SEWER DESIGN STANDARDS

(September 2007) Revised January 5, 2009
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</tr>
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</tr>
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<td>TYPE A-1 AND TYPE A-2 MANHOLES ON 8&quot; DIAMETER TO 30&quot; DIAMETER PIPE SEWERS ON PILES IN DRY LOCATION</td>
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<td>TYPE B-1 AND TYPE B-2 MANHOLES ON 8&quot; DIAMETER TO 30&quot; DIAMETER PIPE SEWERS ON PILES IN WET LOCATION</td>
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<td>TYPE C-1 AND TYPE C-2 MANHOLES ON 36&quot; DIAMETER TO 60&quot; DIAMETER PIPE SEWERS ON PILES</td>
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<td>TYPE D-1 AND TYPE D-2 MANHOLES ON 66&quot; DIAMETER TO 96&quot; DIAMETER PIPE SEWERS ON PILES</td>
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</tr>
<tr>
<td>TYPE E-1 MANHOLE ON 23&quot;W x 14&quot;H TO 60&quot;W x 38&quot;H HORIZONTAL ELLIPTICAL PIPE SEWERS ON PILES</td>
</tr>
<tr>
<td>TYPE E-2 MANHOLE ON 66&quot;W x 43&quot;H TO 121&quot;W x 77&quot;H HORIZONTAL ELLIPTICAL PIPE SEWERS</td>
</tr>
<tr>
<td>TYPE E-2 MANHOLE ON 66&quot;W x 43&quot;H TO 121&quot;W x 77&quot;H HORIZONTAL ELLIPTICAL PIPE SEWERS ON PILES</td>
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<td>DROP PIPE MANHOLE (TYPE I) ON 10&quot; DIAMETER TO 24&quot; DIAMETER PIPE SEWERS</td>
</tr>
<tr>
<td>DROP PIPE MANHOLE (TYPE I) ON 10&quot; DIAMETER TO 24&quot; DIAMETER PIPE SEWERS ON PILES</td>
</tr>
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<td>DROP PIPE MANHOLE (TYPE II) FOR 10&quot; DIAMETER TO 24&quot; DIAMETER INCOMING DROP PIPE SEWERS</td>
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# Standard for Sewer Design Criteria - Manhole Spacing and Location on Pipe Sewers

## A. Maximum Spacing of Manholes on Pipe Sewers

<table>
<thead>
<tr>
<th>Pipe Size:</th>
<th>Recommended Maximum Spacing</th>
<th>Absolute Maximum Spacing</th>
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<tbody>
<tr>
<td>10&quot; DIA. TO 36&quot; DIA. CIRCULAR PIPE</td>
<td>250'</td>
<td>300'</td>
</tr>
<tr>
<td>14&quot;H x 23&quot;W TO 26&quot;H x 45&quot;W HORIZONTAL ELLIPTICAL PIPE</td>
<td></td>
<td></td>
</tr>
<tr>
<td>23&quot;H x 14&quot;W TO 45&quot;H x 29&quot;W VERTICAL ELLIPTICAL PIPE</td>
<td></td>
<td></td>
</tr>
<tr>
<td>42&quot; DIA. TO 72&quot; DIA. CIRCULAR PIPE</td>
<td>400'</td>
<td>500'</td>
</tr>
<tr>
<td>34&quot;H x 53&quot;W TO 58&quot;H x 91&quot;W HORIZONTAL ELLIPTICAL PIPE</td>
<td></td>
<td></td>
</tr>
<tr>
<td>53&quot;H x 34&quot;W TO 91&quot;H x 58&quot;W VERTICAL ELLIPTICAL PIPE</td>
<td></td>
<td></td>
</tr>
<tr>
<td>78&quot; DIA. AND LARGER CIRCULAR PIPE</td>
<td>600'</td>
<td>800'</td>
</tr>
<tr>
<td>63&quot;H x 98&quot;W AND LARGER HORIZONTAL ELLIPTICAL PIPE</td>
<td></td>
<td></td>
</tr>
<tr>
<td>98&quot;H x 63&quot;W AND LARGER VERTICAL ELLIPTICAL PIPE</td>
<td></td>
<td></td>
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</tbody>
</table>

