# List of Water Main Standard Drawings

## City of New York
### Department of Environmental Protection

**November 25, 2020**

<table>
<thead>
<tr>
<th>No.</th>
<th>Std. Dwg. No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>WH0021</td>
<td>Hydrant Setting Methods &amp; Drain Base</td>
</tr>
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<td>2</td>
<td>WH0031</td>
<td>Hydrant Fenders</td>
</tr>
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<td>3</td>
<td>WH0031</td>
<td>Oversize Hydrant Fenders</td>
</tr>
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<td>Hydrant Valve Box</td>
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</tr>
<tr>
<td>6</td>
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<td>20772-AZ</td>
<td>Standard Method of Connections Between Steel and C.I. Pipe</td>
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<td>12</td>
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<td>Standard Symbols to be Used on All Plans &amp; Maps</td>
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<td>33317-I</td>
<td>Standard Chamber for 20&quot; Connection Valves on Steel Mains</td>
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<td>34086-I</td>
<td>Masonry for Access Manholes on 36&quot; Ø to 72&quot; Ø Steel Mains</td>
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<td>15</td>
<td>35510-C1</td>
<td>Joints for Steel Water Mains</td>
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<td>40868-2</td>
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<table>
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<tr>
<th>No.</th>
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<th>Description</th>
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<td>20</td>
<td>44162-W</td>
<td>Standard Chamber for 36&quot; &amp; 36&quot; Butterfly Connection Valve on Steel Main</td>
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<td>22</td>
<td>44307-BZ</td>
<td>Rodding All Special Castings, Lead &amp; Mechanical Joints on Low Pressure Water Mains, Push-on Joint Pipe</td>
</tr>
<tr>
<td>23</td>
<td>44573-W</td>
<td>Standard Chamber for 48&quot; Butterfly Connection Valve on Steel Main</td>
</tr>
<tr>
<td>24</td>
<td>44588-AK</td>
<td>Standard Chamber for 48&quot; Butterfly Line Valve on Steel Main</td>
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<tr>
<td>25</td>
<td>45700-W</td>
<td>Standard Supports for Water Mains Installed at Subways and in Extremely Yielding Soil</td>
</tr>
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</tr>
<tr>
<td>27</td>
<td>46068-Y</td>
<td>Standard Chamber for 12&quot; Outlet Valve</td>
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<td>46104-W</td>
<td>Insulated Flange Joints for Reduction of Electrolysis in Trunk Mains</td>
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<td>46105-W</td>
<td>Standard Chamber for Intermediate Insulated Flange Joints for 36&quot; to 72&quot; Steel and Concrete Pipe</td>
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<tr>
<td>30</td>
<td>46464-Z</td>
<td>Method for Protecting D.I. Water Mains with Shallow (Less than 24&quot;) Cover</td>
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<tr>
<td>31</td>
<td>48829-Z</td>
<td>Expansion Joint for 36&quot;, 36&quot; and 48&quot; Dia. Butterfly Valves</td>
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<tr>
<td>33</td>
<td>WM10402</td>
<td>Pavement Excavation Limits for Permanent Restoration in Streets Protected by N.Y.C. Adm. Code § 19.144, Water Mains 20&quot; and Less in Diameter</td>
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<tr>
<td>34</td>
<td>WM10403</td>
<td>Pavement Excavation Limits for Permanent Restoration, Water Mains 24&quot; and Larger in Diameter</td>
</tr>
</tbody>
</table>
NOTES:
1. HYDRANT DRAIN BASE MUST BE MADE IN ACCORDANCE WITH DEPARTMENT'S LATEST STANDARD SPECIFICATION FOR IRON CASTINGS.
2. LOCATION OF THE DOMED CAST IRON HYDRANT DRAIN IN METHOD-B TO BE AS DETERMINED BY THE ENGINEER.
3. THE DISTANCE OF THE HYDRANT VALVE FROM THE WATER MAIN WILL BE 1 FOOT UNLESS OTHERWISE SHOWN ON CONTRACT PLANS AND/OR AS DIRECTED BY THE ENGINEER.
4. SELECT GRANULAR FILL MUST BE PROVIDED TO BACKFILL VOID SPACE FROM THE BOTTOM OF THE CONCRETE BLOCKS UP TO THE BOTTOM OF THE VALVE BOX SKIRT, IN LINE WITH THE TOP OF THE VALVE BOX FLANGE.
1. CONCRETE COLLARS MUST BE SQUARED AND MADE FLUSH WITH EXISTING SIDEWALK, PAVEMENT, AND CURB.

2. ALL PARTS OF HYDRANT FENDERS MUST BE CLEANED OF SCALE, RUST, AND DIRT AND BE COATED ON THE OUTSIDE WITH A COAT OF RED PRIMER AND ONE COAT OF BLACK ASPHALT PAINT BELOW THE GROUND AND ONE COAT OF INDUSTRIAL GRADE ALUMINUM PAINT ABOVE THE GROUND.

