## THE CITY OF NEW YORK
### DEPARTMENT OF ENVIRONMENTAL PROTECTION
### LIST OF WATER MAIN STANDARD DRAWINGS

<table>
<thead>
<tr>
<th>NO.</th>
<th>STD. DWG. NO.</th>
<th>DESCRIPTION</th>
</tr>
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<tbody>
<tr>
<td>1</td>
<td>10240-A-Z</td>
<td>VALVE BOX SKIRT, CAST IRON</td>
</tr>
<tr>
<td>2</td>
<td>10241-A-Z</td>
<td>HYDRANT VALVE BOX, CAST IRON</td>
</tr>
<tr>
<td>3</td>
<td>11576-A-Z</td>
<td>FOUNDATIONS FOR VALVE BOXES</td>
</tr>
<tr>
<td>4</td>
<td>13547-B-Z</td>
<td>WIDE FLANGE MANHOLE HEAD &amp; COVER, CAST IRON</td>
</tr>
<tr>
<td>5</td>
<td>18583-Z</td>
<td>LARGE MANHOLE FRAME &amp; COVER</td>
</tr>
<tr>
<td>6</td>
<td>19840-A-X</td>
<td>STANDARD REGULATOR CHAMBERS</td>
</tr>
<tr>
<td>7</td>
<td>19841-Z-B</td>
<td>STANDARD METHODS FOR RECONSTRUCTING CATCH BASIN CONNECTIONS</td>
</tr>
<tr>
<td>8</td>
<td>20731-Z-C</td>
<td>STANDARD METHOD OF CONNECTIONS BETWEEN STEEL AND C.I. PIPE</td>
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<td>9</td>
<td>22809-Z</td>
<td>HYDRANT DRAIN BASE</td>
</tr>
<tr>
<td>10</td>
<td>26438-Z-A</td>
<td>STANDARD SYMBOLS TO BE USED ON ALL PLANS &amp; MAPS</td>
</tr>
<tr>
<td>11</td>
<td>31050-Z</td>
<td>STANDARD METHODS FOR HYDRANT DRAINAGE, 31050-Z SUPERSEDES 11522-Z</td>
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<tr>
<td>12</td>
<td>33317-Y</td>
<td>STANDARD CHAMBER FOR 20&quot; CONNECTION VALVES ON STEEL MAINS</td>
</tr>
<tr>
<td>13</td>
<td>34006-Y</td>
<td>MASONRY FOR ACCESS MANHOLES ON 30&quot; Ø TO 72&quot; Ø STEEL MAINS</td>
</tr>
<tr>
<td>14</td>
<td>35310-C-Y</td>
<td>JOINTS FOR STEEL WATER MAINS</td>
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<tr>
<td>15</td>
<td>38226-Y-A</td>
<td>STANDARD FABRICATED CONNECTIONS FOR STEEL MAINS</td>
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<tr>
<td>16</td>
<td>40868-Z</td>
<td>SUPPORTS FOR WATER MAIN OVER PIPE CROSSING</td>
</tr>
<tr>
<td>17</td>
<td>42063-Y</td>
<td>SHALLOW CROSSING FOR WATER MAINS, 24&quot; DIAMETER AND SMALLER</td>
</tr>
<tr>
<td>18</td>
<td>44015-A-X</td>
<td>STANDARD CHAMBER FOR 36&quot; BUTTERFLY LINE VALVE ON STEEL MAIN</td>
</tr>
<tr>
<td>19</td>
<td>44162-W</td>
<td>STANDARD CHAMBER FOR 30&quot; &amp; 36&quot; BUTTERFLY CONNECTION VALVE ON STEEL MAIN</td>
</tr>
<tr>
<td>20</td>
<td>44292-B-Z</td>
<td>GRAVEL OR BROKEN STONE BEDDING AND FILTER FABRIC INSTALLATION FOR DUCTILE CAST IRON PIPES</td>
</tr>
<tr>
<td>21</td>
<td>44387-Z-B</td>
<td>RODDING ALL SPECIAL CASTINGS, LEAD &amp; MECHANICAL JOINTS ON LOW PRESSURE WATER MAINS, PUSH-ON JOINT PIPE</td>
</tr>
<tr>
<td>22</td>
<td>44573-W</td>
<td>STANDARD CHAMBER FOR 48&quot; BUTTERFLY CONNECTION VALVE ON STEEL MAIN</td>
</tr>
<tr>
<td>23</td>
<td>44588-A-X</td>
<td>STANDARD CHAMBER FOR 48&quot; BUTTERFLY LINE VALVE ON STEEL MAIN</td>
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<tr>
<td>24</td>
<td>45161-A-Z</td>
<td>STANDARD STEEL HYDRANT FENDER</td>
</tr>
<tr>
<td>25</td>
<td>45700-W</td>
<td>STANDARD SUPPORTS FOR WATER MAINS INSTALLED AT SUBWAYS AND IN EXTREMELY YIELDING SOIL</td>
</tr>
<tr>
<td>26</td>
<td>46006-X</td>
<td>STANDARD BLOWOFFS, DETAILS OF VALVE AND BLOWOFF MANHOLES</td>
</tr>
<tr>
<td>27</td>
<td>46069 Y</td>
<td>STANDARD CHAMBER FOR 12&quot; OUTLET VALVE</td>
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<tr>
<td>28</td>
<td>46104-W</td>
<td>INSULATED FLANGE JOINTS FOR REDUCTION OF ELECTROLYSIS IN TRUNK MAINS</td>
</tr>
<tr>
<td>29</td>
<td>46105-W</td>
<td>STANDARD CHAMBER FOR INTERMEDIATE INSULATED FLANGE JOINTS FOR 36&quot; TO 72&quot; STEEL AND CONCRETE PIPE</td>
</tr>
<tr>
<td>30</td>
<td>46464-Z</td>
<td>METHOD FOR PROTECTING D.I. WATER MAINS WITH SHALLOW (LESS THAN 24&quot;) COVER</td>
</tr>
<tr>
<td>31</td>
<td>48829-Z</td>
<td>EXPANSION JOINT FOR 30&quot;, 36&quot; AND 48&quot; DIA. BUTTERFLY VALVES</td>
</tr>
<tr>
<td>32</td>
<td>WM0401</td>
<td>PAVEMENT EXCAVATION LIMITS FOR PERMANENT RESTORATION IN STREETS NOT PROTECTED BY N.Y.C. ADM. CODE § 19.144, WATER MAINS 20&quot; AND LESS IN DIAMETER</td>
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<tr>
<td>33</td>
<td>WM0402</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>WM0403</td>
<td>PAVEMENT EXCAVATION LIMITS FOR PERMANENT RESTORATION, WATER MAINS 24&quot; AND LARGER IN DIAMETER</td>
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</table>
VALVE BOX COMPONENTS