## B. Manhole Location on Pipe Sewers

1. At all changes in grade or elevation for all sizes of sewers.
2. At all changes in alignment for all sizes of sewers.
3. At all street intersections for sewers up to and including 24" diameter.
4. At all junctions of 2 or more sewers.
5. At all catch basin connections where it is not practical to connect directly to the sewer. A direct connection shall not be made to a sewer less than 60" in diameter.
6. The term "Dry Location" shall mean any location where the entire manhole is located above the water table and is in normally dry soil.
7. The term "Wet Location" shall mean any location where the manhole is located in whole or in part below the water table or in normally wet soil.
8. Special consideration will be required for situations not covered herein.
STANDARD FOR VITRIFIED CLAY PIPE
ON CONCRETE CRADLE ON EARTH OR ON ROCK

SECTION ON ROCK

SECTION ON EARTH

NOTES:
(1) CRADLE AND ENCASEMENT ARE CLASS 40 CONCRETE.
(2) ENTIRE CRADLE OR ENCASEMENT IS TO BE PLACED MONOLITHICALLY.
(3) ENCASEMENT REQUIRED ON PIPE WHICH HAS A COVER, FROM FINAL GRADE TO THE OUTER TOP OF THE PIPE, OF LESS THAN FOUR (4) FEET OR WHEN THE UPPER LIMIT OF COVER IS EXCEEDED.
(4) UNLESS OTHERWISE APPROVED BY THE ENGINEER, THE MAX. WIDTH OF TRENCH SHALL BE SUCH THAT THE MAX. WIDTH BETWEEN INNER FACES OF THE LOWEST STAGE OF SHEETING OR ROCK CUT LINES, FROM SUBGRADE OF TRENCH TO A MIN. HEIGHT OF TWO (2) FEET ABOVE THE OUTER TOP OF THE PIPE, SHALL NOT BE GREATER THAN THE STANDARD CRADLE WIDTH PLUS EIGHTEEN (18) INCHES MAXIMUM EACH SIDE.
(5) SIX (6) INCH MINIMUM SHALL BE MAINTAINED AT ALL TIMES, EXCEPT WHERE SHEETING IS TO BE USED AS FORMWORK.

SECTION A-A
BREAK JOINTS TO CONCRETE BEDDING

<table>
<thead>
<tr>
<th>D</th>
<th>A</th>
<th>MAX. COVER WITHOUT ENCSMT.</th>
<th>CONC. CRADLE CU. YD./L.F.</th>
<th>CONC. ENCSMT. CU. YD./L.F.</th>
</tr>
</thead>
<tbody>
<tr>
<td>8&quot;</td>
<td>1'-6&quot;</td>
<td>22'</td>
<td>0.0408</td>
<td>0.0815</td>
</tr>
<tr>
<td>10&quot;</td>
<td>2'-0&quot;</td>
<td>20'</td>
<td>0.0596</td>
<td>0.1191</td>
</tr>
<tr>
<td>12&quot;</td>
<td>2'-3&quot;</td>
<td>18'</td>
<td>0.0708</td>
<td>0.1415</td>
</tr>
<tr>
<td>15&quot;</td>
<td>2'-6&quot;</td>
<td>16'</td>
<td>0.0831</td>
<td>0.1661</td>
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<tr>
<td>18&quot;</td>
<td>2'-10&quot;</td>
<td>15'</td>
<td>0.0998</td>
<td>0.1996</td>
</tr>
</tbody>
</table>

1" THICK FOAM BOARD (EXTRUDED POLYSTYRENE) OR OTHER APPROVED MATERIAL

BREAK JOINTS TO BE PROVIDED AT ALL PIPE JOINTS.