3. THE NUMBER OF HYDRANT FENDERS INSTALLED, AT ANY LOCATION, WILL BE AT THE DISCRETION OF THE ENGINEER.

4. ALL FIELD PAINT MUST BE APPLIED WITH A MINIMUM OF TWO (2) COATS BY BRUSH AS PER THE MANUFACTURER'S INSTRUCTIONS.

5. EXISTING HYDRANTS TO BE CLEANED OF SCALE, RUST AND DIRT PRIOR TO RECEIVING FINISH COATING.

6. ALL HYDRANTS MUST HAVE ONE FINISH COAT OF HEAVY DUTY / INDUSTRIAL EXTERIOR GRADE ENAMEL PAINT

7. SIZE OF WATER MAIN TO BE STENCILED ON STREET SIDE OF HYDRANT IN HEAVY DUTY / EXTERIOR ENAMEL PAINT. COLOR = HIGH GLOSS WHITE MIN. HEIGHT = 4" MAX. HEIGHT = 6"

8. UNITED STATES DEPARTMENT OF TRANSPORTATION CERTIFIED 2" WIDE (DOT C2) REFLECTIVE TAPE MUST BE PLACED IMMEDIATELY BELOW THE THREADS OF THE HYDRANT FENDERS AND MUST ENCIRCLE THE HYDRANT FENDER'S CIRCUMFERENCE. THE TYPE OF DOT C2 TAPE MUST BE 6" RED / 6" WHITE.

NOTES:
NOTES:

1. CONCRETE COLLARS MUST BE SQUARED AND MADE FLUSH WITH EXISTING SIDEWALK, PAVEMENT, AND CURB. THE CONTRACTOR MUST HAND EXCAVATE THE FENDER PIT TO THE REQUIRED DEPTH AND WIDTH WITH CARE NOT TO DAMAGE THE HYDRANT PARTS. THE CONTRACTOR MUST ENSURE A MINIMUM OF 6" CLEARANCE BETWEEN THE HYDRANT DRAIN BASE AND FENDER CONCRETE ENGAGEMENT.

2. ALL PARTS OF OVERSIZE HYDRANT FENDERS MUST BE CLEANED OF SCALE, RUST, AND DIRT AND BE COATED ON THE OUTSIDE WITH A COAT OF RED PRIMER AND ONE COAT OF INDUSTRIAL GRADE ALUMINUM PAINT ABOVE THE GROUND AND ONE COAT OF INDUSTRIAL GRADE ALUMINUM PAINT ABOVE THE GROUND.

3. THE NUMBER OF OVERSIZE HYDRANT FENDERS INSTALLED, AT ANY LOCATION, WILL BE AT THE DISCRETION OF THE ENGINEER. TYPICALLY, HYDRANT LAYOUT WITH TWO FENDERS IS USED AT MID BLOCK LOCATIONS AND HYDRANT LAYOUTS WITH THREE OR FOUR FENDERS ARE USED IN ISLANDS/MEDIANS OR COMMERCIAL DRIVEWAY AREAS.

4. ALL FIELD PAINT MUST BE APPLIED WITH A MINIMUM OF TWO (2) COATS BY BRUSH AS PER THE MANUFACTURER’S INSTRUCTIONS.

5. EXISTING HYDRANTS TO BE CLEANED OF SCALE, RUST AND DIRT PRIOR TO RECEIVING FINISH COATING.

6. ALL HYDRANTS MUST HAVE ONE FINISH COAT OF HEAVY DUTY / INDUSTRIAL EXTERIOR GRADE ENAMEL PAINT TOP = BRIGHT ALUMINUM UPPER SECTION = BLACK < 24" PIPE DIA. RED ≥ 24" PIPE DIA.

7. SIZE OF WATER MAIN TO BE STENCILED ON STREET SIDE OF HYDRANT IN HEAVY DUTY / EXTERIOR ENAMEL PAINT COLOR = HIGH GLOSS WHITE MIN. HEIGHT = 4" MAX. HEIGHT = 6".

8. THE USE OF OVERSIZE HYDRANT FENDERS MUST BE AS SHOWN ON THE CONTRACT DRAWINGS OR AS DIRECTED BY THE ENGINEER.

NOTES:

1. ALL CASTINGS MUST CONFORM TO THE STANDARD SPECIFICATIONS FOR IRON CASTINGS, DEPARTMENT OF ENVIRONMENTAL PROTECTION, CITY OF NEW YORK.

2. WHEN TOLERANCE IN DIMENSIONS IS NOT SHOWN, THE TOLERANCE IN THICKNESS OF METAL MUST NOT BE GREATER THAN 1/16 INCH. ALL OTHER DIMENSIONS MUST BE AS SHOWN ON THE DRAWING AND WITHIN THE TOLERANCES CONSISTENT WITH THE BEST FOUNDRY PRACTICE.

