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| W-3 | THRUST BLOCKING FOR WATERMAIN |
| W-4 | FIRE HYDRANT SETTING DETAIL - DUCTILE IRON |
| W-4A | FIRE HYDRANT SETTING DETAIL - HDPE |
| W-5 | TYPICAL COPPER WATER SERVICE - 3/4", 1", 1-1/4", AND 2" |
| W-5A | TYPICAL HDPE WATER SERVICE - 3/4" AND 1" |
| W-5B | 4" & LARGER WATER SERVICE - HDPE |
| W-5C | 4" & LARGER WATER SERVICE - DUCTILE IRON |
| W-6 | STRAPPING WATERMAIN VERTICAL OFFSETS |
| W-7 | 2" HDPE WATERMAIN CONNECTION TO DI OR CI |
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| W-13 | WATER SERVICE INSULATION |
| W-15 | CAST IRON WATER MANHOLE FRAME AND COVER |
| W-16 | DULUTH THREAD FOR STEAMER NOZZLE |
| W-17 | WATER VALVE BOX - DUCTILE IRON MAIN |
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| W-18 | ANODE CONNECTION |
| W-19 | CONCRETE ENCASED VALVE BOX COLLAR IN ROADWAY |
| W-30 | TYPICAL WATER METER INSTALLATION - SINGLE |
| W-31 | TYPICAL WATER METER INSTALLATION WITH BYPASS |
| W-32 | MULTIPLE WATER METER INSTALLATION |
| W-34 | TYPICAL 6" FIRE SERVICE WITH DOMESTIC WATER |
NOTES:
1. BLOCKING DIMENSIONS BASED ON EARTH RESISTANCE OF 2 TONS PER SQ. FT. WHERE, IN THE OPINION OF THE ENGINEER, EARTH IS POOR, BLOCKING SHALL BE INCREASED IN SIZE AS DIRECTED OR STRAPPING MAY BE NECESSARY.
2. ANGLE# SHALL BE EQUAL TO OR LARGER THAN 45°.
3. BLOCKING SHALL BE CENTERED ON MAIN.
4. CONCRETE SHALL BE MIX 3G52 - MDOT 2461.
5. POLYETHYLENE SHALL BE USED TO SEPARATE CONCRETE FROM FITTING.
6. REFER TO SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS.
NOTES
1. DIMENSIONS IN TABLE ARE BASED ON A WATER PRESSURE OF 150 P.S.I. & AN EARTH RESISTANCE OF 2 TONS/S.F.
2. BLOCKING TO BE SET AGAINST UNDISTURBED SOIL
3. CONCRETE SHALL BE MIX 3052. (MNDOT SPEC. 2461) CONCRETE SHALL NOT INTERFERE WITH MECHANICAL JOINTS
4. POLYETHYLENE SHALL BE USED TO SEPARATE CONCRETE FROM FITTING.
5. REFER TO SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS.

<table>
<thead>
<tr>
<th>BLOCKING DIMENSIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>BEND OR BRANCH SIZE</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>0'-6&quot;</td>
</tr>
<tr>
<td>0'-8&quot;</td>
</tr>
<tr>
<td>1'-0&quot;</td>
</tr>
<tr>
<td>1'-4&quot;</td>
</tr>
<tr>
<td>1'-8&quot;</td>
</tr>
<tr>
<td>2'-0&quot;</td>
</tr>
<tr>
<td>2'-6&quot;</td>
</tr>
</tbody>
</table>

THRUST BLOCKING FOR WATERMAIN

REVISED/APPROVED 01/20/2017
CITY OF DULUTH STANDARD DETAIL
DEPT. OF PUBLIC WORKS AND UTILITIES
NO SCALE
GENERAL NOTES:
1. VALVES SHALL BE CONNECTED DIRECTLY TO AN ANCHORING TEE. WHENEVER DIRECT CONNECTION IS NOT POSSIBLE, TIE RODS OR MEGALUGS SHALL BE USED. TIE RODS SHALL BE GALVANIZED.
2. USE EPOXY COATING ON VALVE AND HYDRANT BASE.
3. ALL BOLTS SHALL BE BLUE COATED COR-TEN WITH 6 OUNCE ZINC ANODE CAPS CONFORMING TO ASTM B-418 FOR ALL MECHANICAL JOINT FITTINGS.
4. GATE VALVES AND HYDRANTS WITH ALPHA RESTRAINT COUPLERS MAY BE USED IN LIEU OF MJ FITTINGS.

