PATTERN MARKINGS AND CASTING SHOP SHOULD MAKE ALLOWANCES ACCORDINGLY
2. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SHOWN
3. IT IS ESSENTIAL THAT THE COVER BE INSTALLED IN THE DIRECTION OF THE GUTTER LINE AS SHOWN
4. THE FRAME FOR THIS COVER SHALL BE AS PER OPSD 400.02
5. FOR USE ON CITY OF WATERLOO STREETS ONLY (NOT ON REGIONAL ROADS IN WATERLOO)

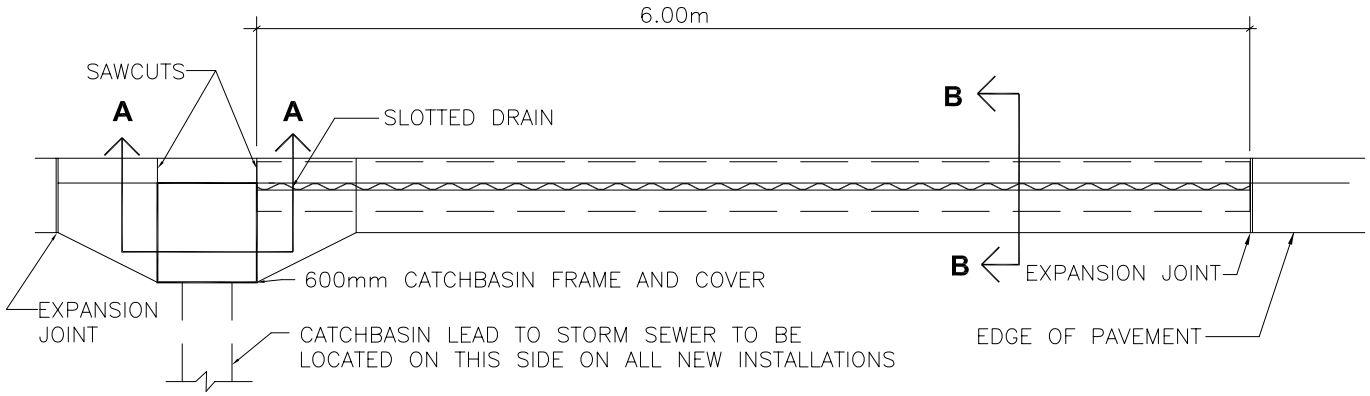
REGION OF WATERLOO AND AREA MUNICIPALITIES STANDARD DRAWINGS

REVISION DATE: FEB. 2008

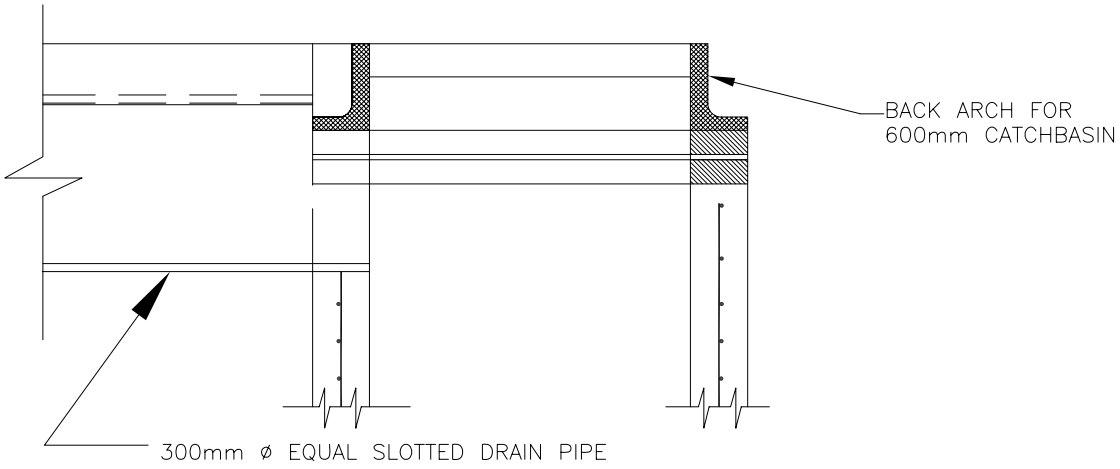
CATCHBASIN FRAME WITH FISH PATTERN

SSMS

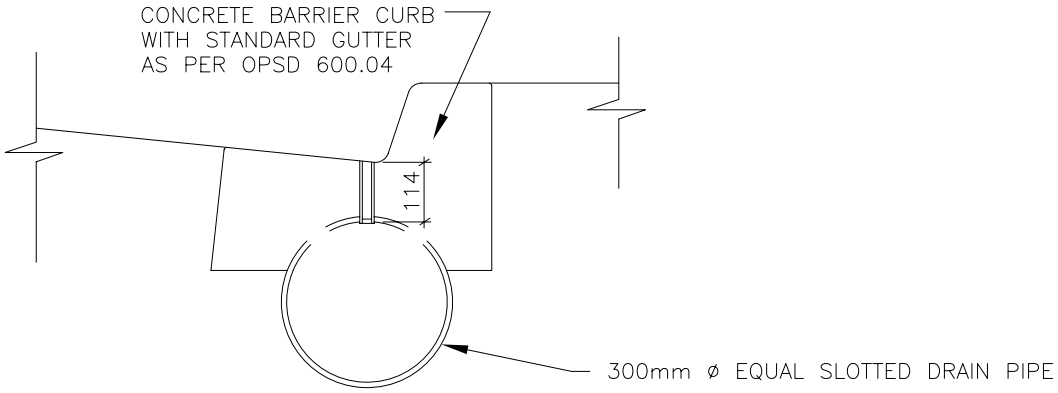
E4 - 01



PLAN VIEW



SECTION A – A



SECTION B – B