3. HYDRANT VALVE BOXES MUST BE DELIVERED IN ASSEMBLED SETS CONSISTING ONE EACH OF LOWER PART, UPPER PART, AND COVER PER SET PRIOR TO ASSEMBLY. THE COMPONENTS MUST BE COATED AS SPECIFIED IN SPECIFICATIONS MENTIONED ABOVE IN NOTE 1.

<table>
<thead>
<tr>
<th>DESCRIPTION</th>
<th>MIN.</th>
<th>STD.</th>
<th>MAX.</th>
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</thead>
<tbody>
<tr>
<td>UPPER PART</td>
<td>108</td>
<td>120</td>
<td>126</td>
</tr>
<tr>
<td>LOWER PART</td>
<td>117</td>
<td>130</td>
<td>137</td>
</tr>
<tr>
<td>COVER</td>
<td>43</td>
<td>48</td>
<td>50</td>
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P.E. 11-30-20  DATE

ASSOCIATE COMMISSIONER, DESIGN DEPARTMENT OF DESIGN AND CONSTRUCTION

EXECUTIVE DIRECTOR OF ENGINEERING DEPARTMENT OF ENVIRONMENTAL PROTECTION 11/30/2020

NOVEMBER 25, 2020
VALVE BOX COMPONENTS

<table>
<thead>
<tr>
<th>Description</th>
<th>Acceptable Weight -</th>
<th>Std. Dwg. No.</th>
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<tbody>
<tr>
<td>Manhole head</td>
<td>Min. 472 513 539</td>
<td>10240-A-Z</td>
</tr>
<tr>
<td>Manhole head</td>
<td>Max. 383 416 437</td>
<td></td>
</tr>
<tr>
<td>Manhole Cover</td>
<td>Min. 208 220 237</td>
<td></td>
</tr>
<tr>
<td>Valve Box Skirt</td>
<td>Max. 446 465 509</td>
<td></td>
</tr>
</tbody>
</table>

NOTES:
2. This Drawing supersedes Drawing No. 10240-Z.
3. When tolerance in dimensions is not shown, the variation in thickness of metal shall not be greater than 1/8 inch. All other dimensions shall be as shown on the drawing and within the tolerances consistent with the best foundry practice.
NOTES:
1. In wet trenches crushed stone or sand shall be placed under foundation, as required.
2. For standard hydrant connection details, see Std. Dwg. No 18581.57
3. For details of standard manhole head and cover and skirt, see Std. Dwg. No. 10240-A-Z

This drawing supersedes Dwg. No. 11576-2.

City of New York
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF WATER SUPPLY
FOUNTAIN FOR VALVE BOXES

SCALE: 1" = 1'-0"
FEBRUARY, 1984

11576-A-Z
DETAIL OF SEAT TYPE I.

DETAIL OF SEAT TYPE II.

NOTES:
2. Either cover fits both seat types I and II.
3. This drawing supersedes drawing No. 13547-A-Z.

City of New York
DEPARTMENT OF ENVIRONMENTAL PROTECTION

WIDE FLANGE MANHOLE HEAD & COVER
CAST IRON
NOT TO SCALE

JANUARY, 1983

John A. DeFoures
Deputy Director

13547 - B - Z
MANHOLE FRAME
To be furnished with either round or square base and 6" or 12" deep, as called for.

SECTION A-A
WEIGHT OF COVER = 460 LBS.
MIN. 437 LBS

PLAN OF FRAME, SQUARE TYPE
WEIGHT OF FRAME 12" DEEP = 810 LBS
WEIGHT OF FRAME 6" DEEP = MIN. 770 LBS
WEIGHT OF FRAME 6" DEEP = 645 LBS

PLAN OF FRAME, ROUND TYPE
WEIGHT OF FRAME 12" DEEP = 810 LBS
WEIGHT OF FRAME 12" DEEP = MIN. 770 LBS
WEIGHT OF FRAME 6" DEEP = MIN. 670 LBS

DEPARTMENT OF ENVIRONMENTAL PROTECTION
LARGE MANHOLE FRAME & COVER
SCALE: 1" = 1'-0"
SEPT. 1951

NOTES:
1. The casting shall conform to DEP standard specifications for Iron Castings, 1951.
2. Latest Revision.

DRAWN BY: J. E. M. RIEDEL
TRACED BY: L. M.
CHECKED BY: M. A. W.

18583-Z
CITY OF NEW YORK
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF WATER SUPPLY
STANDARD METHODS FOR RECONSTRUCTING CATCH BASIN CONNECTIONS
SCALE: 1/4" = 1'-0" EXCEPT AS NOTED  JAN. 1992

DRAWN BY: R.J.C.
TRACED BY: R.J.C.
CHECKED BY: M.J.W.