FIRE HYDRANT SETTING DETAIL - DUCTILE IRON

REVISED/APPROVED 04/05/2019

CITY OF DULUTH STANDARD DETAIL
DEPT. OF PUBLIC WORKS AND UTILITIES

NO SCALE
GENERAL NOTES:
1. VALVES SHALL BE CONNECTED DIRECTLY TO MECHANICAL JOINT ADAPTORS.
2. USE EPOXY COATING ON VALVE AND HYDRANT BASE.
3. ALL BOLTS SHALL BE BLUE COATED COR-TEN WITH 6 OUNCE ZINC ANODE CABLE CONFORMING TO ASTM G-418 FOR ALL MECHANICAL JOINT FITTINGS.
4. FOR 8" MAINS, CONTRACTOR SHALL USE AN 8 X 8 TEE WITH A MACHINED 8 X 6 REDUCER OR AN 8 X 6 ELECTROFUSION BRANCH SADDLE. FOR LARGER DIMENSION MAINS A FABRICATED TEE WITH A 6" BRANCH OUTLET MAY BE USED.
5. HYDRANT AND GATE VALVES WITH ALPHA RESTRAINED COUPLERS MAY BE USED IN LIEU OF MJ FITTINGS. ANODES SHALL BE CONNECTED DIRECTLY TO THE VALVE BONNET BOLTS.
NOTE: EXCAVATE 6" UNDER IN-PLACE MAIN AND BACKFILL WITH COARSE FILTER AGGREGATE MNDOT SPEC. # 3149.2H. CONTRACTOR SHALL PROVIDE & PLACE A TRENCH BOX WHEN REQUIRED.

CURB BOX WILL BE SUPPLIED BY CITY AT GARFIELD SHOP AND INSTALLED BY CONTRACTOR. (INCIDENTAL)

2" I.D. BLK. IRON CAP ON 6" LONG PIECE OF 2" I.D. BLK IRON SLIPPED OVER 1 1/2" I.D. BLK IRON PIPE.

1 1/2" I.D. BLK. IRON PIPE TOP SECTION SLIPPED IN 2" I.D. BLK. IRON PIPE

2" I.D. BLK IRON PIPE BOTTOM SECTION SCREWED ONTO 2" X 1 1/2" I.D. REDUCING BUSHING

WN/DOT 3149.2H COARSE FILTER AGGREGATE REQUIRED AROUND CORPORATION STOP AND CURB STOP

DIRECT CONNECTION

VARIABLE R/W MEASURE - ONE PIECE

TYPE "K" COPPER (FLARED FITTING)

FLARE BY FLARE CURB STOP

CONCRETE SUPPORT

INSERT LEAD OR PLASTIC SLUG & TIGHTEN COUPLING TO SEAL END

5# ZINC ANODE BAG TO BRASS CLAMP (INCIDENTAL)

TYPICAL COPPER WATER SERVICE - 3/4", 1", 1-1/4", AND 2"

REvised/Approved 04/05/2019

CITY OF DULUTH STANDARD DETAIL
DEPT. OF PUBLIC WORKS AND UTILITIES

NO SCALE
NOTE: EXCAVATE 6" UNDER IN-PLACE MAIN AND BACKFILL WITH COURSE FILTER AGGREGATE MNDOT SPEC. # 3149.2H. CONTRACTOR SHALL PROVIDE & PLACE A TRENCH BOX WHEN REQUIRED.

CONTRACTOR SUPPLIED MAGNETIZED TRACER BOX WITH BLUE TOP OVER 1-1/2" I.D. BLK IRON PIPE. WIRE CONNECTED TO TRACER BOX TERMINAL

IRON PIPE WILL BE SUPPLIED BY CITY AT GARFIELD SHOP AND INSTALLED BY CONTRACTOR. (INCIDENTAL)

1 1/2" I.D. BLK IRON PIPE TOP SECTION SLIPPED IN 2" I.D. BLK IRON PIPE

2" I.D. BLK IRON PIPE BOTTOM SECTION SCREWED ONTO 2" X 1-1/2" I.D. REDUCING BUSHING

VARIABLE BAY MEASURE - ONE PIECE

COARSE FILTER AGG. SPEC. NO. 3149.2H REQUIRED AROUND TAPPING TEE AND CURB STOP (INCIDENTAL)

HOPE SDR 9 SERVICE BUTT FUSED OR SOCKET FUSED TO TAPPING TEE

INSTALL TRACER WIRE

BRASS FLARED END SWIVEL TRANSITION FITTING TO CONNECT TO A FLARE BY FLARE CURB STOP TRANSITION FITTING TO BE BUTT FUSED TO HOPE SERVICE PIPE.