<table>
<thead>
<tr>
<th>Description</th>
<th>Acceptable Weight -</th>
<th>Std. Dng. No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manhole head</td>
<td>Min. 472, Std. 513, Max. 539</td>
<td>10240-A-Z</td>
</tr>
<tr>
<td>Manhole head</td>
<td>Min. 383, Std. 416, Max. 437</td>
<td>10240-A-Z</td>
</tr>
<tr>
<td>Manhole Cover</td>
<td>Min. 208, Std. 226, Max. 237</td>
<td>10240-A-Z</td>
</tr>
<tr>
<td>Valve Box Skirt</td>
<td>Min. 446, Std. 485, Max. 509</td>
<td>10240-A-Z</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.

City of New York
DEPARTMENT OF ENVIRONMENTAL PROTECTION

VALVE BOX SKIRT
CAST IRON

JANUARY, 1983

Chief of Design

Deputy Director
NOTES:

1. The casting shall conform to DEP Standard Specifications for Iron Castings; rev. 6-22-80, latest revision.

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 3/4 inch. All other dimensions shall be as shown on the drawing and within the tolerances consistent with the best foundry practice.

4. Hydrant valve boxes shall be delivered in assembled sets consisting one each of upper port, lower port and cover per set. Prior to assembly, the components shall be coated as specified in Specifications mentioned above in Note 1.