SECTION A-A
SCALE: 1/4" = 1'-0"

SECTION B-B
SCALE: 1/4" = 1'-0"

Harry Hollinder  Edward Clark
DIVISION ENGINEER  CHIEF ENGINEER
DIVISION OF INVESTIGATION & DESIGN

19841-Z-B
### MAINS

<table>
<thead>
<tr>
<th>Diameter (Inches)</th>
<th>Existing (S)</th>
<th>New (C)</th>
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<tr>
<td>96</td>
<td></td>
<td></td>
</tr>
<tr>
<td>84</td>
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<tr>
<td>72</td>
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<td>66</td>
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<td>2</td>
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</table>

Existing Main to be lowered

Mains with an "S" superimposed on their respective sizes are steel water mains

Mains with a "C" superimposed on their respective sizes are concrete water mains

### APPURTENANCES ON MAINS

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<th>Description</th>
<th>Existing</th>
<th>New</th>
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<tbody>
<tr>
<td>Hydrant</td>
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<td>Valve</td>
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<tr>
<td>Valve (closed)</td>
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<td>Check Valve</td>
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<tr>
<td>Reducer</td>
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<tr>
<td>Connection</td>
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<tr>
<td>Cap</td>
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<tr>
<td>Plug</td>
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<tr>
<td>Blow-off</td>
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<td>Access M.H.</td>
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<td>Roundabout</td>
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<td>Régulator</td>
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<td>Venturi Meter</td>
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<td>Tap for air vent</td>
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<td>ELECTROLYSIS TEST CONNECTION</td>
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<td>Curb test box</td>
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<tr>
<td>Welded Conn.</td>
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### MISCELLANEOUS

- Sewer & Manhole
- Catch basin & Conn.
- Storm Sewer
- Combination Sewer
- Sanitary Sewer
- Chamber
- Test Pits
- Test Borings

Note: Existing shown lightly, new work shown dark.
NOTES:

1. THE CHAMBER SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE REQUIREMENTS OF APPLICABLE STANDARD WATER MAIN SPECIFICATIONS AND AS SHOWN ON THE DRAWING TO THE SATISFACTION OF THE ENGINEER.

2. PAYMENT FOR ALL WORK, EQUIPMENT AND MATERIAL REQUIRED SHALL BE THE LUMP SUM BID FOR THE ITEM PROVIDED IN THE SCHEDULE OF BID PRICES UNLESS OTHERWISE INDICATED ON THE DRAWING.

3. CONCRETE SHALL BE CLASS 35.

QUANTITIES

<table>
<thead>
<tr>
<th>CONCRETE</th>
<th>TYPE</th>
<th>PK</th>
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<tr>
<td>2.33</td>
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<td>4'-6&quot;</td>
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<tr>
<td>2.79</td>
<td>5-6</td>
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C.I. Manhole steps Pattern No. U581 as manufactured by Campbell or approved equal (Typ.)

Sunken gravel or broken stone bedding.

Cement, sand and water.

Screened gravel or broken stone bedding.

Insulated joint, for details see Standard Drawing No. 8336-M.

Line seal type wall penetration seal as figure manufactured by Thunderline Corp., Wayne, Michigan or approved equal (Typ.)
NOTES:

Where cover on pipe exceeds 5:

- The 6" casing walls shall be reinforced 1/8" from the inner faces with 3/8" rods, 12" on centers horizontally and vertically.

- C. Pumps or Steps shall be installed 12" a.c. vertically.

DETAILED FOR ACCESS MANHOLES ON 30" to 48" STEEL MAINS

SECTION 'X-X'

TYPICAL SECTION 'XX'

DETAILED FOR ACCESS MANHOLES ON 60" & 72" STEEL MAINS

SECTION 'A-A'

SECTION 'C-C'

SECTION 'D-D'

DETAILED FOR ACCESS MANHOLES ON 60" & 72" STEEL MAINS

DETAILED FOR ACCESS MANHOLES ON 30" to 48" STEEL MAINS

QUANTITIES

<table>
<thead>
<tr>
<th>PIPE SIZE</th>
<th>CONCRETE CUBIC YD</th>
<th>STEEL</th>
<th>LB/FT</th>
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<tbody>
<tr>
<td>30&quot;</td>
<td>3.59</td>
<td>0.43</td>
<td>311</td>
</tr>
<tr>
<td>40&quot;</td>
<td>4.18</td>
<td>0.43</td>
<td>311</td>
</tr>
<tr>
<td>48&quot;</td>
<td>4.65</td>
<td>0.43</td>
<td>369</td>
</tr>
<tr>
<td>72&quot;</td>
<td>5.77</td>
<td>0.43</td>
<td>423</td>
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*WEIGHT OF WIRE MESH NOT INCLUDED.*
FILLET WELDED FIELD LAP JOINT
EXPANDED END OR BELL TYPE

DEFLECTED JOINT
(See Table and Notes for maximum permissible deflection angles.)