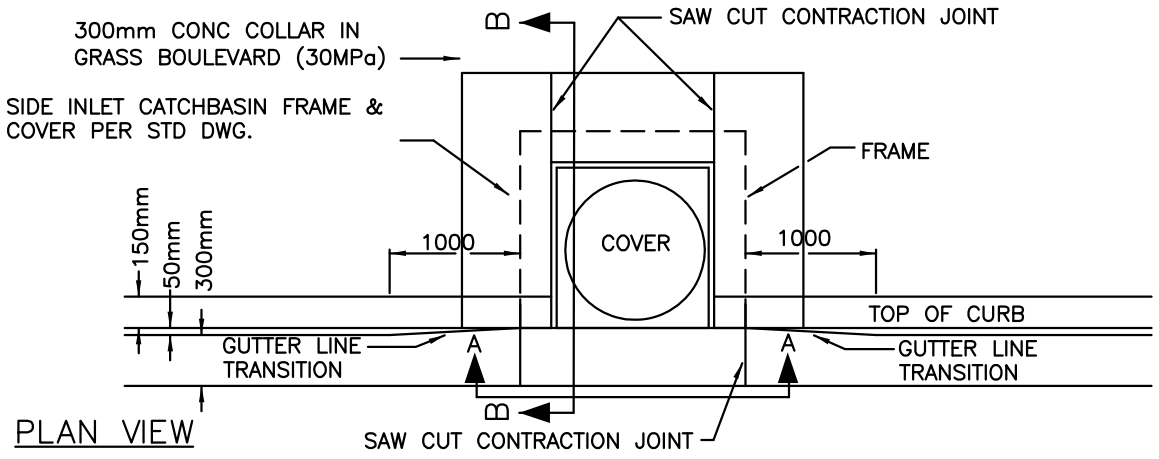
REGION OF WATERLOO AND AREA MUNICIPALITIES STANDARD DRAWINGS

REVISION DATE: FEB. 2008

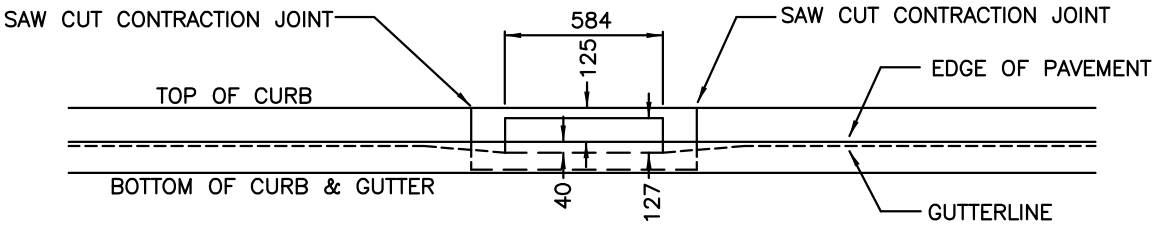
CATCHBASIN WITH SLOTTED DRAIN

SSMS

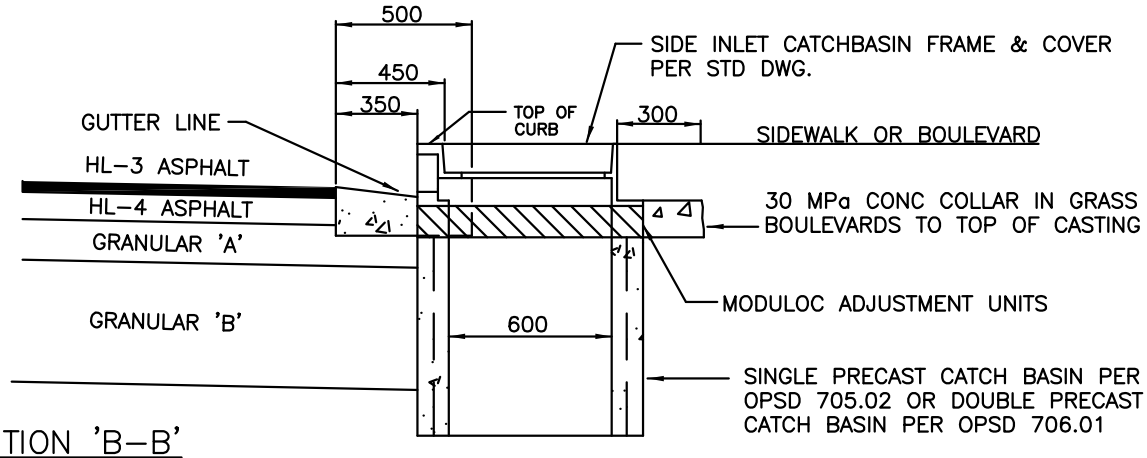
E4 - 02



PLAN VIEW



SECTION 'A–A'



SECTION 'B–B'

NOTE:

1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE SPECIFIED.
2. AT DOUBLE CATCH BASINS MAINTAIN 100mm SEPERATION BETWEEN FRAMES AND FILL WITH CONCRETE.
3. IN GRASS BOULEVARD AREAS ONLY, INSTALL 300mm WIDE CONCRETE (30MPa) COLLAR AS SUPPORT.
4. FOR TEMPORARY CONDITION PRIOR TO PLACEMENT OF SURFACE ASPHALT REFER TO RMW STANDARD DWG. 215.