LOWER PART

SCALE 1"=1'

SECTION B-B

DETAL OF SCREW THREADS

SCALE 3"=1'

UPPER PART

SCALE 1"=1'

SECTION C-C

COVER

SCALE 2"=1'

VALVE BOX COMPONENTS

<table>
<thead>
<tr>
<th>Description</th>
<th>Acceptable weight - lbs.</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Min.</td>
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<tr>
<td>Upper port</td>
<td>108</td>
</tr>
<tr>
<td>Lower port</td>
<td>117</td>
</tr>
<tr>
<td>Cover</td>
<td>43</td>
</tr>
</tbody>
</table>
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 B-Z

3. For details of standard manhole head and cover and skirt, see Std. Dwg. No. 10240-A-Z

This drawing supersedes Dwg. No. 11576-Z

City of New York
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF WATER SUPPLY

FOUNDTIONS FOR VALVE BOXES

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

City of New York
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF WATER SUPPLY

FOUNDTIONS FOR VALVE BOXES

SCALE: 1" = 1'-0"
FEBRUARY, 1984
Letfer blocks of rims raised 7/16" nigh, 13547rB-JZ

DETAIL OF SEAT TYPE I.

TOP VIEW

SECTION D-D

MANHOLE HEAD
CAST IRON
12" head std. wt. - 513#
6"  "  min. wt. - 472#
4"  "  std. wt. - 416#
2"  "  min. wt. - 383#

NOTES:
1. The casting shall conform to DEP Standard Specifications for Iron Castings; Revised 6/30/93, Latest Revision.
2. Either cover fits both seat types I and II.
3. This drawing supersedes drawing No. 13547-A-Z.

MANHOLE HEAD
HEAD & COVER
CAST IRON
WIDE FLANGE MANHOLE
NOT TO SCALE

City of New York
DEPARTMENT OF ENVIRONMENTAL PROTECTION
JANUARY, 1993

Walter C. Coscarelli
Chief of Design

5/15/03 CHANGED REFERENCE TO STD. SPEC'S.
6/27/03 ADDED MINIMUM WEIGHT
9/03/03 ADDED ORIGIN CAST MARK

Edgar L. C. Fleshman
Deputy Director
MANHOLE FRAME
To be furnished with either round or square base and 6" or 12" deep, as called for.

NOTE 1.
The casting shall conform to DEP Standard specifications for Iron Castings; Rev. 1-30-03. Latest Revision.

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

PLAN OF FRAME, ROUND TYPE
WEIGHT OF FRAME 12" DEEP = 645 LBS.
WEIGHT OF FRAME 6" DEEP = 510 LBS.

DEPARTMENT OF ENVIRONMENTAL PROTECTION
LARGE MANHOLE FRAME & COVER

SCALE: 1/8" = 1'-0"
REBUILD CATCH BASIN IF REQUIRED TO GIVE 2'-0" MIN. SHOWN.

EXISTING OUTLET TO BE BRICKED UP

RELOCATED HOOD

EXISTING PIPE TO BE REMOVED

WATER MAIN

NEW 12" VITRIFIED PIPE LAID IN CONCRETE CRADLE

NOTE:

REPLACE ENTIRE CONNECTION - BASIN TO SEWER TO STRAIGHT LINE AND GRADE

NEW 12" VITRIFIED PIPE ENCASED IN CONCRETE

5'-2" ROOS
MIN. OR -2.5%

EXISTING INLET TO BE REMOVED

EXISTING SEWER

NEW 12" VIT. PIPE

1:2:4 CONCRETE

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

5'-2" ROOS
1:2:4 CONCRETE

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

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. 1952

Harry Hollinder
Chief Engineer
Division of Investigation & Design

19841-Z-B
PLAN

TO BE MADE IN ACCORDANCE WITH DEP STANDARDS
SPECIFICATIONS FOR IRON CASTINGS;
REVISED 2/1930
FOR METHOD OF SETTING
SEE DWG. NO. 31050-Z

SIDES OF 1/4" HOLE PARALLEL TO VERTICAL AXIS

WEIGHT
MAX.-- --- 284 LBS.
STD.-- --- 270 LBS.
MIN.-- --- 240 LBS.

