REGION OF WATERLOO
AND AREA MUNICIPALITIES

DESIGN GUIDELINES
AND SUPPLEMENTAL SPECIFICATIONS
FOR MUNICIPAL SERVICES

PART E
STANDARD DRAWINGS
& DESIGN SHEETS
STANDARD DRAWINGS AND FORMS

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

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REVISED: February 2012
### TABLE

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

**Class "B" Bedding**

- O.D.
- C
- Approved Earth Backfill
- Cover Material
- Granular 'A'
- 100% SPMDD
- Limit of Excavation
- Springline
- Haunching
- Granular 'A'
- Filter Fabric
- Bedding
- Granular 'A'
- 100% SPMDD
- 19mm # Clear Stone
- Foundation Grade

**Modified Class "B" Bedding (Wet Trench Conditions)**

- O.D.
- C
- W

### 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 # Clear Stone may be used to invert of pipe. The bedding below invert shall be wrapped in Filter Fabric (Terrafix 270 or approved equal) where directed by the Engineer.
5. Granular "A" bedding shall not contain recycled asphalt.

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**REGION OF WATERLOO AND AREA MUNICIPALITIES STANDARD DRAWINGS**

**SSMS**

**E1 - 01**
<table>
<thead>
<tr>
<th>Maintenance Hole Inside Diameter (mm)</th>
<th>Max. Pipe Size for Straight Through Installation (mm)</th>
<th>Max. Pipe Size for Right Angle Installation (mm)</th>
<th>Remarks</th>
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<tbody>
<tr>
<td>1200</td>
<td>600 600</td>
<td>450 450</td>
<td></td>
</tr>
<tr>
<td>1500</td>
<td>825 825</td>
<td>600 600</td>
<td>ALL DIMENSIONS ARE FOR CONCRETE PIPE</td>
</tr>
<tr>
<td>1800</td>
<td>1050 1050</td>
<td>825 825</td>
<td>KNOCKOUTS FOR SMALL DIAMETER LATERALS (i.e. 250mm or 300mm) COULD BE PROVIDED IN ADDITION TO WHAT IS SHOWN</td>
</tr>
<tr>
<td>2400</td>
<td>1500 1500</td>
<td>1050 1050</td>
<td></td>
</tr>
<tr>
<td>3000</td>
<td>1950 1950</td>
<td>1500 1500</td>
<td></td>
</tr>
</tbody>
</table>
TRACER WIRE DETAIL

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.

MANUFACTURED ITEMS LIST

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

REGION OF WATERLOO AND AREA MUNICIPALITIES STANDARD DRAWINGS

HYDRANT INSTALLATION

SSMS
E2 - 01

REVISION DATE: FEB. 2012
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.
NOTES:
1. UNION COUPLINGS WILL NOT BE PERMITTED UNLESS THE SERVICE LENGTH EXCEEDS 20M AND UNION 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.
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.
ATTACH TRACING WIRE TO MAIN TRACING WIRE (REFER TO SSMS DWG E2-15) (*)

LEAVE SUFFICIENT SLACK TO ALLOW USE OF TOOLS ON MAIN STOP

SERVICE SADDLE

MAIN STOP

ATTACH TRACING WIRE TO TAIL NUT (*)

SLIDE TYPE SERVICE BOX WITH UPPER AND LOWER SECTION

STAINLESS STEEL ROD AND PIN

ATTACH TRACING WIRE TO TAIL NUT (*)

TAPE TRACING WIRE TO WATER SERVICE AT 5m MIN. INTERVALS (*)

CURB STOP

SOLID CONC BLOCK (200X200X100)

(*) 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.
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.
PLAN VIEW

100 @ VALVE BOX TOP SECTION
GRADE OP5D--1101.02
FINISHED GRADE
VARI'S
MAX 300

STANDARD FRAME AND COVER
(AS PER OP5D 401.02@ TYPE A CLOSE COVER)

150

ADJUSTMENT RINGS

FLAT CAP

"LADDER UP" BY BILCO (GALVANIZED)
OR MSU MODEL 3100
SAFETY POST

PRECAST CONCRETE MH SECTIONS
(SIZE TO SUIT APPLICATION)

MANHOLE STEPS (OP5D--405.01)
(HOLLOW CIRCULAR ALUMINUM)

VALVE STEM EXTENSION

D.L. CL53 PLAIN END BY FL
MIN 150 @ (AS SPECIFIED)