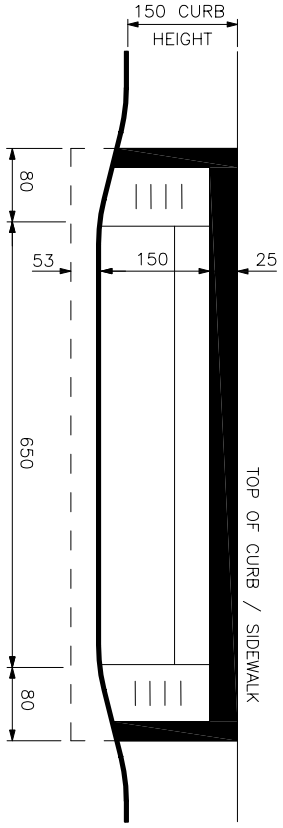
REGION OF WATERLOO AND AREA MUNICIPALITIES STANDARD DRAWINGS

REVISION DATE: JAN. 2010

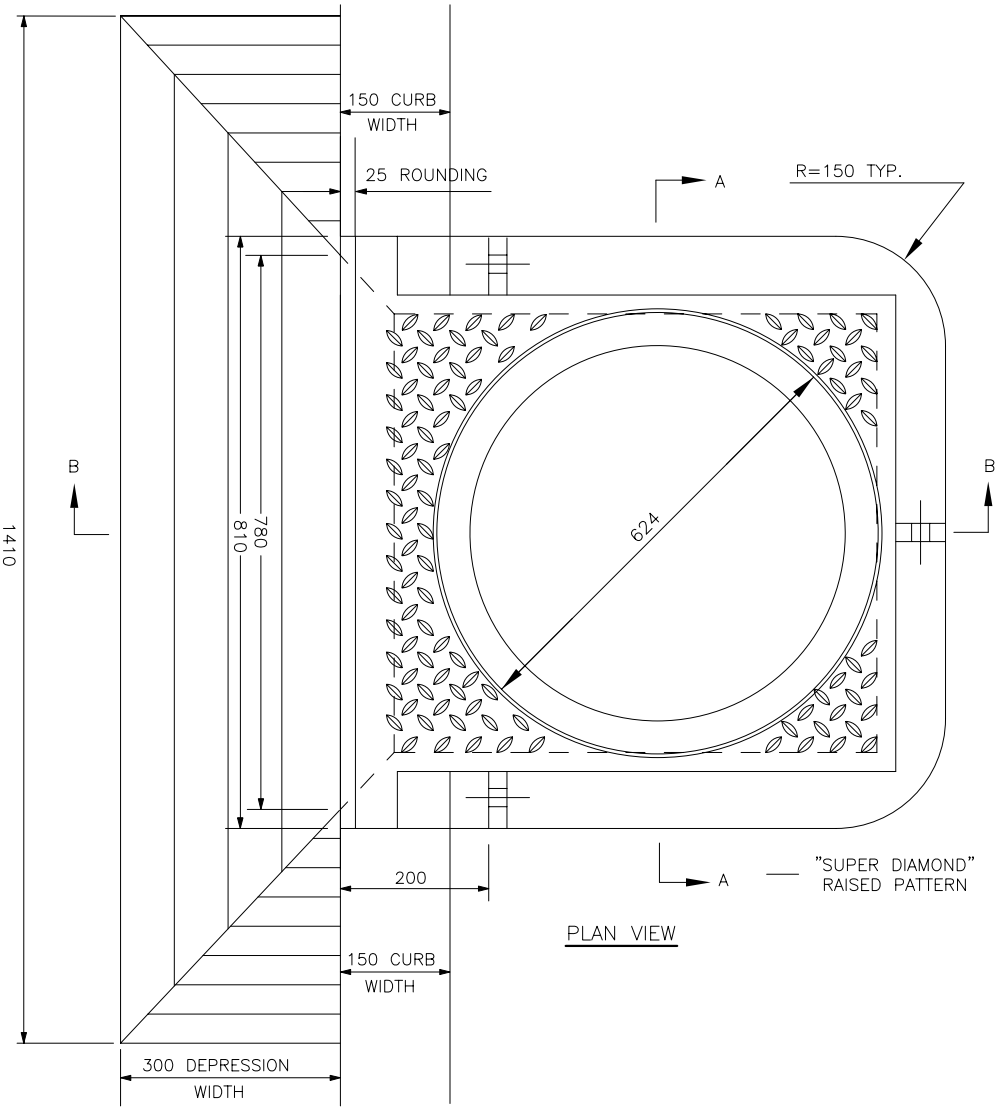
SIDE INLET CATCHBASIN

SSMS

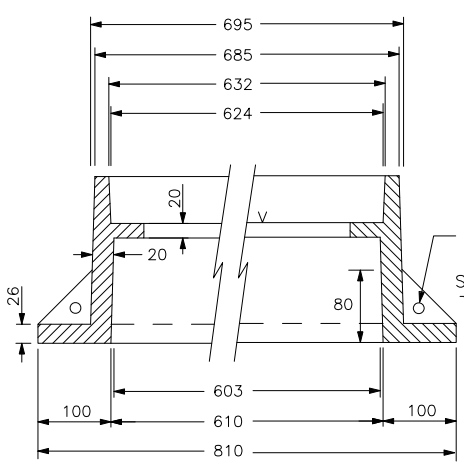
E4 - 03



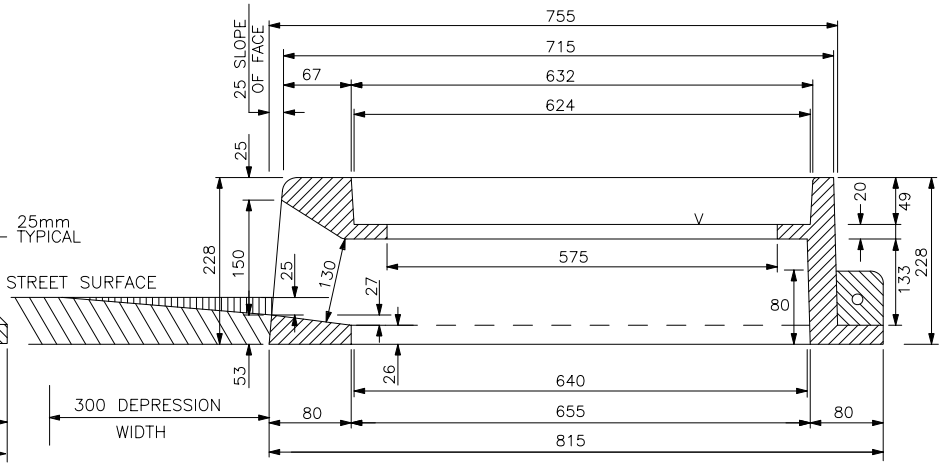
CURB ELEVATION



PLAN VIEW



SECTION A–A



SECTION B–B

NOTES:
1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS SHOWN OTHERWISE.
2. SIDE INLET CATCHBASIN FRAME AND COVER TO BE MANUFACTURED IN ACCORDANCE TO OPSS 1850 REQUIREMENTS.

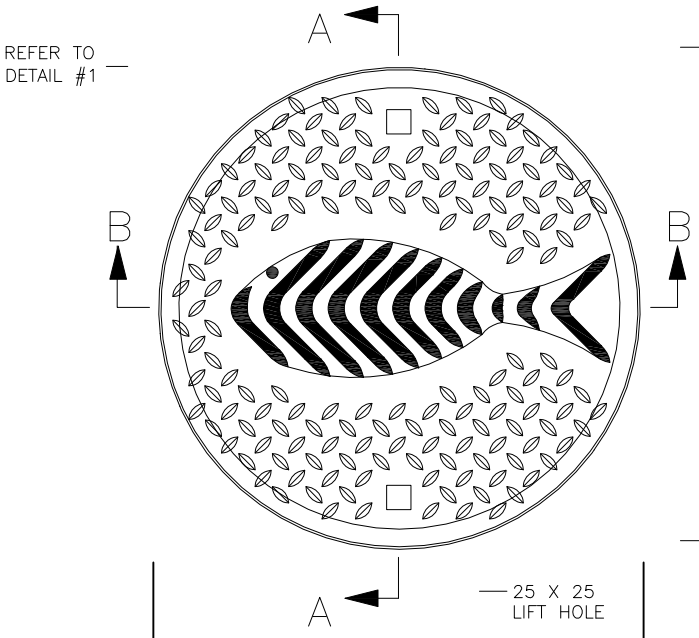
REGION OF WATERLOO AND AREA MUNICIPALITIES STANDARD DRAWINGS

REVISION DATE: FEB. 2008

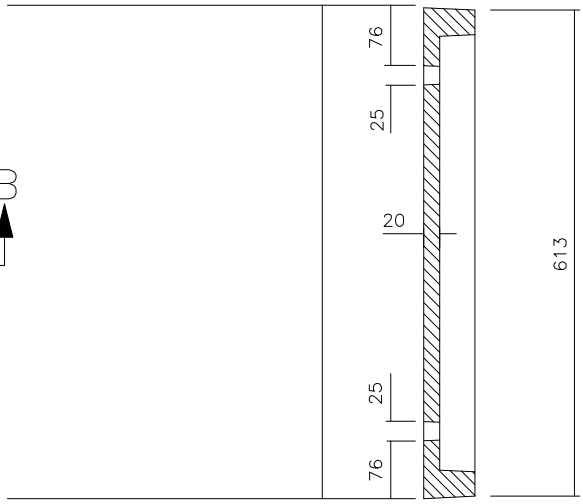
SIDE INLET CATCHBASIN FRAME AND COVER DETAIL