TYPICAL SLIP-ON FLANGED JOINT

NOTES:
Pipe sleeve and cover plates shall be of some thickness as steel being joined.
All plugs shall be ground flush.
All welds shall be continuous.
L = thickness as specified.
Bolted welded joints to be full penetration welds.
Size of all fillet welds shall be 0.06 minimum.
1. Where clearance between new water main and top of existing vitrified pipe sewer is more than 6" and less than 12", replace the vitrified pipe with cast iron pipe.
2. Install concrete cradles where new water main crosses sewer 12" and larger, where clearance between bottom of main and top of sewer is less than 12", or as directed.
3. Concrete cradles to be used at pipe sewers and other crossings as directed by the Engineer.
4. All digging to be done by hand within one foot of existing sewers or house connection drains.

**MINIMUM DIMENSIONS & VOL.**

<table>
<thead>
<tr>
<th>PIPE DIAMETER</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>CONCRETE VOL.</th>
<th>STEEL LBS.</th>
</tr>
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<tbody>
<tr>
<td>36&quot;</td>
<td>3'-6&quot;</td>
<td>5'-0&quot;</td>
<td>1'-6&quot;</td>
<td>1.59</td>
<td>50.1</td>
</tr>
<tr>
<td>48&quot;</td>
<td>3'-6&quot;</td>
<td>6'-0&quot;</td>
<td>1'-9&quot;</td>
<td>2.08</td>
<td>60.8</td>
</tr>
<tr>
<td>60&quot;</td>
<td>4'-0&quot;</td>
<td>7'-0&quot;</td>
<td>2'-0&quot;</td>
<td>3.01</td>
<td>76.1</td>
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<tr>
<td>72&quot;</td>
<td>4'-0&quot;</td>
<td>8'-0&quot;</td>
<td>2'-3&quot;</td>
<td>3.69</td>
<td>87.5</td>
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CITY OF NEW YORK
DEPARTMENT OF ENVIRONMENTAL PROTECTION
SUPPORTS FOR WATER MAIN
OVER PIPE CROSSING
NOT TO SCALE
JANUARY 1967
SHALLOW CROSSING FOR WATER MAINS, 24" DIAMETER AND SMALLER

NOTE
All pipe to be restrained in accordance with Department Standards and Specifications. See Dwg. No. 6038 A-2, 44867-0-2.

CITY OF NEW YORK
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF WATER SUPPLY

SCALE: NONE
DATE: MAY 1970
SHEET 1 OF 1

DRAWN BY: W.S.B.J.M.
CHECKED BY: J.B.T.

42063-Y
NOTES:

1. See Std. Specifications for Pay Limits for Filter Fabric and screened gravel or broken stone bedding.

2. Depth of bedding shall be as shown in the Table above or as ordered and approved by the Engineer.

CITY OF NEW YORK
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF WATER SUPPLY

GRAVEL OR BROKEN STONE BEDDING
AND FILTER FABRIC INSTALLATION
FOR DUCTILE CAST IRON PIPES

REVISED: FEB. 1989

44292-B-Z
LENGTH TO BE RODDED FOR VERTICAL BENDS & OFFSETS
(APPLIES ONLY FOR 2FT COVER BETWEEN STREET SURFACE AND WATER MAINS)

<table>
<thead>
<tr>
<th>DIAM. IN INCHES</th>
<th>€: CAP OR VALVE</th>
<th>VERTICAL OFFSET</th>
<th>DEGREE OF VERTICAL BEND</th>
<th>REDUCERS</th>
</tr>
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<tbody>
<tr>
<td>6</td>
<td>35</td>
<td>16</td>
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<tr>
<td>20</td>
<td>125</td>
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LENGTH TO BE RODDED FOR HORIZONTAL BENDS & OFFSETS
(APPLIES ONLY FOR 4FT COVER BETWEEN STREET SURFACE AND WATER MAINS)

<table>
<thead>
<tr>
<th>DIAM. IN INCHES</th>
<th>CAP OR VALVE</th>
<th>OUTLET END OF 3-WAY</th>
<th>DEGREE OF HORIZONTAL BEND</th>
<th>REDUCERS</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
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<td>18</td>
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<tr>
<td>20</td>
<td>65</td>
<td>10</td>
<td>18</td>
<td>30</td>
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</tbody>
</table>

