CONCRETE TO BE MIN. 50 BELOW FLANGE NUTS ON HYDRANT AND VALVE

METHOD OF SUPPORTING VALVE CASING

1. BUILD A 600x600 LEVEL BASE OF COMPACTED CLAY AROUND AND OVER VALVE.
2. PLACE ALTERNATE LAYERS OF 50x200x600 TREATED BLOCKS, NOTCHED TO FIT AROUND BONNET, UNTIL REQUIRED CLEARANCE FROM BONNET TO VALVE NUT IS OBTAINED. NAIL EACH LAYER.
3. BONNET CENTERED OVER VALVE NUT FASTENED WITH NAILS BENT OVER.
4. 50x200x600 TREATED BLOCK NOTCHED TO FIT AROUND BONNET AND NAIRED IN PLACE.
5. BACKFILL WITH COMPACTED CLAY TO ABOVE TOP OF BONNET.

CONCRETE THRUST BLOCK
75x300x600 TREATED TIMBER
HYDRANT SEAT

HEIGHT OF SPINDLE AND ROCK DISC NUT MIN. 150 BELOW FINAL GRADE

THE CITY OF SPRUCE GROVE
PLANNING AND INFRASTRUCTURE

REVISIONS

<table>
<thead>
<tr>
<th>DATE</th>
<th>DETAILS</th>
<th>DRAWN</th>
</tr>
</thead>
<tbody>
<tr>
<td>04/12</td>
<td>CHANGES TO NOTES</td>
<td>RP</td>
</tr>
<tr>
<td>04/15</td>
<td>CHANGES TO NOTES</td>
<td>RP</td>
</tr>
</tbody>
</table>

HYDRANT AND VALVE

DRAWN: T. CRAWFORD   DATE: MARCH 6, 2006
CHECKED: J. MUSTARD  SCALE: NOT TO SCALE
APPROVED: J. MUSTARD  DRAWING No.: WR-01
NOTES:
1. ALL BOLTS TO BE STAINLESS STEEL.
   WRAPPED WITH DENSO MASTIC AND DENSO TAPE.
2. PVC SLEEVE TO BE USED WHEN VALVE IS INCORPORATED
   WITHIN CONCRETE.
3. CATHODIC PROTECTION REQUIRED. REFER TO DRAWINGS WR-07 & WR-08.

THE CITY OF SPRUCE GROVE
PLANNING AND INFRASTRUCTURE

VALVE INSTALLATION (300mm)

REVISIONS

<table>
<thead>
<tr>
<th>DATE</th>
<th>DETAILS</th>
<th>DRAWN</th>
</tr>
</thead>
<tbody>
<tr>
<td>04/12</td>
<td>WOOD BLOCKING DETAIL</td>
<td>RP</td>
</tr>
</tbody>
</table>

DRAWN: T. CRAWFORD  DATE: MARCH 6, 2006
CHECKED: J. MUSTARD  SCALE: NOT TO SCALE
APPROVED: J. MUSTARD  DRAWING No.: WR-02
THE CITY OF SPRUCE GROVE
PLANNING AND INFRASTRUCTURE

REVISIONS

<table>
<thead>
<tr>
<th>DATE</th>
<th>DETAILS</th>
<th>DRAWN</th>
</tr>
</thead>
</table>

BUTTERFLY VALVE (<300mm)

DRAWN: T. CRAWFORD  DATE: MARCH 6, 2006
CHECKED: J. MUSTARD  SCALE: NOT TO SCALE
APPROVED: J. MUSTARD  DRAWING No.: WR-03

NOTES:

1. PAINT TOP OF INTERIOR BOX BRIGHT RED AND STAMP CAP "BV".
2. ALL BOLTS TO BE STAINLESS STEEL WRAPPED WITH DENSO MASTIC AND TAPE.
3. PVC SLEEVE TO BE USED WHEN VALVE IS INCORPORATED WITHIN CONCRETE.
4. CATHODIC PROTECTION REQUIRED. REFER TO DRAWINGS WR-07 & WR-08.