SSMS

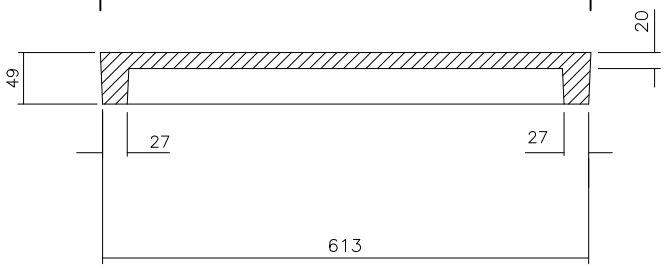
E4 - 041



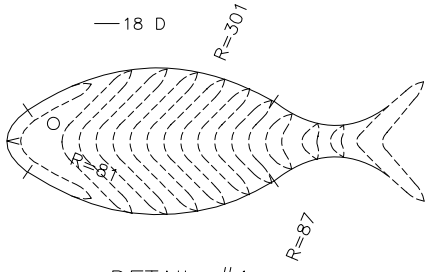
PLAN



SECTION A–A



SECTION B–B



DETAIL #1

NOTES:

1. ALL DIMENSIONS SHOWN ARE FOR FINISHED CASTINGS ONLY.
   PATTERN MARKERS AND CASTING SHOP SHOULD MAKE ALLOWANCES ACCORDINGLY.

2. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS SHOWN OTHERWISE.