NOTES
1. REQUIRED LENGTHS OF RESTRAINT FOR PIPES UP TO AND INCLUDING 48-INCH DIAMETER, AT VARIOUS HEIGHTS OF COVER, ARE LISTED IN THE "SPECIFICATIONS FOR DUCTILE CAST IRON PIPE 6-INCH THROUGH 48-INCH DIAMETER".
2. ALL JOINTS WITHIN THE DISTANCE OF "L" OR "L", AS APPLICABLE, SHALL BE RODDED.
3. PIPE JOINTS SHALL BE PUSH-ON TYPE WITH RUBBER GASKET.
4. BELL AND SPIGOT CASTINGS SHALL HAVE 100% LEAD JOINTS.
5. TOTAL OF ALL ADJACENT ANGLES SHALL BE USED IN TABLE FOR DETERMINING "L" AND "L".
6. LENGTH OF REDUCERS SHALL BE INCLUDED IN THE REQUIRED LENGTH OF RESTRAINT "L" OR "L".
7. PIPE SHALL BE RODDED (RESTRAINED) ON BOTH SIDES OF A VALVE.
8. FOR DETAILS OF RODS AND BANDS, SEE Dwg. 10238-A-Z.

CITY OF NEW YORK
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF WATER SUPPLY
RODDING ALL SPECIAL CASTINGS, LEAD & MECHANICAL JOINTS ON LOW PRESSURE WATER MAINS, PUSH-ON JOINT PIPE
NOT TO SCALE JULY 1986

44387-Z-A
NOTES:
1. The minimum compressive strength of cast-in-place concrete, C, shall be 3,500 psi at 28 days.
2. Air entraining agents may be used in the concrete, subject to the approval of the engineer.
3. The allowable concrete slump shall be 2 to 4 inches.
4. Steel for reinforcing shall be ASTM A615 Grade 60 and shall conform to the requirements of the Standard Specifications for Deformed and Plain Billet Steel Bars for Concrete Reinforcement.
5. Steel reinforcement may be slightly milled or bent in the field to clear watertaps, anchors, obstructions and inclusions as approved by the Engineer.
6. The concrete cover for steel reinforcement shall be as follows:
   a. Concrete poured on ground - 3"
   b. Surfaces exposed to earth, water and weather - 2"
   c. Surfaces not exposed to earth, water or weather - 1.5"
   d. Slab not exposed to earth, water or weather - 1"
   e. All keys - 1"
7. Where bars are to be spliced or embedded, the length of splice or embedment shall comply with the latest edition of the American Concrete Institute.
8. Construction joints shall be provided with 8-inch PVC watertaps where indicated on the drawing or as ordered by the Engineer.
9. All exposed corners and edges of the structure shall be chamfered one inch, except where otherwise noted.
10. The chamber shall be waterproofed with layers of woven fiberglass fabric saturated with bituminous waterproofing substance on exterior surfaces as shown on the drawing.
11. For details of Insulated Flanges, see Std. Dwg. No. 4605-W.
Section b-b

Table B

<table>
<thead>
<tr>
<th>Diameter Min. Size</th>
<th>Steel Plate Thickness</th>
<th>Remarks</th>
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<tr>
<td>6&quot;</td>
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</tr>
<tr>
<td>8&quot;</td>
<td>1.25&quot;</td>
<td></td>
</tr>
<tr>
<td>10&quot;</td>
<td>1.5&quot;</td>
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<tr>
<td>12&quot;</td>
<td>1.75&quot;</td>
<td></td>
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<tr>
<td>14&quot;</td>
<td>2&quot;</td>
<td></td>
</tr>
<tr>
<td>16&quot;</td>
<td>2.25&quot;</td>
<td></td>
</tr>
</tbody>
</table>

Notes:
1. Offsets shall have restrained joints.
2. Clean fill shall be thoroughly compacted around pipe between beams.
3. All pavement restoration over plates to have 6" min. concrete base.
4. The design for protection of mains may be varied as required for a particular location, but shall conform to the general requirements as shown on this drawing. Any major deviation from these requirements shall be approved by the engineer.
5. Support of piers or beams directly on sewer, subway or other structures shall be approved by the engineer.
6. If cover is less than 1.5", pipes shall be insulated with 2" min. thick of approved insulation with aluminum jacket.

Method for Protecting D.I. Water Mains with Shallow (Less Than 24") Cover

City of New York
Department of Environmental Protection
Bureau of Water Supply

Method for Protecting D.I. Water Mains with Shallow (Less Than 24") Cover

Scale: Not to Scale

May 1986

Department of Environmental Protection

Director of Design

Deputy Director
Pipe: 1 in.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
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<th></th>
<th></th>
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<td>1</td>
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<td>1</td>
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</tr>
</tbody>
</table>