LEAVE SLACK IN WIRE

TRACER WIRE RUN ALONG OUTSIDE OF STANDPIPE

FLARE BY FLARE CURB STOP

INSERT LEAD OR PLASTIC SLUG & TIGHTEN COUPLING TO SEAL END

NOTE: SERVICE TO BE AIR TESTED PRIOR TO TAPPING MAIN

THE TRACER WIRE SHALL REMAIN CONTINUOUS TO THE GREATEST EXTENT POSSIBLE. SPLICES IN THE TRACER WIRE SHOULD BE MADE WITH SPLIT BOLT CONNECTORS. WIRE NUTS OR CLIP TYPE CONNECTOR SHALL NOT BE USED. A WATER-PROOF CONNECTION IS NECESSARY TO PREVENT CORROSION.

TYPICAL HOPE WATER SERVICE – 1", 1-1/4", AND 2"

REVISED/APPROVED 04/05/2019
CITY OF DULUTH STANDARD DETAIL
DEPT. OF PUBLIC WORKS AND UTILITIES

W-5A
NO SCALE
GENERAL NOTES

1. VALVES SHALL BE CONNECTED DIRECTLY TO MECHANICAL JOINT ADAPTORS.
2. ALL BOLTS SHALL BE BLUE COATED COR-TEN WITH 6 OUNCE ZINC ANODE CAPS CONFORMING TO ASTM B-118 FOR ALL MECHANICAL JOINT FITTINGS.
3. FOR 8" MAINS, CONTRACTOR SHALL USE AN 8 X 8 TEE WITH A MACHINED 8 X 6 REDUCER OR AN 8 X 6 ELECTROFUSION BRANCH SADDLE. FOR LARGER DIMENSION MAINS A FABRICATED TEE WITH A 6" BRANCH OUTLET MAY BE USED.
4. GATE VALVES WITH ALPHA RESTRAINT COUPLERS MAY BE USED IN LIEU OF MJ FITTINGS. ANODES SHALL BE CONNECTED DIRECTLY TO THE VALVE BONNET BOLTS.
5. WHEN RECONNECTING TO EXISTING SERVICE PIPING CONCRETE THRUST BLOCKING MAY BE REQUIRED.

4" & LARGER WATER SERVICE - HDPE
NOTE: ON EXISTING WATERMAINS, HOT TAPS SHALL BE PERFORMED FOR NEW SERVICES WHEN POSSIBLE.

GENERAL NOTES:
1. VALVES SHALL BE CONNECTED DIRECTLY TO AN ANCHORING TEE. WHENEVER DIRECT CONNECTION IS NOT POSSIBLE, TIE RODS OR MEGALUGS SHALL BE USED. TIE RODS SHALL BE GALVANIZED.
2. USE EPOXY COATING ON VALVE.
3. ALL BOLTS SHALL BE BLUE COATED COR-TEN WITH 6 OUNCE ZINC ANODE CAPS CONFORMING TO ASTM B-418 FOR ALL MECHANICAL JOINT FITTINGS.
4. GATE VALVES WITH ALPHA RESTRAINT COUPLERS MAY BE USED IN LIEU OF MJ FITTINGS.

4" & LARGER WATER SERVICE – DUCTILE IRON

REVISED/APPROVED 04/05/2019

CITY OF DULUTH STANDARD DETAIL
DEPT. OF PUBLIC WORKS AND UTILITIES

NO SCALE
NOTES:
1. TIE RODS, BOLTS, NUTS, BANDS, AND WASHERS TO BE FURNISHED BY THE CONTRACTOR AND INSTALLED BY CONTRACTOR. ALL RODS AND CONNECTING HARDWARE SHALL BE GALVANIZED. ALL BOLTS SHALL BE BLUE COATED COR-TEN WITH ZINC ANODE CAPS.
2. STRAPPING MATERIAL:
   2.1. NO. RODS 2 PER TIE
   2.2. DIA. RODS 1 INCH
   2.3. STRAP SIZE 1/2" X 2"
   2.4. BOLT DIA. 3/4"
   2.5. WASHER SIZE 1/2" X 3" X 5"
3. OFFSETS FOR 16" WATER MAIN AND LARGER, TIE DOWNS SHALL BE INSTALLED AS SHOWN. TURNBUCLE AND BLOCK SIZES:

<table>
<thead>
<tr>
<th>PIPE SIZE</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
</tr>
</thead>
<tbody>
<tr>
<td>16&quot;</td>
<td>6'-0&quot;</td>
<td>2'-0&quot;</td>
<td>3'-0&quot;</td>
<td>0'-1&quot;</td>
</tr>
<tr>
<td>20&quot;</td>
<td>8'-0&quot;</td>
<td>3'-0&quot;</td>
<td>3'-0&quot;</td>
<td>0'-1 1/4&quot;</td>
</tr>
<tr>
<td>24&quot;</td>
<td>8'-0&quot;</td>
<td>3'-0&quot;</td>
<td>5'-0&quot;</td>
<td>0'-1 1/2&quot;</td>
</tr>
<tr>
<td>30&quot;</td>
<td>8'-0&quot;</td>
<td>5'-0&quot;</td>
<td>5'-0&quot;</td>
<td>0'-2&quot;</td>
</tr>
</tbody>
</table>

STRAPPING WATERMAIN VERTICAL OFFSETS  W-6
NOTE: EXCAVATE 6" UNDER IN-PLACE MAIN AND
BACKFILL WITH COARSE FILTER AGGREGATE MINOT
SPEC. # 3149.2H. CONTRACTOR SHALL PROVIDE &
PLACE A TRENCH BOX WHEN REQUIRED.

CONTRACTOR SUPPLIED MAGNETIZED TRACER BOX
WITH BLUE TOP OVER 1-1/2" I.D. BLK IRON PIPE.
WIRE CONNECTED TO TRACER BOX TERMINAL.

IRON PIPE WILL BE SUPPLIED BY
CITY AT GARFIELD SHOP AND
INSTALLED BY CONTRACTOR.
(INCIDENTAL)

2" X 2" L.P.S. BRASS HDPE-
SWIVEL TRANSITION FITTING
WITH HDPE THREADS TO HDPE
2" CU TUBE NUT. 2"
FEMALE HDPE THREAD TO 2"
FEMALE IRON PIPE THREAD
2" 45° BEND
2" CORPORATION STOP
SADDLE

2" HDPE SDR9 WATERMAIN
CONCRETE SUPPORT
DI OR CI WATERMAIN
BRASS HDPE SWIVEL TRANSITION
RUTT OR SOCKET FUSED
INSTALL TRACER WIRE
2" HOPE, SDR9 WATERMAIN

TRACE WIRE RUN ALONG
OUTSIDE OF SAND PIPE
7.5' MIN. COVER
LEAVE SLACK IN WIRE

SPEC. NO 3149H COARSE FILTER
AGGREGATE (INCIDENTAL) REQUIRED
AROUND CORPORATION STOP AND
CURB STOP

THE TRACER WIRE SHALL REMAIN CONTINUOUS TO THE GREATEST EXTENT POSSIBLE. THE NUMBER OF CONNECTIONS MUST BE
KEPT TO A MINIMUM. ANY SPLICES IN THE TRACER WIRE SHOULD BE MADE WITH SPLICE BOLT CONNECTORS. WIRE NUTS OR CLIP
TYPE CONNECTORS SHALL NOT BE USED. A WATER-PROOF CONNECTION IS NECESSARY TO PREVENT CORROSION.