SECTION A-A

CITY OF NEW YORK
DEPARTMENT OF ENVIRONMENTAL PROTECTION
HYDRANT DRAIN BASE
SCALE: 1" = 8"
JANUARY 1931

22809-Z
# Standard Symbols

## Mains

<table>
<thead>
<tr>
<th>Diameter</th>
<th>Existing</th>
<th>New</th>
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<td>![New Symbol]</td>
</tr>
<tr>
<td>84 &quot;</td>
<td>![Existing Symbol]</td>
<td>![New Symbol]</td>
</tr>
<tr>
<td>72 &quot;</td>
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</tr>
<tr>
<td>60 &quot;</td>
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<td>![New Symbol]</td>
</tr>
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<td>24 &quot;</td>
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<td>16 &quot;</td>
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<td>14 &quot;</td>
<td>![Existing Symbol]</td>
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</tr>
<tr>
<td>8 &quot;</td>
<td>![Existing Symbol]</td>
<td>![New Symbol]</td>
</tr>
<tr>
<td>6 &quot;</td>
<td>![Existing Symbol]</td>
<td>![New Symbol]</td>
</tr>
<tr>
<td>4 &quot;</td>
<td>![Existing Symbol]</td>
<td>![New Symbol]</td>
</tr>
<tr>
<td>2 &quot;</td>
<td>![Existing Symbol]</td>
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</table>

Existing Main to be lowered: XXXX

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

<table>
<thead>
<tr>
<th></th>
<th>Existing</th>
<th>New</th>
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<tbody>
<tr>
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<td>Valve (closed)</td>
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<td>Check Valve</td>
<td>![Existing Symbol]</td>
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<tr>
<td>Reducer</td>
<td>![Existing Symbol]</td>
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<td>Connection</td>
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<td>Plug</td>
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<td>Access M.H.</td>
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<td>Régulateur</td>
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<td>Venturi Meter</td>
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<tr>
<td>Tap for air vent</td>
<td>![Existing Symbol]</td>
<td>![New Symbol]</td>
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**Electrolysis Test Connection**
- Curb test box: ![Curb Symbol]
- Welded Conn.: ![Welded Conn. Symbol]

**Miscellaneous**
- Sewer & Manhole: ![Sewer Symbol]
- Catch basin & Conn.: ![Catch Basin Symbol]
- Storm Sewer: ![Storm Sewer Symbol]
- Combined Sewer: ![Combined Sewer Symbol]
- Sanitary Sewer: ![Sanitary Sewer Symbol]
- Chamber: ![Chamber Symbol]
- Test Pits: ![Test Pits Symbol]
- Test Borings: ![Test Borings Symbol]

---

**Notes:**

- Existing shown lightly, new work shown dark.

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

**Standard Symbols**

**To Be Used on All Plans & Maps**

**Drawn by:** J.M.W.

**Checked by:** G.J.

**Revised Jan. 1973 April 1982**
METHOD (A)
HYDRANT SET ON C.I. DRAIN BASE
SCALE: 1/4"=1'-0"

METHOD (B)
HYDRANT SET WITH BLIND DRAIN
SCALE: 1/4"=1'-0"

DRAIN ASSEMBLY
FOR HYDRANT SET ON DRAIN BASE
SCALE: 3"=1'-0"

PLAN OF CONCRETE BOX BLIND DRAIN
SCALE: 1/2"=1'-0"

SECTION B-B
SCALE: 1/2"=1'-0"

Note:
Dimensions of drain may be varied by permission of the Engineer; provided the same cubic contents are retained.

Revised Feb. 1948 — AA Lead pipe eliminated.

CITY OF NEW YORK
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF WATER SUPPLY
STANDARD METHODS FOR HYDRANT DRAINAGE
31050-Z Supersedes 11522-Z
SCALE: AS ShOWN FEB. 1948

Harry Koenderink
DIVISION ENGINEER

Edward Gillman
CHIEF ENGINEER
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.

PLAN

ROOF PLAN

SECTION A-A

SECTION B-B

SECTION C-C

QUANTITIES

<table>
<thead>
<tr>
<th>CONCRETE</th>
<th>TYPE</th>
<th>&quot;&quot;</th>
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<tbody>
<tr>
<td>5.23</td>
<td>8&quot;</td>
<td>9'-6&quot;</td>
</tr>
<tr>
<td>5.24</td>
<td>6&quot;</td>
<td>3'-6&quot;</td>
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</table>

DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF WATER SUPPLY AND WASTEWATER COLLECTION

STANDARD CHAMBER FOR 20" CONNECTION VALVES ON STEEL MAINS

SCALE: 1/4"=1'-0" DATE: JUN, 1952

CITY OF NEW YORK
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF WATER SUPPLY AND WASTEWATER COLLECTION

33317-Y
**NOTES:**

- The 6" slab shall be reinforced 1/8" from the inner faces with 5/8" #3, 12" centers horizontally and vertically.
- If C. Pumps or Steps will be installed 12" above vertically.