FL x FL SWAB RETRIEVAL PORT c/w BLIND
FLANGE (IF SPECIFIED) SIZED TO SUIT
APPLICATION

300x300x150 MIN SUMP

50 GRANULAR 'A'
LEVELLING SURFACE

PRECAST MANHOLE BASE

NOTES:
1. CHAMBER TO HAVE KOR-N-SEAL BOOT.
2. BACKFILL WITH SELECT SUBGRADE MATERIAL IN ACCORDANCE
   WITH OP5D 1010 AND COMPACT TO 95% S.P.D.
3. ALL JOINTS AND LIFTING HOLES TO BE SEALED WITH NON-
   SHRINK CEMENT, 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 1200mm@ CHAMBER AND
   150mm 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
NOTES:
1. REINFORCED PRECAST CONCRETE MH SECTIONS SHALL BE IN ACCORDANCE WITH OGPS 07 & 1361, AND OGPS 701.03.
2. CHAMBER TO HAVE KOR-N-SEAL SYSTEM OUTLET.
3. BACKFILL WITH SELECT SUBGRADE MATERIAL IN ACCORDANCE WITH OGPS 1010 AND COMPACT TO 90% 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

DRAIN CHAMBER (FOR CONCRETE PRESSURE PIPE)

REVISED DATE: FEB. 2008

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.
NOTES:
1. AIR RELEASE VALVE & PIPING SHALL BE 25mm DIAMETER FOR WATERMINS UP TO & INCLUDING 300mm DIAMETER, AND 50mm DIAMETER FOR WATERMINS 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 OPSS 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.
FLUSHING AND SWAB PORT (UP TO 300mm DIAMETER)

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.
TYPICAL CONNECTION TO ALL METALLIC FITTINGS
SEE DETAIL A&B

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.
Z-24-48 ANODE TO BE INSTALLED AT SAME ELEVATION AS WATERMAIN EVERY 100m.

TAPE TRACING WIRE TO WATERMAIN AT 5m INTERVALS

WRAP ANODE LEAD WIRE AROUND WATERMAIN, KNOT AND LEAVE SLACK.

PLAN VIEW

DETAIL – A-1
ANODE CONNECTION

EXPOSED WIRES TO BE SOLDERED AND WRAPPED WITH DIELECTRIC TAPE OVER WRAPPED WITH VINYL TAPE

TRACING WIRE

ANODE LEAD WIRE

TRACING WIRE, LEAVE SUFFICIENT SLACK

DETAIL – A-2
SOLDERED CONNECTION

TRACING WIRE

KNOT WIRES AHEAD OF CONNECTOR

DRYCONN #10999 WATERPROOF CONNECTOR

2 OR 3 TWU #8 TRACE WIRES

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.
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 = RESTRANDED JOINT.
4. IPT = IRON PIPE THREAD.
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 WATER MAINS ARE DRAINED PRIOR TO THE FINAL CONNECTION 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 WATERMINS, 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 WATERMINS 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

CATCHBASIN FRAME WITH FISH PATTERN

REVISION DATE: FEB. 2008

SSMS
E4 - 01
PLAN VIEW

600mm CATCHBASIN FRAME AND COVER
CATCHBASIN LEAD TO STORM SEWER TO BE LOCATED ON THIS SIDE ON ALL NEW INSTALLATIONS

EXPANSION JOINT
EDGE OF PAVEMENT

BACK ARCH FOR 600mm CATCHBASIN

SECTION A - A

300mm # EQUAL SLOTTED DRAIN PIPE

CONCRETE BARRIER CURB WITH STANDARD GUTTER AS PER OPSD 600.04

SECTION B - B

300mm # EQUAL SLOTTED DRAIN PIPE

REGION OF WATERLOO AND AREA MUNICIPALITIES STANDARD DRAWINGS

CATCHBASIN WITH SLOTTED DRAIN

REVISION DATE: FEB. 2008

SSMS
E4 - 02
NOTE:
1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE SPECIFIED.
2. AT DOUBLE CATCH BASINS MAINTAIN 100mm SEPARATION 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.
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.
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.
13 x 50mm ROLLED STEEL FLAT BAR

19mm DIA. ROUND BAR
SPACED AT 150mm c/c
CENTRE BAR PRODUCED
150mm BEYOND FRAME

75mm CLEARANCE TYP.

12.5 x 50 x 125mm FLAT BAR
WITH 2–13mm DIA. HOLES FOR
10mm EXPANSION ANCHORS

ELEVATION

LOCK DETAIL

HINGE DETAIL

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.
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.
Hydrostatic Pressure Test Template

<table>
<thead>
<tr>
<th>Pipe Class</th>
<th>Material</th>
<th>Diameter</th>
<th>Tested Length and description</th>
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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

<table>
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<tr>
<th>Parameter</th>
<th>Satisfactory</th>
<th>Unsatisfactory</th>
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<tbody>
<tr>
<td>Continuity Signal applied to tracer wire and the signal confirmed over</td>
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<td></td>
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<tr>
<td>the entire length of all tracer wire installed</td>
<td></td>
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</tr>
<tr>
<td>Tracing wire on services is connected to watermain tracer wire and wire</td>
<td></td>
<td></td>
</tr>
<tr>
<td>is intact for the length of the service</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tracing wire in chambers is detectable on the watermain outside of the</td>
<td></td>
<td></td>
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<tr>
<td>chamber</td>
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Test Results:  