INSTALL FLUSH WITH SURFACE
PVC SLEEVE SEE NOTE "3"
150 mm MAX.
VALVE STEAM
TIMBER BLOCKING

VALVE BOX COVERAGE TYPE "A"
SLIDING TYPE "A" VALVE BOX
TO BE INSTALLED IN VERTICAL POSITION
SEE PIPE ZONE DETAIL

20 Mpa CONCRETE CAST IN PLACE

SHORED TRENCH SLOPED TRENCH

THRU5T BLOCK DETAIL

20 Mpa CONCRETE CAST IN PLACE
BEARING AREA 'A' SEE WR-05

20 Mpa CONCRETE CAST IN PLACE
NOTES:
1. ALL BOLTS TO BE STAINLESS STEEL
   WRAPPED WITH DENSO MASTIC AND
   DENSO TAPE.
2. CATHODIC PROTECTION REQUIRED.
   REFER TO DRAWINGS WR-07 & WR-08.
3. VALVE CASING AND OPERATING ROD FOR A
   HOT TAP VALVE SHOULD NOT BE INSTALLED.
4. THE LOCATION OF THE HOT TAP VALVE SHALL
   BE IDENTIFIED ON THE AS-BUILT DRAWINGS.
THrust Block Design is based on:
1. 1050kPa max. system pressure or 700kPa operating pressure plus a surge allowance of 345kPa (2fps surge allowance at 25psi/fps)
2. Thrust block design assumes a min. vertical soil bearing of 100kPa
3. Thrust block bearing area based on P.V.C. pipe (AWWA C900 and C905 DR18)
4. Concrete 20MPa type 50 cement.

<table>
<thead>
<tr>
<th>PIPE SIZE</th>
<th>150</th>
<th>200</th>
<th>250</th>
<th>300</th>
<th>350</th>
<th>400</th>
<th>450</th>
</tr>
</thead>
<tbody>
<tr>
<td>'A'</td>
<td>0.40</td>
<td>0.68</td>
<td>1.06</td>
<td>1.54</td>
<td>2.08</td>
<td>2.72</td>
<td>3.44</td>
</tr>
</tbody>
</table>

The City of Spruce Grove

Planning and Infrastructure

Revisions

<table>
<thead>
<tr>
<th>DATE</th>
<th>DETAILS</th>
<th>DRAWN</th>
</tr>
</thead>
</table>

Thrust Block

Drawn: T. Crawford
Date: March 6, 2006
Checked: J. Mustard
Scale: Not to Scale
Approved: J. Mustard
Drawing No.: WR-05
THRUST BLOCK DESIGN IS BASED ON:
1. 1050kPa MAX. SYSTEM PRESSURE OR 700kPa OPERATING PRESSURE PLUS A SURGE ALLOWANCE OF 345kPa (2fps SURGE ALLOWANCE AT 25psi/fps)
2. THRUST BLOCK DESIGN ASSUMES A MIN. VERTICAL SOIL BEARING OF 100kPa
3. THRUST BLOCK BEARING AREA BASED ON P.V.C. PIPE (AWWA C900 AND C905 DR18)
4. CONCRETE 20MPa TYPE 50 CEMENT.

UPWARD THRUST (GRAVITY)

TABLE – FOR CALCULATION OF BASIC THRUST BLOCK BEARING AREA (IN SQUARE METRES)
CONCRETE UNIT WEIGHT 2400Kg/cu.m

<table>
<thead>
<tr>
<th>BEND</th>
<th>PIPE SIZE</th>
<th>150</th>
<th>200</th>
<th>250</th>
<th>300</th>
<th>350</th>
<th>400</th>
<th>450</th>
</tr>
</thead>
<tbody>
<tr>
<td>11.25'</td>
<td>11.16</td>
<td>0.28</td>
<td>0.45</td>
<td>0.64</td>
<td>0.87</td>
<td>1.14</td>
<td>1.44</td>
<td></td>
</tr>
<tr>
<td>22.50'</td>
<td>0.32</td>
<td>0.57</td>
<td>0.88</td>
<td>1.27</td>
<td>1.73</td>
<td>2.26</td>
<td>2.62</td>
<td></td>
</tr>
<tr>
<td>30'</td>
<td>0.42</td>
<td>0.75</td>
<td>1.17</td>
<td>1.69</td>
<td>2.30</td>
<td>3.00</td>
<td>3.80</td>
<td></td>
</tr>
<tr>
<td>45'</td>
<td>0.62</td>
<td>1.11</td>
<td>1.73</td>
<td>2.50</td>
<td>3.40</td>
<td>4.44</td>
<td>5.62</td>
<td></td>
</tr>
</tbody>
</table>