**SECTION D-D**

**DETAILS FOR ACCESS MANHOLES ON 30" TO 48" STEEL MAINS**

**QUANTITIES**

<table>
<thead>
<tr>
<th>PIPE SIZE</th>
<th>CONCRETE COVERAGE</th>
<th>ORTHOPHOS</th>
<th>STEEL</th>
<th>LBs.</th>
</tr>
</thead>
<tbody>
<tr>
<td>30&quot;</td>
<td>3.50</td>
<td>0.84</td>
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<tr>
<td>48&quot;</td>
<td>4.33</td>
<td>0.67</td>
<td>382</td>
<td></td>
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</table>

**CITY OF NEW YORK**

**DEPARTMENT OF ENVIRONMENTAL PROTECTION**

**BUREAU OF WATER SUPPLY**

**MASONRY FOR ACCESS MANHOLES ON 30" TO 48" STEEL MAINS**

**SCALE: 1\" = 1'-0"**

**DRAWN BY: G. G. EMM**

**CHECKED BY: J. ZAMARR**

**F. A. W**
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

MAXIMUM PERMISSIBLE DEFLECTION ANGLES, $\theta$, in.

<table>
<thead>
<tr>
<th>PIPE DIAMETER</th>
<th>$\theta_1$ (in.)</th>
<th>$\theta_2$ (deg.)</th>
<th>$\theta_3$ (deg.)</th>
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<tr>
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<td>1.3</td>
<td>1.7</td>
<td>1.4</td>
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<tr>
<td>40</td>
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<tr>
<td>12</td>
<td>2.5</td>
<td>1.9</td>
<td>1.4</td>
</tr>
</tbody>
</table>

Up to 54" diameter, $\theta_1$ is based on maximum allowable diametral gap of 1/8", and over 54" d, is based on available length in the straight portion of bell. $\theta_2$ is based on a minimum required diametral gap of 1/8".

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. All welded joints to be full penetration weld. Size of all fillet weld shall be 3/8" minimum.

Drawn by: A.S. Checked by: D.R.B.
Chief of Design: W.L. Finkman P.E.
Deputy Director: J. E. Zimmerman P.E.

35310-C-Y

SECTION a-a

DETAIL A

DETAIL B

NOT TO SCALE
MAY, 1984
**TEST HOLE**

**SIZE**

- 48 x 48
- 8 x 8.625
- 10 x 10

**OUTLET & 2 PIPES OF FOR STEEL SCHEO.**

**± 16 ± 5 ± 2.**

**SCHEDULE**

- 40
- 36
- 32
- 28
- 24
- 20
- 16
- 12
- 8

**FOR PIPE 30" DIAMETER &**

**SADDLE SL.1"-OH OR WELDING &**

**HOLES**

- 10, 16
- 129
- 156

**8-" HOLES FOR 1/8" x 4 LONG BOLTS**

**DIA.**

- 30
- 25
- 19
- 8

**& PIPE 30" DIAMETER &**

**SLIP-ON FLANGE**

**WEIGHTS:**

- COVER-120/4
- FLANGE-OUTLET+SADDLE-321/4
- BOLTS, NUTS & WASHERS-65

**ABBREVIATIONS:**

- B.C. = BOLT CIRCLE
- F.F. = FLAT FACE
- I.D. = INNER DIAMETER
- O.D. = FLANGE OUTSIDE DIAMETER
- S.O. = SLIP-ON

**NOTES:**

1. FIELD WELDS ARE INDICATED BY THE STANDARD SYMBOL .
2. ALL FILLET WELDS SHALL BE CONTINUOUS.
3. ALL FLANGE HOLES SHALL BE STRAIGHT CENTER LINE.
4. ALL TEST HOLES SHALL BE PLUGGED AND ALL PLUGS GROUND FLUSH AFTER TESTING.
5. SLIP-ON FLANGES CONFORMING TO AWWA STANDARD ANSI/AWWA C-507-85, CLASS E MAY BE USED IN LIEU OF SLIP-ON FLANGES AT NO ADDED COST TO THE CITY OF NEW YORK.
6. MAXIMUM SIZE OUTLETS FOR STEEL PIPE USING COLLAR PLATE REINFORCEMENT.
7. FOR OUTLETS EXCEEDING THE ABOVE LIMITS, DESIGN AND DRAWINGS SHALL BE SUBMITTED TO THE ENGINEER FOR APPROVAL.
8. ALL DIMENSIONS ARE IN INCHES.