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

<table>
<thead>
<tr>
<th>Pipe Class</th>
<th>Material</th>
<th>Diameter</th>
<th>Tested Length and description</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Allowable Leakage Calculations:

<table>
<thead>
<tr>
<th>Start Time of Test</th>
<th>Start Pressure</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Finish Time of Test</th>
<th>Finish Pressure</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Actual Period Main Under Test Pressure (Hrs)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Allowable Volume Loss (L)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Measured Volume Loss (L)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
</tbody>
</table>

Test Results:  □ Satisfactory  □ Unsatisfactory

Remarks:

Contractor:_________________  Inspector:_________________
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:

<table>
<thead>
<tr>
<th>Stage</th>
<th>Street</th>
<th>From</th>
<th>To</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Street A</td>
<td>Exist St</td>
<td>Street B</td>
</tr>
<tr>
<td></td>
<td>Street B</td>
<td>Street A</td>
<td>Street C</td>
</tr>
<tr>
<td>2</td>
<td>Street C</td>
<td>Street B</td>
<td>Street D</td>
</tr>
<tr>
<td></td>
<td>Street D</td>
<td>Street C</td>
<td>Sta. x+xxx</td>
</tr>
</tbody>
</table>

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.

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

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

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:

<table>
<thead>
<tr>
<th>Street</th>
<th>Launch Location</th>
<th>Pipe Size mm</th>
<th>Swab Size mm</th>
<th>Velocity m/s</th>
<th>Street</th>
<th>Retrieval Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Street A</td>
<td>0+000</td>
<td>Swab port</td>
<td>450</td>
<td>500</td>
<td>0.60</td>
<td>Street A</td>
</tr>
<tr>
<td>Street B</td>
<td>2+000</td>
<td>Insert in new pipe</td>
<td>150</td>
<td>200</td>
<td>0.85</td>
<td>Street B</td>
</tr>
</tbody>
</table>

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.

<table>
<thead>
<tr>
<th>Street</th>
<th>Station</th>
<th>Elevation- m</th>
<th>Pressure- kPa (psi)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test pressure application point:</td>
<td>Street A</td>
<td>0+000</td>
<td>310.2</td>
</tr>
<tr>
<td>High point</td>
<td>Street B</td>
<td>2+100</td>
<td>319.5</td>
</tr>
<tr>
<td>Low point</td>
<td>Street B</td>
<td>2+420</td>
<td>308.0</td>
</tr>
</tbody>
</table>

Leakage calculation:

| Length and sizes of test section: | 490 m of 300 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

<table>
<thead>
<tr>
<th>Sample Point Number</th>
<th>Street</th>
<th>Station</th>
<th>Source or Previous Sample Location (m)</th>
<th>Type of Sample Port</th>
</tr>
</thead>
<tbody>
<tr>
<td>2-01</td>
<td>Street C</td>
<td>3+000</td>
<td>Source</td>
<td>Temp copper off mainstop for air relief valve</td>
</tr>
<tr>
<td>2-02</td>
<td>Street C</td>
<td>3+120</td>
<td>120</td>
<td>25 mm Service</td>
</tr>
<tr>
<td>2-03</td>
<td>Street C</td>
<td>3+410</td>
<td>290</td>
<td>Temp copper off mainstop in VC</td>
</tr>
<tr>
<td>2-04</td>
<td>Street D</td>
<td>4+075</td>
<td>140</td>
<td>Temp 19 mm service (to be plugged after testing)</td>
</tr>
<tr>
<td>2-05</td>
<td>Street D</td>
<td>4+425</td>
<td>325</td>
<td></td>
</tr>
</tbody>
</table>
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:

<table>
<thead>
<tr>
<th>Street</th>
<th>Launch Location</th>
<th>Size</th>
<th>Swab Size</th>
<th>Swab Velocity</th>
<th>Retrieval Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Street C</td>
<td>3+000</td>
<td>Swab port</td>
<td>200</td>
<td>50</td>
<td>0.70</td>
</tr>
<tr>
<td>Street D</td>
<td>Street C</td>
<td>150</td>
<td>200</td>
<td>0.85</td>
<td></td>
</tr>
</tbody>
</table>

2 D. HYDROSTATIC TESTING

<table>
<thead>
<tr>
<th>Street</th>
<th>Station</th>
<th>Elevation- m</th>
<th>Pressure- kPa (psi)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test pressure application point: Street C 3+000 310.2 1132 (164)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>High point</td>
<td>Street C 3+200</td>
<td>319.5</td>
<td>1035 (150)</td>
</tr>
<tr>
<td>Low point</td>
<td>Street D 4+130</td>
<td>308.0</td>
<td>1153 (167)</td>
</tr>
</tbody>
</table>

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 ________________