Notes:
1. Dimension shown between ( ) apply only for 48" dia. expansion joint.
2. Flanges for expansion joints shall be hub flanges, welded front and back with fillet weld size equal to pipe thickness (t)". Steel for flanges shall conform to Section 15 of N.Y.C. Specifications for "Furnishing, Delivering and Laying Steel Pipe and Appurtenances" latest revision.
3. Flange dimensions shall conform to AWWA Standard ANSI/AWWA C-207-86 for steel hub flange Class C. Note Tables.
4. Bolts and washers for flanged and track head bolts shall be stainless steel type 304 with minimum Type 316 stainless steel washers. All expansion joints shall be stainless steel type 316 and meet the requirements of ASTM designation A193-88 and A194-88.
5. All welded lap joints shall be air tested. After testing, test heads shall be plugged, ground flush and properly coated.
6. Expansion joint shall be shipped and installed at initial setting (mid position).
7. Except slip pipe, all internal and external surfaces of expansion joint shall be coated with two coats of an NSF approved material submitted for approval.
8. Detailed shop drawings for expansion joints, furnished for each contract, shall be submitted for approval before fabrication.
NOTES:

(1) ALL BACKFILL MATERIALS AND METHODS OF COMPACTION SHALL COMPLY WITH THE REQUIREMENTS OF THE STANDARD SPECIFICATIONS OF THE DIVISION OF INFRASTRUCTURE, DEPARTMENT OF DESIGN AND CONSTRUCTION.

(2) BROKEN STONE BASE OR OTHER SUPPORT UNDER PIPE, AND FILTER FABRIC, INSTALLATION OF WHICH MAY BE REQUIRED, ARE NOT SHOWN.

(3) THE MINIMUM WIDTH OF TRENCH (W), COVERING THE WIDTH OF PAVEMENT EXCAVATION AND REPLACEMENT, IS SPECIFIED IN SECTION 5.02 OF THE STANDARD WATER MAIN SPECIFICATIONS. HOWEVER, WHEN THE BASE PAVEMENT IS UNDERCUT, THE BASE PAVEMENT SHALL BE REMOVED AND ADJUSTED ACCORDINGLY TO ELIMINATE ALL UNDERCUTTING.

(4) FOR ADDITIONAL INFORMATION ON BACKFILLING TRENCHES AND DESCRIPTION OF BACKFILL TYPES "A" AND "C", SEE SECTION 4.05 OF THE STANDARD WATER MAIN SPECIFICATIONS.

(5) THERE WILL BE NO ADDITIONAL PAYMENT FOR THE REMOVAL OF TEMPORARY PAVEMENT AND THE BACKFILLING TO THE BOTTOM OF NEW CONCRETE BASE, BUT PAYMENT THEREOF SHALL BE DEEMED INCLUDED IN THE PRICES BID FOR OTHER ITEMS.

(6) NO PAYMENT FOR CUT NO. 1 AND 2 THE COSTS THEREOF SHALL BE INCLUDED IN THE PRICE BID FOR OTHER ITEMS.

(7) EXPOSED CONCRETE EDGES SHALL BE CLEANED AND COATED WITH APPROVED EPOXY BONDING COMPOUND.

(8) REFLECTIVE CRACKING MEMBRANE SHALL BE PLACED OVER JOINT BETWEEN NEWLY PLACED AND EXISTING CONCRETE BASES AND OVER ALL TRANSVERSE JOINTS OR CRACKS THAT CARRY THROUGH.

(9) ALL SAW—CUT EDGES OF EXISTING ASPHALT PAVEMENT SHALL BE COATED WITH AN APPROVED ASPHALTIC TACK COAT NOT MORE THAN THREE (3) HOURS PRIOR TO THE RESTORATION OF THE WEARING COURSE.

(10) FOR DETAILS OF REPLACING PAVEMENTS AND FOUNDATIONS, SEE SECTION 5.33 OF THE STANDARD WATER MAIN SPECIFICATIONS.

(11) THIS STANDARD SUPERSEDES DEP STANDARD DRAWING NO. 47343-Z.
CITY OF NEW YORK
DEPARTMENT OF DESIGN AND CONSTRUCTION
PAVEMENT EXCAVATION LIMITS FOR
PERMANENT RESTORATION IN STREETS
PROTECTED BY N.Y.C. ADM. CODE § 19.144
WATER MAINS 20" AND LESS IN DIAMETER
(NOT TO SCALE)

NOTES:


2. BROKEN STONE BASE OR OTHER SUPPORT UNDER PIPE, AND FILTER FABRIC, INSTALLATION OF WHICH MAY BE REQUIRED, ARE NOT SHOWN.

3. THE MINIMUM WIDTH OF TRENCH (W), GOVERNING THE WIDTH OF PAVEMENT EXCAVATION AND REPLACEMENT, IS SPECIFIED IN SECTION 5.02 OF THE STANDARD WATER MAIN SPECIFICATIONS. HOWEVER, WHEN THE BASE PAVEMENT IS UNDERCUT, THE BASE PAVEMENT SHALL BE REMOVED AND ADJUSTED ACCORDINGLY TO ELIMINATE ALL UNDERCUTTING.