**THIS DRAWING SUPERSEDES DRAWING 38226-Y**

**STANDARD FABRICATED CONNECTIONS FOR STEEL MAINS**
WATER
1/2" Rods, 12" O.C. MAIN

1/2" Rods, 9" O.C

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.

3. Where clearance between bottom of main and top of sewer is less than 12", or as directed.

4. Concrete cradles to be used at pipe sewers and other crossings as directed by the Engineer.

5. 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 CU. YDS.</th>
<th>STEEL LBS.</th>
</tr>
</thead>
<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>
</tr>
<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>
</tr>
</tbody>
</table>

CITY OF NEW YORK
DEPARTMENT OF ENVIRONMENTAL PROTECTION
SUPPORTS FOR WATER MAIN
OVER PIPE CROSSING

NOT TO SCALE JANUARY 1967

Drawn by: R.B. Checked by: G.G.
DIVISION ENGINEER DIVISION OF INVESTIGATION AND DESIGN
NOTE
All pipe to be restrained in accordance with Department Standards and Specifications. See Dwg. No. 00304-1-44387-6-2.

SHALLOW CROSSING FOR WATER MAINS, 24 INCH OR SMALLER

SECTION B-B

SECTION A-A

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.M.T.

42063-Y
NOT TO SCALE

REFERENCE DRAWINGS

1. For insulated joints, see Drawing No. 48574-W
2. For 8" street outlet connection, see Drawing No. 48573-W
3. For flange thickness of reinforced lap splices, see Drawing No. 48573-W
4. For flange thickness of insulated flange joints, see Drawing No. 48574-W
5. For details of expansion Joint, see the Drawing No. 48573-2

GENERAL NOTES

1. This drawing shall be used for the purpose of determining dimensions, but the complete information on this drawing shall be found in the following:
2. This drawing shall be used for the purpose of determining dimensions, but the complete information on this drawing shall be found in the following:
3. This drawing shall be used for the purpose of determining dimensions, but the complete information on this drawing shall be found in the following:
4. This drawing shall be used for the purpose of determining dimensions, but the complete information on this drawing shall be found in the following:

QUANTITIES FOR ESTIMATING

<table>
<thead>
<tr>
<th>Item</th>
<th>Unit</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.00</td>
<td></td>
<td>2965</td>
</tr>
</tbody>
</table>

DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF WATER SUPPLY

STANDARD CHAMBER FOR 36" BUTTERFLY LINE VALVE ON STEEL MAIN

SCALE 1/4"=1'-0" DATE: DECEMBER, 1984 SHEET: 1 OF 1

NOTE FOR DETAILS OF EXPANSION JOINT AND 6" DIA. OUTLET SEE 1ST DRAWING NO. 48573-Z.
Surface of street pavement

Bottom of existing or proposed pavement

Approved refill material

Filter fabric

Water main

Pipe installation trench

Bedding trench

C = Var (see Table)

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

NOV. 1985
REVISED: FEB. 1989

This drawing supersedes Dwg. No. 44292-A-Z 44292-B-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

NOTES
1. REQUIRED LENGTHS OF RESTRAINT FOR PIPES UP TO AND INCLUDING 48-INCH IN 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

THIS DRAWING SUPERSEDES DRAWING NO. 44387-Z-A

FOR REDUCER OR BEND WHICHEVER VALUE IS LARGER

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>DEGREE OF VERTICAL BEND</th>
<th>REDUCERS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>90°  45°  22.5°  11.25°</td>
<td>SIZE L</td>
</tr>
<tr>
<td>6</td>
<td>35     16     24    16    10    6    -    -</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>48     21     32    27    15    9    8 6    21</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>74     32     47    32    20    11   12 6    41</td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>125    50     77    50    30    17   20    12  80</td>
<td></td>
</tr>
</tbody>
</table>