2" HDPE WATERMAIN CONNECTION TO DI OR CI

REVISED/APPROVED 04/05/2019
CITY OF DULUTH STANDARD DETAIL
DEPT. OF PUBLIC WORKS AND UTILITIES
NO SCALE
1-1/4" BLOWOFF FOR 6" & 8" IRON WATERMAINS

NOTE: TOP OF CASTING SHALL BE ½" BELOW FINISHED SURFACE

CONCRETE BLOCK

9 (PROVIDED BY CITY)

TYPE 1 GEOTEXTILE FABRIC (INCIDENTAL)

8 (PROVIDED BY CITY)

1-1/4" I.P. THREAD TO FLARE COPPER COUPLING

1-1/4" CURB STOP, FLARED END FITTINGS

1-1/4" 90° BEND W/ COPPER TYPE GASKET CONNECTION TO CURB STOP

COUPLING, COPPER TO IRON PIPE

1-1/4" I.P. NIPPLE - 6" LONG

1-1/4" I.P. CAP

1-1/4" COPPER TUBE, TYPE K

2" I.D. MINN. PATTERN (BOTTOM SECTION)

1-1/2" BLACK IRON PIPE SLIPPED IN 2" DUCTILE IRON BLACK PIPE

TOP SECTION OF WATERMAIN VALVE BOX W/LID
1 1/4" BLOW OFF (VALVE BOX TYPE) ON EXISTING WATERMAIN
NOTE: TOP OF CASTING SHALL BE 3/8" BELOW FINISHED SURFACE

CONCRETE BLOCK

NOTE: INSTALL BLOCKING ONLY IF THERE IS AN UNRESTRAINED JOINT WITHIN 36" OF THE ENDCAP.

COARSE FILTER AGGREGATE SPEC. NO. 3149.2H (INCIDENTAL)

1-1/4" BLOWOFF FOR HDPE WATERMAIN
NOTE: T/CASTING SHALL BE 3/8" BELOW FINISHED SURFACE

CONCRETE SUPPORT

(PROVIDED BY CITY)

5/8' DRAIN HOLE

TYPE 1 GEOFABRIC

CONCRETE SUPPORT

-COARSE FILTER AGGREGATE
SPEC. NO. 3149.2H

HIGH POINT OF MAIN
WATERMAIN

<table>
<thead>
<tr>
<th>ITEM</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1&quot; CORPORATION STOP</td>
</tr>
<tr>
<td>2</td>
<td>1&quot; COPPER TUBE, TYPE K</td>
</tr>
<tr>
<td>3</td>
<td>1&quot; CURB STOP, FLARED END FITTINGS</td>
</tr>
<tr>
<td>4</td>
<td>1-90° BEND W/ COPPER TYPE GASKET CONNECTION TO CURB STOP</td>
</tr>
<tr>
<td>5</td>
<td>2&quot; I.D. MINN. PATTERN (BOTTOM SECTION)</td>
</tr>
<tr>
<td>6</td>
<td>1-1/2&quot; I.D. BLACK IRON PIPE</td>
</tr>
<tr>
<td>7</td>
<td>TOP SECTION OF WATERMAIN VALVE BOX W/ LID</td>
</tr>
<tr>
<td>8</td>
<td>COUPLING, COPPER TO IRON PIPE</td>
</tr>
<tr>
<td>9</td>
<td>1&quot; LP. NIPPLE - 6&quot; LONG</td>
</tr>
<tr>
<td>10</td>
<td>1&quot; LP. CAP</td>
</tr>
</tbody>
</table>

MANUAL AIR RELEASE VALVE BOX TYPE W-9

REVISED/APPROVED 04/05/2019

CITY OF DULUTH STANDARD DETAIL
DEPT. OF PUBLIC WORKS AND UTILITIES

NO SCALE
EXCAVATION FOR TAPPING SLEEVE AND VALVE

- IN PLACE WATER MAIN
- VARES
- 3.0' MIN FROM NEAREST BELL
- EXCAVATE 2.0' UNDER INPLACE WATER MAIN
- CENTER OF TAP
- TRENCH EXCAVATION LIMITS AT 1' ABOVE TOP OF PIPE
- TRENCH EXCAVATION/CRIBBING INSTALLATION MUST MEET OSHA STANDARDS.

TRENCH BOX OR CRIBBING

OSHA APPROVED SLOPE FOR EXISTING MATERIAL

REVISED/APPROVED 02/01/2013
CITY OF DULUTH STANDARD DETAIL
DEPT. OF PUBLIC WORKS AND UTILITIES
NO SCALE
NOTES:
1. Layering of 2 or 3 sheets to arrive at 3" is required with joints offset a minimum of 6".
2. Polystyrene shall be as specified in the City of Duluth Public Works and Utilities Standard Construction Specifications.
3. Insulation shall only be used where approved by the Engineer.