DOWNWARD THRUST

TABLE – FOR CALCULATION OF BASIC THRUST BLOCK BEARING AREA (IN SQUARE METRES)
CONCRETE UNIT WEIGHT 2400Kg/cu.m

<table>
<thead>
<tr>
<th>BEND</th>
<th>PIPE SIZE</th>
<th>150</th>
<th>200</th>
<th>250</th>
<th>300</th>
<th>350</th>
<th>400</th>
<th>450</th>
</tr>
</thead>
<tbody>
<tr>
<td>11.25'</td>
<td>0.04</td>
<td>0.07</td>
<td>0.11</td>
<td>0.15</td>
<td>0.21</td>
<td>0.27</td>
<td>0.34</td>
<td></td>
</tr>
<tr>
<td>22.50'</td>
<td>0.08</td>
<td>0.13</td>
<td>0.21</td>
<td>0.30</td>
<td>0.41</td>
<td>0.53</td>
<td>0.67</td>
<td></td>
</tr>
<tr>
<td>30'</td>
<td>0.10</td>
<td>0.18</td>
<td>0.28</td>
<td>0.40</td>
<td>0.54</td>
<td>0.71</td>
<td>0.89</td>
<td></td>
</tr>
<tr>
<td>45'</td>
<td>0.15</td>
<td>0.26</td>
<td>0.41</td>
<td>0.59</td>
<td>0.80</td>
<td>1.05</td>
<td>1.32</td>
<td></td>
</tr>
</tbody>
</table>
NOTES:
1. MINIMUM DISTANCE FROM ANODE TO PIPE, FITTING, VALVE, OR HYDRANT IS 150mm.
2. INSTALL ANODE AT APPROX. PIPE DEPTH IN NATIVE SOIL.
3. ZINC ANODES TO BE EMBEDDED INTO TRENCH WALL TO PROVIDE FOR A MINIMUM OF 50mm OF NATIVE CLAY COMPLETELY SURROUNDING THE ANODE.
4. ANODES TO BE AT LEAST 300mm CLEAR OF THRUST BLOCK.
NOTES:
1. MINIMUM DISTANCE FROM ANODE TO PIPE, FITTING, VALVE, OR HYDRANT IS 150mm.
2. INSTALL ANODE AT APP. PIPE DEPTH IN NATIVE SOIL.
3. BOND WIRES MAY BE USED TO PROTECT UP TO TWO FITTINGS WITH ONE ANODE
WHEN DIMENSION 'A' DOES NOT EXCEED ONE (1) METER.
4. ALL ZINC ANODES ON FITTINGS AND VALVES ARE 2.3kg (5lb).
5. ZINC ANODES TO BE EMBEDDED INTO TRENCH WALL TO PROVIDE FOR A
MINIMUM OF 50mm OF NATIVE CLAY COMPLETELY SURROUNDING THE ANODE.
6. ANODES TO BE AT LEAST 300mm CLEAR OF THRUSt BLOCK.

THE CITY OF
SPRUCE GROVE

PLANNING AND INFRASTRUCTURE

REVISIONS

<table>
<thead>
<tr>
<th>DATE</th>
<th>DETAILS</th>
<th>DRAWN</th>
</tr>
</thead>
<tbody>
<tr>
<td>02/14</td>
<td>DRAWING NUMBER</td>
<td>RP</td>
</tr>
</tbody>
</table>

VALVE/FITTING ANODE

DRAWN: T. CRAWFORD  DATE: MARCH 6, 2006
CHECKED: J. MUSTARD  SCALE: NOT TO SCALE
APPROVED: J. MUSTARD  DRAWING No.: WR-08
SOLID OBJECT (e.g. WALL OR FENCE)

Hose nozzle to be parallel to road

Pumper nozzle face road and at right angle to curb

150mmØ steel bumper post filled with concrete

Existing ground

20 MPa concrete, Type 50 cement

NOTE:
1. Adjust number of posts and location according to the site conditions.
2. To be installed in areas adjacent to driveways, approaches and other vehicle access points.

THE CITY OF SPRUCE GROVE
PLANNING AND INFRASTRUCTURE

REVISIONS

<table>
<thead>
<tr>
<th>DATE</th>
<th>DETAILS</th>
<th>DRAWN</th>
</tr>
</thead>
<tbody>
<tr>
<td>02/14</td>
<td>DRAWING NUMBER</td>
<td>RP</td>
</tr>
</tbody>
</table>

HYDRANT BUMPER

DRAWN: T. CRAWFORD
CHECKED: J. MUSTARD
APPROVED: J. MUSTARD

DATE: MARCH 6, 2006
SCALE: NOT TO SCALE
DRAWING NO.: WR-09
WALL
(ENTRANCE WALL)

DOMESTIC
SUPPLY

12" Min.
(300mm)

"A"

METER AND FILL PIECE SPACE

OUTLET
VALVE

MAX 36"
(914mm)

MIN. 12"
(300mm)

FLOOR (GRADE WALL)