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>OUTLET OR VALVE OF 3-WAY</th>
<th>DEGREE OF HORIZONTAL BEND</th>
<th>REDUCERS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Lc  CAP END OF 3-WAY</td>
<td>90°  45°  22.5°  11.25°</td>
<td>SIZE L</td>
</tr>
<tr>
<td>6</td>
<td>18     9      9      6      3      2   -   -</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>24     12     12     7      4      2    8 6    21</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>37     11     11     7      4      2    12 6    14</td>
<td></td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>63     10     10     3      18     10   5    12 6    23</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>100% LEAD JOINTS</td>
<td>LEAD JOINTS</td>
<td></td>
</tr>
</tbody>
</table>

3 WAY

VERTICAL OFFSET

FOR REDUCER OR BEND WHICHEVER VALUE IS LARGER

DESIGN ENGINEER

44387-Z-B
HYDRANT FENDER LAYOUT

Notes: 1) Dimensions shown thus [10"] are typical dimensions. 2) Dimensions marked with an * are minimum dimensions. 3) Concrete collars shall be squared and made flush with existing sidewalk pavement and curb.

METHOD A
For new hydrant installations in fresh backfill

METHOD B
For existing hydrants in undisturbed soil

City of New York
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF WATER SUPPLY
STANDARD STEEL HYDRANT FENDER
Not to scale

Drawn by: A.S. Checked by: B.S.
Supersedes Dwg. No. 42225-Z April, 1982


NOTES:

1. For selecting the applicable method for supporting water mains, see Table 5.
2. All pipes supported by methods B, C, D, and F shall have bar supports.
3. Method B is used to support steel pipes, the minimum wall thickness of the pipe shall be as given in Table 3.
4. All pipes and methods for their support (concrete, reinforced concrete, reinforced concrete, steel, etc.) shall comply with the regulations of the state specifications.
5. Minimum 2-inch clearance shall be provided for reinforcing bar supports, and a minimum of 3 inches for all design moments in contact with soils.
6. Standard details for pipes are shown on this diagram. Method D is used to support pipes in a way that they are not subjected to extreme loads.

STANDARD METHODS OF PIPE SUPPORTS:

Table 1: Nominal diameters, pipe, and values of 

Table 2: Minimum thicknesses, 

Table 3: Minimum wall thickness, for steel pipes supported by method D

Table 4: Minimum thicknesses, 

Table 5: Applicable methods for supporting water mains

SECTION C-C

SECTION D-D

SECTION F-F

SECTION A-A

SECTION B-B

DRAWN BY:

DEPUTY DIRECTOR

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

STANDARD SUPPORTS FOR WATER MAINS INSTALLED AT SUBWAYS AND IN EXTREMELY YIELDING SOIL

SCALE: NOT TO SCALE DATE: JULY, 1986 SHEET: 1 OF 1

45700-W
TABLE A

<table>
<thead>
<tr>
<th>A</th>
<th>( M_y )</th>
<th>( S_y ) ( \text{min.} )</th>
<th>( l_1 )</th>
<th>SUGGESTED BEAM SIZE</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>29.13</td>
<td>15.8</td>
<td>WI2x16</td>
<td>WBx18</td>
</tr>
<tr>
<td>6</td>
<td>35.7</td>
<td>16.2</td>
<td>WI2x19</td>
<td>WBx24</td>
</tr>
<tr>
<td>7</td>
<td>42.5</td>
<td>22.9</td>
<td>WI2x22</td>
<td>WBx28</td>
</tr>
<tr>
<td>8</td>
<td>54.8</td>
<td>30.44</td>
<td>WI2x26</td>
<td>WBx35</td>
</tr>
<tr>
<td>9</td>
<td>60.63</td>
<td>37.07</td>
<td>WI4x30</td>
<td>W12x39</td>
</tr>
<tr>
<td>10</td>
<td>79.1</td>
<td>45.94</td>
<td>WI4x34</td>
<td>W12x45</td>
</tr>
<tr>
<td>11</td>
<td>91.7</td>
<td>50.94</td>
<td>WI4x38</td>
<td>W12x49</td>
</tr>
<tr>
<td>12</td>
<td>104.7</td>
<td>58.17</td>
<td>WI4x43</td>
<td>W12x54</td>
</tr>
<tr>
<td>13</td>
<td>117.92</td>
<td>65.51</td>
<td>WI4x48</td>
<td>W12x53</td>
</tr>
<tr>
<td>14</td>
<td>131.5</td>
<td>73.08</td>
<td>WI4x53</td>
<td>W12x58</td>
</tr>
<tr>
<td>15</td>
<td>145.3</td>
<td>80.72</td>
<td>WI4x61</td>
<td>W12x60</td>
</tr>
</tbody>
</table>