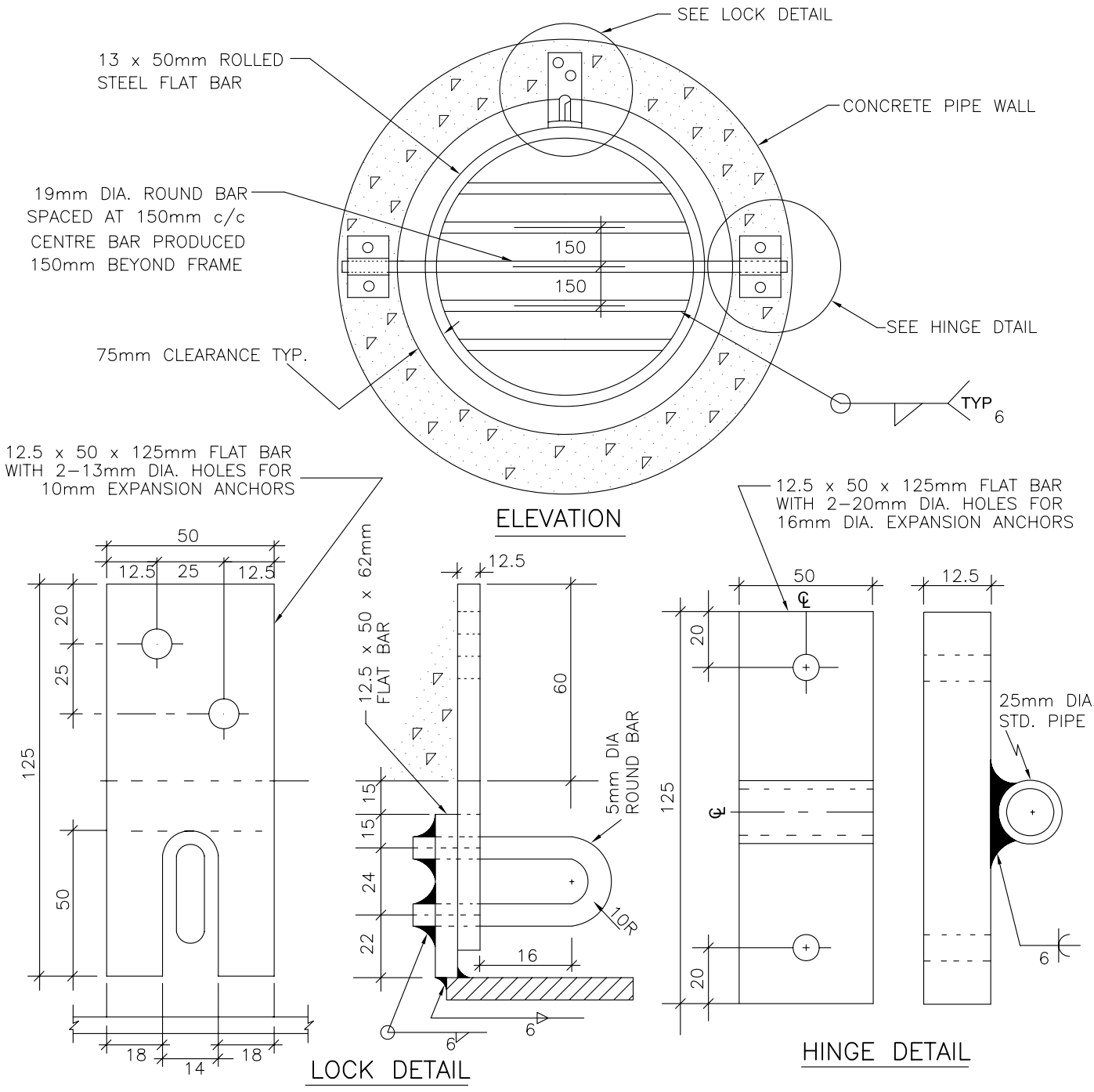
REGION OF WATERLOO AND AREA MUNICIPALITIES STANDARD DRAWINGS

REVISION DATE: FEB. 2008

SIDE INLET CATCHBASIN COVER

SSMS

E4 - 042



NOTES

1. WHEN ORDERING SPECIFY INSIDE DIA. OF PIPE.
2. STEEL TO : CSA CAN 3 G40.21 – M81 GRADE 300W.
3. WELDING TO : CSA W59.
4. DOUBLE HOT DIPPED GALVANIZE TO : CSA G164 – M.
5. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE SPECIFIED.
6. APPLIES TO PIPES 400 TO 1200mm DIA. FOR LARGER PIPES, BARS SHALL BE 25mm DIA. WITH VERTICAL BARS SPANNING 3 CENTRE BARS.

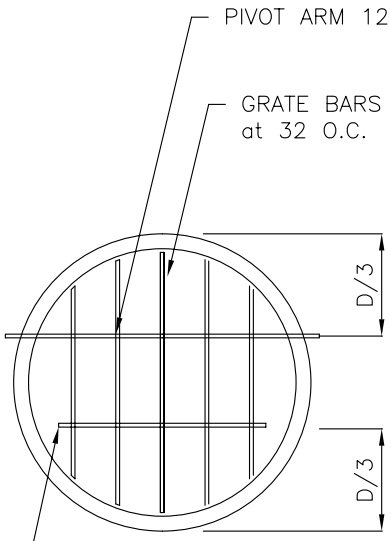
REGION OF WATERLOO AND AREA MUNICIPALITIES STANDARD DRAWINGS

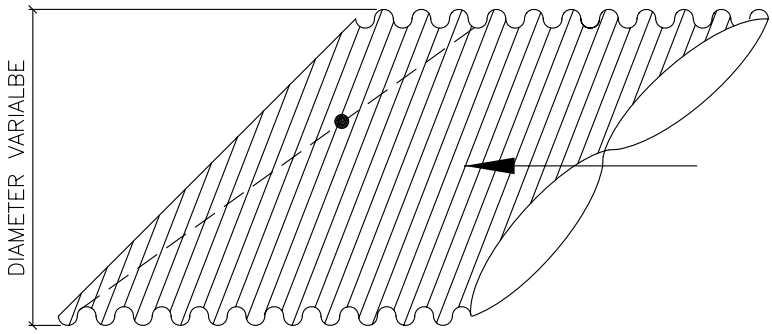
REVISION DATE: FEB. 2008

INTERNAL GRATE FOR CONCRETE PIPE

SSMS

E4 - 05





1. FOR 300mmø PIPES AND OVER, ADDITIONAL 12mmø HORIZONTAL GRATE BAR TO BE PLACED IN THIS LOCATION.

2. FOR PIPES LESS THAN 300mmø, NO HORIZONTAL GRATE BARS REQUIRED.

3. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE STATED.

4. ALL MATERIALS TO BE DOUBLE HOT DIPPED GALVANIZED TO: CSA G164–M.

REGION OF WATERLOO AND AREA MUNICIPALITIES STANDARD DRAWINGS

REVISION DATE: FEB. 2008

RODENT GRATE FOR ATTACHMENT TO OUTLET

SSMS

E4 - 06

Hydrostatic Pressure Test Template

Project Name: _____
Project Number: _____
Consultant: _____
Contractor: _____
Date: _____
Inspector: _____
Test Location: _____
_____

Criteria: see OPSS 701, building code or NFPA

Pipe Class	Material	Diameter	Tested Length and description)

Allowable Leakage Calculations:

Start Time of Test:	Start Pressure:
Finish Time of Test:	Finish Pressure:

Actual Period Main Under Test Pressure (Hrs)	
Allowable Volume Loss (L)	
Measured Volume Loss (L)	

Test Results: ☐ Satisfactory ☐ Unsatisfactory

Remarks:

Contractor:_____ Inspector:_____

Tracer Wire Conductivity Test Template

Project Name: _____
Project Number: _____
Consultant: _____
Contractor: _____
Date: _____
Inspector: _____
Test Location:
Street to Street
Station to Station _____
Description to be provide on how tracer wire is connected to existing wm _____
Gauge and type _____
Equipment used by contractor: _____
Criteria: see DGSSMS D2.8.8

Parameter	Satisfactory	Unsatisfactory
Continuity Signal applied to tracer wire and the signal confirmed over the entire length of all tracer wire installed		
Tracing wire on services is connected to watermain tracer wire and wire is intact for the length of the service		
Tracing wire in chambers is detectable on the watermain outside of the chamber		

Test Results: ☐ Satisfactory ☐ Unsatisfactory

Remarks:

Contractor:_____ Inspector:_____

Hydrostatic Pressure Test Template

Project Name: _____
Project Number: _____
Consultant: _____
Contractor: _____
Date: _____
Inspector: _____
Test Location: _____
_____

Criteria: see OPSS 701, building code or NFPA

Pipe Class	Material	Diameter	Tested Length and description)

Allowable Leakage Calculations:

Start Time of Test:	Start Pressure:
Finish Time of Test:	Finish Pressure:

Actual Period Main Under Test Pressure (Hrs)	
Allowable Volume Loss (L)	
Measured Volume Loss (L)	

Test Results: ☐ Satisfactory ☐ Unsatisfactory

Remarks:

Contractor:_____ Inspector:_____

PROJECT NAME
FROM – TO / DESCRIPTION
REGION / CITY / TOWNSHIP CONTRACT No. XXX

WATERMAIN COMMISSIONING PLAN

Note on use of this template:
This template attempts to provide a format and show example information needed for a wide range of watermain projects from a trunk main to a subdivision to a large water service. The user should edit, add or delete information and/or sections as may suit the particular application while still providing an adequate description of the work to be undertaken so that a timely review may be completed by the Contract Administrator/Chief Municipal Engineer. In Stage 1, the SSMS criteria are included for each section ahead of the project calculations as a reminder of the requirements to be met. The Plan should be submitted prior to watermain installation so that source requirements and sampling points are known which may avoid the need to change construction plans or re-excavate a main to install an intermediate sampling point.

The following plan for temporary connection, swabbing, disinfection and testing of the watermain meets the requirements of the Region of Waterloo and Area Municipal Design Guidelines and Supplemental Specifications for Municipal Services (DGSSMS), latest edition. A sketch of the site is attached showing the system layout with source and sampling locations identified.

STAGING

In general, the new water system will be pressure and leakage tested in xx stage(s) comprised of the following areas:

Stage	Street	From	To
1	Street A	Exist St	Street B
	Street B	Street A	Street C
2	Street C	Street B	Street D
	Street D	Street C	Sta. x+xxx

STAGE 1

1 A. SAMPLE LOCATIONS

Samples will be taken from existing system facilities like service laterals and air relief valve fittings, or temporary service laterals where necessary on long runs. When plugging temporary laterals, the mainstop will be removed and replaced with a stainless steel plug in the stainless steel saddle.

Sample Point Number	Street	Station	Max. Distance from Source or Previous Sample Location (m)	Type of Sample Port
1-01	Street A	0+000	Source	D/S temporary connection
1-02		0+140	140	Temp copper off mainstop for air relief valve
1-03		0+490	350	25 mm Service
1-04	Street B	2+168	180	Temp 19 mm service (to be plugged after testing)
1-05		2+480	312	Temp copper off mainstop in VC

1 B. TEMPORARY CONNECTION / WATER SOURCE

The watermain stage under test will be connected to the source as detailed below. A tested and certified backflow preventer will be located in each filler line to prevent a possible reverse flow and contamination of the in-service source main. Any samples taken at the source end of the new main will come from the downstream side (new main side) of the backflow preventer.

Source and Filling

Street:	Name	
Location (Station. /intersection)	0+000	
Source main size:	300	mm
No. of fill lines:	2	
Fill line size:	50	mm
Flow rate per line:	3.5	litres/sec
Total flow rate of feed:	7.0	litres/sec

1 C. SWABBING

Swabbing will be done wet and 4 swabs will pass through all new mains. Water will be added to the pipelines ahead of the swabs by filling at xxxx (e.g. first filling from the source connection prior to launching the swabs, or adding water via the sample line at Sta. xxx, etc.). Swabs will be launched, travel at adequate cleaning speeds, and be retrieved as follows:

Launch Location			Pipe	Swab		Retrieval Location		
Street	Station	Type	Size mm	Size mm	Velocity m/s	Street	Station	Type
Street A	0+000	Swab port	450	500	0.60	Street A	0+490	Open pipe
Street B	2+000	Insert in new pipe	150	200	0.85	Street B	2+480	Hydrant

1 D. HYDROSTATIC TESTING

As a minimum, the hydrostatic test pressure of 1035 kPa (150 psi) will be applied to all points of the watermain within the test section, including high points.

	Street	Station	Elevation- m	Pressure- kPa (psi)
Test pressure application point:	Street A	0+000	310.2	1132 (164)
High point	Street B	2+100	319.5	1035 (150)
Low point	Street B	2+420	308.0	1153 (167)

Leakage calculation:	Length and sizes of test section:	490 m of 300 mm 312 m of 150 mm
	Allowable leakage rate:	0.082l/mm dia/km of pipe
	Allowable leakage vol for stage:	15.9 litres

1 E. DISINFECTION and TESTING

Chlorine will be injected into the new main at the source end at a rate that will result in a free chlorine residual of between 50 and 100 mg/l (ppm) throughout the new pipeline. While chlorinating, residuals will be checked at intermediate sampling locations. At least 24 hours after chlorinating, residuals will be checked again to confirm a minimum free residual of 25 mg/l in all parts of the pipe. Less than 25 mg/l will require re-chlorination of the main. If acceptable

readings are found then flushing (de-chlorination) will commence. All chlorinated water will be neutralized to less than 0.2 mg/l total chlorine for discharge to a storm sewer or less than 0.002 mg/l total chlorine when there may be detrimental effects to the natural environment. After flushing, chlorine residuals will again be checked to ensure a free residual of at least 0.05 mg/l or a combined residual of at least 0.25 mg/l, and a total within 0.2 mg/l of the source water residual. Acceptable results will allow the first round of bacteriological samples to be taken. All testing and sampling will be performed in the presence of the Contract Administrator and all testing will be performed by properly licensed personnel.