<table>
<thead>
<tr>
<th>DEPTH (D)</th>
<th>WIDTH (W)</th>
</tr>
</thead>
<tbody>
<tr>
<td>7' or more</td>
<td>none</td>
</tr>
<tr>
<td>5.2' to 6.9'</td>
<td>4'-0&quot;</td>
</tr>
<tr>
<td>4.3' to 5.1'</td>
<td>6'-0&quot;</td>
</tr>
<tr>
<td>3.0' to 4.2'</td>
<td>8'-0&quot;</td>
</tr>
</tbody>
</table>
NOTE: ROUND OFF ALL EXPOSED EDGES FURNISHED WITH MACHINED HORIZONTAL BEARING SURFACES.
WEIGHT: RING—295 LBS. COVER — 162 LBS. SIMILAR OR EQUAL TO NEENAH FOUNDRY NOR-1723 (EXCEPT WITH LETTERING AS NOTED)
NOTES:
1. USE EPOXY COATING ON EXTERIOR OF VALVES
2. ALL BOLTS SHALL BE BLUE COATED COR-TEN WITH 6 OUNCE ZINC ANODE CAPS CONFORMING TO ASTM B-418 FOR ALL MECHANICAL JOINT FITTINGS.
3. GATE VALVES WITH ALPHA RESTRAINT COUPLERS MAY BE USED IN LIEU OF MJ FITTINGS.
CONCRETE ENCASED COLLAR - SEE DETAIL W-19

SET CASTING 0.03" BELOW FINISHED PAVEMENT SURFACE

MAGNETIZED TRACER BOX WITH BLUE TOP, WIRE CONNECTED TO TRACER BOX TERMINAL, TRACER LOCATED DIRECTLY ABOVE PIPE WITHIN 2" OF VALVE BOX.

NOTE: THE CONNECTION FOR THE WIRE IS SO THAT THE MINIMUM NO. OF CONNECTIONS IN THE WIRE SYSTEM ARE USED.

COARSE FILTER AGGREGATE MN/DOT 3149.2.H (INCIDENTAL)

GATE VALVE ADAPTER BOX

GEOTEXTILE FABRIC TYPE 1 (INCIDENTAL)

TRACER WIRE

LEAVE SLACK IN WIRE

CONCRETE BLOCKING

12# ZINC ANODE BAG FASTENED TO MJ BOLT SEE DETAIL W-18 (INCIDENTAL)

HOPE PIPE

HOPE PIPE

HOPE TO MJ ADAPTERS

NOTES:
1. VALVES SHALL BE CONNECTED DIRECTLY TO HOPE WITH HOPE TO MECHANICAL JOINT ADAPTERS.
2. USE EPOXY COATING ON EXTERIOR OF VALVES.
3. ALL BOLTS SHALL BLUE COATED BE COR-TEN WITH 6 OUNCE ZINC ANODE CAPS CONFORMING TO ASTM B-418 FOR ALL MECHANICAL JOINT FITTINGS.
4. FOR OPEN CUT PIPE INSTALLATIONS, ELECTROFUSION COUPLINGS ARE NOT ALLOWED FOR CONNECTION OF HOPE TO MJ ADAPTERS. FOR DIRECTIONAL DRILLED INSTALLATIONS, ONE ELECTROFUSION COUPLING MAY BE USED PER VALVE.
5. GATE VALVES WITH ALPHA RESTRAINT COUPLERS MAY BE USED IN LIEU OF MJ FITTINGS. ANODE SHALL BE CONNECTED DIRECTLY TO THE VALVE BUNNET BOLTS.

WATER VALVE BOX - HDPE MAIN

REVISED/APPROVED 04/05/2019

CITY OF DULUTH STANDARD DETAIL

DEPT. OF PUBLIC WORKS AND UTILITIES

W-17A

NO SCALE
NOTES:

1. CONCRETE (MIX NO. 3052) COLLAR TO ENCASE VALVE BOX CASTING.
2. CONCRETE COLLAR SHALL BE CIRCULAR LAYOUT. PAVEMENT AND BASE SHALL BE CUT OUT WITH ROTATING CUTTING DEVICE.
3. FINISH CONCRETE EDGE WITH 1/4” RADIUS. SEAL JOINT BETWEEN PAVEMENT AND COLLAR.
4. MAINTAIN 3.5” COVER ON REINFORCEMENT.