7. DIMENSIONS SHOWN FOR CONCRETE SUPPORT ARE APPLICABLE UP TO AND INCLUDING 36" DIAMETER OFFSET.

8. STEEL BEAMS, EXTERIORS OF PIPE COLUMNS AND OTHER EXPOSED METAL COMPONENTS SHALL BE COATED WITH COAL TAR ENAMEL BEFORE BACKFILLING THE EXCAVATIONS.

\[ a \] ALL STRUCTURAL STEEL SHALL CONFORM TO ASTM A-36

METHOD FOR PROTECTING D.I. WATER MAINS WITH SHALLOW (LESS THAN 24") COVER

SCALE: NOT TO SCALE

MAY 1986

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

HAROLD C. FLATOW, P.E.
CHIEF OF DESIGN

EDWARD A. MARCHY
DEPUTY DIRECTOR

TABLE B

<table>
<thead>
<tr>
<th>WATER MAIN SIZE</th>
<th>STEEL PLATE THICKNESS</th>
<th>6' MIN.</th>
</tr>
</thead>
<tbody>
<tr>
<td>6&quot; E, 8&quot;, 12&quot;</td>
<td>1/4&quot;</td>
<td></td>
</tr>
<tr>
<td>10&quot; H1020/24&quot;</td>
<td>5/32&quot;</td>
<td></td>
</tr>
<tr>
<td>12&quot; H12/36&quot;</td>
<td>5/32&quot;</td>
<td></td>
</tr>
</tbody>
</table>

NOTES:

1. OFFSETS SHALL HAVE RESTRAINED JOINTS.

2. CLEAN FILL TO 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 OR OTHER STRUCTURES SHALL BE APPROVED BY THE ENGINEER.

6. IF COVER IS LESS THAN 1'-6", PIPE SHALL BE INSULATED WITH 3" MIN. THICK OF APPROVED INSULATION WITH ALUMINUM JACKET.

7. SCALE: NOT TO SCALE

MAY 1986

HAROLD C. FLATOW, P.E.
CHIEF OF DESIGN

EDWARD A. MARCHY
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MAY 1986

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MAY 1986

HAROLD C. FLATOW, P.E.
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7. SCALE: NOT TO SCALE

MAY 1986

HAROLD C. FLATOW, P.E.
CHIEF OF DESIGN

EDWARD A. MARCHY
DEPUTY DIRECTOR
1. Dimension shown between ( ) apply only for 48" dia. expansion joint.
2. Flanges for expansion joints shall be hub flanges, sealed front and back with fillet weld size equal to pipe thickness (t). Steel for flanges shall conform to Section 15 Part I of the NYC Specification for Furnishing, Delivering and Laying Steel Pipe and Appurtenances, latest revision.
3. Flange dimensions shall conform to Standard ASME B16.50, ANSI C-20.3-86 for steel hub flange Class 8. D. Table.
4. Nuts and washers for flanges and track head bolts shall be stainless steel type 304 and meet the requirements of ASTM Designation A194-88, Grade 8." Steel for flanges shall conform to Section 15 Part I of the NYC Specification for Furnishing, Delivering and Laying Steel Pipe and Appurtenances, latest revision.
5. All welded lap joints shall be air tested. After testing, test heads shall be grinded, removed from flange and properly cleaned.
6. Expansion joint shall be shipped and installed at initial setting (mid position).
7. Except slip joint, 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), 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 "A" 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 nos. 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 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 5.33 of the standard water main specifications.

11. This standard supersedes Dep Standard Drawing No. 47343-Z.
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), 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.

(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 5.33 OF THE STANDARD WATER MAIN SPECIFICATIONS.

(11) THIS STANDARD SUPERSEDES DEP STANDARD DRAWING NO. 47321-A-Z.
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), 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 Nos. 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 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.

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