INLET
VALVE

NOTE:
1. METER SETTING CONSTRUCTED USING PLASTIC PIPING ON OUTLET SIDE OF METER SHALL HAVE ADEQUATE ANCHORING CAPABLE OF KEEPING THE PIPE IN ALIGNMENT AND SUPPORTING THE WEIGHT OF THE METER, PIPE AND OTHER COMPONENTS.
2. MINIMUM DISTANCE OF CENTERLINE OF PIPING ADJACENT TO METER SETTINGS TO BE 12" (300mm) FROM ANY ENTRANCE, FOUNDATION WALL, INTERIOR WALL OR ANY OTHER POTENTIAL OBSTRUCTION.
3. VALVE IS REQUIRED ON THE INLET AND OUTLET SIDE OF METER SETTING ON ALL PIPE.
4. PIPING FOR "A" MUST BE IN A HORIZONTAL PLANE.
5. VALVES OR FITTINGS ON SIDES CONNECTING TO METER MUST BE 90' FEMALE THREADED IN 1/2" (13mm) FOR 5/8 METER, 3/4" (20mm) FOR 3/4" METER, AND 1" (25mm) FOR 1" METERS.
6. BUILDINGS WITH MORE THAN ONE METER MUST HAVE A METAL OR PLASTIC TAG SECURELY ATTACHED TO THE CONTROL VALVE HANDLE OF THE METER IT SERVES. THE TAG MUST HAVE THE SERVICE ADDRESS ENGRAVED ON IT IN LETTERS OR NUMBERS AT LEAST 5mm (3/16") IN HEIGHT.
7. METER LOCATION MUST REMAIN ACCESSIBLE FOR FUTURE MAINTENANCE OF METER, FITTINGS OR INSPECTION.
8. BACK FLOW PREVENTION DEVICES MAY BE REQUIRED, PHONE THE CITY OF SPRUCE GROVE AT (780) 962-2611.
9. NO BY-PASS ALLOWED UNLESS APPROVED BY THE CITY.

NOTE: 1.5" AND 2" METERS ARE FLANGED END

<table>
<thead>
<tr>
<th>METER SIZE</th>
<th>&quot;A&quot;</th>
<th>&quot;B&quot; MAX</th>
</tr>
</thead>
<tbody>
<tr>
<td>5/8&quot;</td>
<td>12&quot; (300mm)</td>
<td>1&quot; (25mm)</td>
</tr>
<tr>
<td>3/4&quot;</td>
<td>14&quot; (356mm)</td>
<td>1&quot; (25mm)</td>
</tr>
<tr>
<td>1&quot;</td>
<td>16&quot; (400mm)</td>
<td>2&quot; (50mm)</td>
</tr>
<tr>
<td>1.5&quot;</td>
<td>13&quot; (330mm)</td>
<td>3&quot; (75mm)</td>
</tr>
<tr>
<td>2&quot;</td>
<td>17&quot; (432mm)</td>
<td>3&quot; (75mm)</td>
</tr>
</tbody>
</table>

THE CITY OF SPRUCE GROVE

PLANNING AND INFRASTRUCTURE

REVISIONS

<table>
<thead>
<tr>
<th>DATE</th>
<th>DETAILS</th>
<th>DRAWN</th>
</tr>
</thead>
<tbody>
<tr>
<td>02/14</td>
<td>DRAWING NUMBER</td>
<td>RP</td>
</tr>
<tr>
<td>03/15</td>
<td>CHANGES TO NOTES</td>
<td>RP</td>
</tr>
</tbody>
</table>

METER SETTING GUIDELINES

DRAWN: T. CRAWFORD  DATE: MARCH 6, 2006
CHECKED: J. MUSTARD  SCALE: NOT TO SCALE
APPROVED: J. MUSTARD  DRAWING No.: WR–10
Sampling Stations shall be 2.8m minimum bury, with a 3/4" FIP inlet, and a (3/4" hose or unthreaded) nozzle.

All stations shall be enclosed in a lockable, nonremovable, aluminum-cast housing.

When opened, the station shall require no key for operation, and the water will flow in an all brass waterway.

All working parts will also be of brass and be removable from above ground with no digging. Exterior piping shall be galvanized steel (brass pipe also available).

A copper vent tube will enable each station to be pumped free of standing water to prevent freezing and to minimize bacteria growth.

Eclipse No. 88 Sampling Station shall be manufactured by Kupferle Foundry, St. Louis, MO 63102.

ALL SAMPLING STATIONS ARE PROVIDED BY THE CITY OF SPRUCE GROVE BUT INSTALLED BY THE DEVELOPER.