Type of chlorine:	xx%	sodium hypochlorite / calcium hypochlorite / (name other)
Rate of water flow:	x.x	l/sec
Rate of chlorine injection:	x.x	l/sec
Time to chlorinate test section:	xx	minutes
Neutralizing agent:		peroxide / sodium thiosulphate / (name other)

After the first round of samples have been taken, the test section will be shut down (ie. no flow of water). After a minimum of 24 hours the chlorine at each sampling point will again be tested to ensure that the total remains no more than 0.2 mg/l above nor 50% less than the first round source water, with a free residual of at least 0.05 mg/l or a combined residual of at least 0.25 mg/l. Acceptable results will initiate the second round of samples to be taken.

Results of bacteriological sample analysis will be reported to the Contract Administrator who will in turn notify the Contractor. Acceptable results (E. Coli - absent, Total Coliform - absent, Background Coliform <25) will allow the Chief Municipal Engineer to approve the final connection of the main to the existing system.

1 F. FINAL CONNECTION

Final connection will be made in dry conditions in the presence of the Contract Administrator. All required pipe and fittings will be swabbed with a minimum 1% to maximum 5% solution of chlorine prior to installation. Upon completion of the connection, the main will be flushed from the hydrant / service at Sta.x+xxx to rid the main of high chlorine. If some occurrence during final connection indicates that the main may have been contaminated, a third round bacteriological sample will be taken.

Type of Connection:	remove cap/cut-in tee and sleeve/tapping sleeve and valve/other
Gap to connect:	3.5 m
Connection details:	remove exist cap, install 450 pipe and solid sleeve

Subsequent to acceptable bacteriological testing and final connection, the municipality will be called to open the new main to regular service.

STAGE 2

2 A. SAMPLE LOCATIONS

Sample Point Number	Street	Station	Max. Distance from Source or Previous Sample Location (m)	Type of Sample Port
2-01	Street C	3+000	Source	
2-02		3+120	120	Temp copper off mainstop for air relief valve
2-03		3+410	290	25 mm Service
2-04	Street D	4+075	140	Temp 19 mm service (to be plugged after testing)
2-05		4+425	325	Temp copper off mainstop in VC

2 B. TEMPORARY CONNECTION / WATER SOURCE

Source and Filling

Street:	Jones St.	
Location (Station. /intersection)	3+000	
Source main size:	150	mm
No. of fill lines:	1	
Fill line size:	50	mm
Flow rate per line:	1.8	litres/sec
Total flow rate of feed:	1.8	litres/sec

2 C. SWABBING

Water will be added to the pipelines ahead of the swabs by filling at xxxx. Swabs will be retrieved as follows:

Launch Location			Pipe	Swab		Retrieval Location		
Street	Station	Type	Size mm	Size mm	Velocity m/s	Street	Station	Type
Street C	3+000	Swab port	200	250	0.70	Street C	0+490	Open pipe
Street D	Street C		150	200	0.85	Street D	4+480	Hydrant

2 D. HYDROSTATIC TESTING

	Street	Station	Elevation- m	Pressure- kPa (psi)
Test pressure application point:	Street C	3+000	310.2	1132 (164)
High point	Street C	3+200	319.5	1035 (150)
Low point	Street D	4+130	308.0	1153 (167)

2 E. DISINFECTION and TESTING

Type of chlorine:	xx%	same as Stage 1/sodium hypochlorite/calcium hypochlorite/ (name other)
Rate of water flow:	x.x	l/sec
Rate of chlorine injection:	x.x	l/sec
Time to chlorinate test section:	xx	minutes
Neutralizing agent:		same as Stage 1/peroxide / sodium thiosulphate / (name other)
Rate of injection:	xx	l/sec

2 F. FINAL CONNECTION

Type of Connection:	remove cap/cut-in tee and sleeve/tapping sleeve and valve/other
Gap to connect:	4.2 m
Connection details:	hot tap with 200x200 tapping sleeve and valve

Upon completion of the connection, the main will be flushed from the hydrant / service at Sta.x+xxx to rid the main of any high concentrations of chlorine.

---------- Copy and re-number Stage 2 format for each additional section of watermain being commissioned ----------

SAMPLE LOCATION LAYOUT

Attached is a plan(s) / sketch(es) showing the project's sample point numbers and their locations.

CONTACT NAMES

These names are to be included in the appropriate area of the Region of Waterloo *New Watermain Bacteriological Analyses Submission and Provisional Results Form* when delivering samples to the Region lab.

Municipality:	name		
Municipal Reviewer:	name	phone no.	fax no.
Contract Administrator:	name	phone no.	fax no.

This Commissioning Plan provided:

Date:	Date
Contractor:	Name of company
Commissioning Subcontractor (if applicable):	Name of company
Name of licensed testing technician:	Name

COMMISSIONING PLAN REVIEW

Review of this plan does not relieve the proponent of its responsibility for compliance with the requirements of applicable regulations, guidelines and construction documents.

Municipality: _____

☐ Reviewed Submission No. _____

☐ Revise as Noted Reviewed by _____

☐ Revise & Re-submit Date _____