4. FOR ADDITIONAL INFORMATION ON BACKFILLING TRENCHES AND DESCRIPTION OF BACKFILL TYPES "B" AND "C", SEE SECTION 4.06 OF THE STANDARD WATER MAIN SPECIFICATIONS.

5. THERE WILL BE NO ADDITIONAL PAYMENT FOR THE REMOVAL OF TEMPORARY PAVEMENT AND THE BACKFILLING TO THE BOTTOM OF NEW CONCRETE BASE, BUT PAYMENT THEREOF SHALL BE DEEMED INCLUDED IN THE PRICES BID FOR OTHER ITEMS.

6. NO PAYMENT FOR CUT NO. 1 AND 3. THE COSTS THEREOF SHALL BE INCLUDED IN THE PRICE BID FOR OTHER ITEMS. CUT NO. 2 SHALL BE PAID FOR UNDER THE PAY ITEM OF "SAW-CUTTING PAVEMENT".

7. EXPOSED CONCRETE EDGES SHALL BE CLEANED AND COATED WITH AND APPROVED EPOXY BONDING COMPOUND.

8. REFLECTIVE CRACKING MEMBRANE SHALL BE PLACED OVER JOINT BETWEEN NEWLY PLACED AND EXISTING CONCRETE BASES AND OVER ALL TRANSVERSE JOINTS OR CRACKS THAT CARRY THROUGH.

9. ALL SAW-CUT EDGES OF EXISTING ASPHALT PAVEMENT SHALL BE COATED WITH AN APPROVED ASPHALTIC TACK COAT NOT MORE THAN THREE (3) HOURS PRIOR TO THE RESTORATION OF THE WEARING COURSE.

10. FOR DETAILS OF REPLACING PAVEMENTS AND FOUNDATIONS, SEE SECTION 5.33 OF THE STANDARD WATER MAIN SPECIFICATIONS.

11. THIS STANDARD SUPERSEDES DEP STANDARD DRAWING NO. 47321-A-Z.

DRAWN: J.R.
CHECKED: P.B.
APPROVED: E.G.
DATE: NOVEMBER 1, 2007
NOTES:


2. BROKEN STONE BASE OR OTHER SUPPORT UNDER PIPE, AND FILTER FABRIC, INSTALLATION OF WHICH MAY BE REQUIRED, ARE NOT SHOWN.

3. THE MINIMUM WIDTH OF TRENCH (W), GOVERNING THE WIDTH OF PAVEMENT EXCAVATION AND REPLACEMENT, IS SPECIFIED IN SECTION 6.02 OF THE STANDARD WATER MAIN SPECIFICATIONS. HOWEVER, WHEN THE BASE PAVEMENT IS UNDERCUT, THE BASE PAVEMENT SHALL BE REMOVED AND ADJUSTED ACCORDINGLY TO ELIMINATE ALL UNDERCUTTING.

4. FOR ADDITIONAL INFORMATION ON BACKFILLING TRENCHES AND DESCRIPTION OF BACKFILL TYPES "B" AND "C", SEE SECTION 4.06 OF THE STANDARD WATER MAIN SPECIFICATIONS.

5. THERE WILL BE NO ADDITIONAL PAYMENT FOR THE REMOVAL OF TEMPORARY PAVEMENT AND THE BACKFILLING TO THE BOTTOM OF NEW CONCRETE BASE, BUT PAYMENT THEREOF SHALL BE DEEMED INCLUDED IN THE PRICES BID FOR OTHER ITEMS.

6. NO PAYMENT FOR CUT NO. 1, 2 AND 3. THE COSTS THEREOF SHALL BE INCLUDED IN THE PRICE BID FOR OTHER ITEMS.

7. EXPOSED CONCRETE EDGES SHALL BE CLEANED AND COATED WITH AN APPROVED EPoxy BONDING COMPOUND.

8. REFLECTIVE CRACKING MEMBRANE SHALL BE PLACED OVER JOINT BETWEEN NEWLY PLACED AND EXISTING CONCRETE BASES AND OVER ALL TRANSVERSE JOINTS OR CRACKS THAT CARRY THROUGH.

9. ALL SAW-CUT EDGES OF EXISTING ASPHALT PAVEMENT SHALL BE COATED WITH AN APPROVED ASPHALTIC TACK COAT NOT MORE THAN THREE (3) HOURS PRIOR TO THE RESTORATION OF THE WEARING COURSE.

10. FOR DETAILS OF REPLACING PAVEMENTS AND FOUNDATIONS, SEE SECTION 5.03 OF THE STANDARD WATER MAIN SPECIFICATIONS.

11. THIS STANDARD SUPERSEDES DEP STANDARD DRAWING NO. 47321-A-Z.