CONCRETE ENCASED WATER VALVE BOX COLLAR

CONCRETE ENCASED WATER VALVE BOX COLLAR W/ TRACER BOX ALTERNATIVE
### WATER METER SIZE

<table>
<thead>
<tr>
<th>WATER METER SIZE</th>
<th>5/8&quot;</th>
<th>3/4&quot;</th>
<th>1&quot;</th>
<th>1 1/2&quot;</th>
<th>2&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td>A - METER LENGTH</td>
<td>7-1/2&quot;</td>
<td>8&quot;</td>
<td>10 5/8&quot;</td>
<td>12-5/8&quot;</td>
<td>15-1/4&quot;</td>
</tr>
<tr>
<td>B - METER TAIL PIECE</td>
<td>2-5/8&quot;</td>
<td>2-1/2&quot;</td>
<td>2 5/8&quot;</td>
<td>2-1/2&quot;</td>
<td>2-5/8&quot;</td>
</tr>
<tr>
<td>C - METER W/ TAIL PIECE</td>
<td>12-1/2&quot;</td>
<td>14&quot;</td>
<td>16&quot;</td>
<td>17-5/8&quot;</td>
<td>20-1/2&quot;</td>
</tr>
<tr>
<td>TAIL PIECE THREAD SIZE</td>
<td>1/2&quot;</td>
<td>3/4&quot;</td>
<td>1&quot;</td>
<td>2-1/4&quot; X 1-3/4&quot;</td>
<td>2-1/4&quot; X 1-3/4&quot;</td>
</tr>
<tr>
<td>MAX. METER OUTPUT (GPM)</td>
<td>25</td>
<td>35</td>
<td>70</td>
<td>120</td>
<td>170</td>
</tr>
</tbody>
</table>

### NOTES:
1. Supply pipe and fittings between building valve and meter shall be threaded brass and/or copper and not be less than 3/4" size.
2. Meters shall always be installed in a horizontal position.
3. Valves shall be gate or full-way ball valves.
4. Pressure reducing valve is required where pressure exceeds 80 PSI.
5. Electrical continuity strap is required except where bypass is installed. Size of strap by electrical code.

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**TYPICAL WATER METER INSTALLATION – SINGLE**

**W-30**

**REVISED/APPROVED 02/01/2013**

**CITY OF DULUTH STANDARD DETAIL**

**DEPT. OF PUBLIC WORKS AND UTILITIES**

**NO SCALE**
NOTES:
1. Supply pipe and fittings between building valve and meter shall be threaded brass and/or copper and not be less than 3/4" size.
2. Meters shall always be installed in a horizontal position.
3. Valves shall be gate or full-way ball valves.
4. Pressure reducing valve is required where pressure exceeds 80 PSI.
5. Electrical continuity strap is required except where bypass is installed. Size of strap by electrical code.
6. For meters 3" and larger, a strainer is required ahead of meter.
7. Upstream meter valve on multimeter installations must be lockable.

MULTIPLE WATER METER INSTALLATION

REVISED/APPROVED 02-01-2013
CITY OF DULUTH STANDARD DETAIL
DEPT. OF PUBLIC WORKS AND UTILITIES
NO SCALE
NOTES:
1. SUPPLY PIPE AND FITTINGS BETWEEN BUILDING VALVE AND METER SHALL BE THREADED BRASS AND/OR COPPER AND NOT BE LESS THAN 3/4" SIZE
2. METERS SHALL ALWAYS BE INSTALLED IN A HORIZONTAL POSITION
3. VALVES SHALL BE GATE OR FULL-WAY BALL VALVES
4. PRESSURE REDUCING VALVE IS REQUIRED WHERE PRESSURE EXCEEDS 80 PSI
5. ELECTRICAL CONTINUITY STRAP IS REQUIRED EXCEPT WHERE BYPASS IS INSTALLED. SIZE OF STRAP BY ELECTRICAL CODE
6. FOR METERS 3" AND LARGER, A STRAINER IS REQUIRED AHEAD OF METER
7. UPSTREAM METER VALVE ON MULTIMETER INSTALLATIONS MUST BE LOCKABLE
8. BYPASS VALVE MUST BE LOCKABLE OR SEALABLE
9. UPSTREAM METER VALVE ON DOMESTIC BRANCH OFF OF A FIRE SERVICE MUST BE LOCKABLE

TYPICAL 6" FIRE SERVICE WITH DOMESTIC WATER