ENCASEMENT (AS REQUIRED)

CONCRETE CRADLE

PAYMENT LINES FOR ROCK EXCAVATION

ENCASMENT WHERE REQUIRED (SEE NOTE 4)

INNER FACE OF SHEETING

ENCASMENT WHERE REQUIRED (SEE NOTE 3)

MAXIMUM WIDTH OF TRENCH
(SEE NOTE 4)

MAXIMUM WIDTH OF TRENCH
(SEE NOTE 4)
CITY OF NEW YORK
DEPARTMENT OF ENVIRONMENTAL PROTECTION

STANDARD FOR VITRIFIED CLAY PIPE
ON CONCRETE CRADLE ON PILES

MAXIMUM WIDTH OF TRENCH
(SEE NOTE 4)

1'-6" MAX.

1'-6" MAX.

INNER FACE
OF SHEETING

ENCASMENT
WHERE REQUIRED
(SEE NOTE 3)

6" MIN.

(SEE NOTE 5)

2" CLEARANCE

5" - DEPTH OF
ADDITIONAL CONC.

STONE BALLAST
6" MINIMUM OR
AS REQUIRED

20 TON TIMBER PILE
SEE TABLE FOR MAX.
PILE SPACING

MAXIMUM PILE SPACING

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<thead>
<tr>
<th>D</th>
<th>10&quot; COVER</th>
<th>15&quot; COVER</th>
<th>20&quot; COVER</th>
<th>25&quot; COVER</th>
<th>ADD. CONC. CU. YD.</th>
<th>ADDITIONAL STL. REINF. (LBS.)</th>
<th>STONE BALLAST CU. YD. PER L.F.</th>
</tr>
</thead>
<tbody>
<tr>
<td>6&quot;</td>
<td>6'-0&quot;</td>
<td>6'-0&quot;</td>
<td>6'-0&quot;</td>
<td>6'-0&quot;</td>
<td>0.0232</td>
<td>6.85</td>
<td>6.85</td>
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<tr>
<td>10&quot;</td>
<td>6'-0&quot;</td>
<td>6'-0&quot;</td>
<td>6'-0&quot;</td>
<td>6'-0&quot;</td>
<td>0.0509</td>
<td>7.85</td>
<td>7.85</td>
</tr>
<tr>
<td>12&quot;</td>
<td>6'-0&quot;</td>
<td>6'-0&quot;</td>
<td>6'-0&quot;</td>
<td>5'-0&quot;</td>
<td>0.0348</td>
<td>8.35</td>
<td>8.35</td>
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<tr>
<td>15&quot;</td>
<td>6'-0&quot;</td>
<td>6'-0&quot;</td>
<td>6'-0&quot;</td>
<td>4'-0&quot;</td>
<td>0.0386</td>
<td>11.85</td>
<td>11.85</td>
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<tr>
<td>18&quot;</td>
<td>6'-0&quot;</td>
<td>5'-0&quot;</td>
<td>4'-0&quot;</td>
<td>3'-0&quot;</td>
<td>0.0438</td>
<td>12.52</td>
<td>12.77</td>
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</tbody>
</table>

NOTES:

1. CRADLE AND ENCASEMENT ARE CLASS 40 CONCRETE. REBARS - GRADE 60.
2. ENTIRE CRADLE OR ENCASEMENT IS TO BE PLACED MONOLITHICALLY.
3. ENCASEMENT REQUIRED ON PIPE WHICH HAS A COVER, FROM FINAL GRADE TO THE INNER TOP OF THE PIPE, OF LESS THAN FOUR (4) FEET OR WHEN THE UPPER LIMIT OF COVER IS EXCEEDED.
4. UNLESS OTHERWISE APPROVED BY THE ENGINEER, THE MAX. WIDTH OF TRENCH SHALL BE SUCH THAT THE MAX. WIDTH BETWEEN INNER FACES OF THE LOWEST STAGE OF SHEETING OR ROCK CUT LINES, FROM SUBGRADE OF TRENCH TO A MIN. HEIGHT OF TWO (2) FEET ABOVE THE OUTER TOP OF THE PIPE, SHALL NOT BE GREATER THAN THE STANDARD CRADLE WIDTH PLUS EIGHTEEN (18) INCHES MAXIMUM EACH SIDE.
5. SIX (6) INCH MINIMUM SHALL BE MAINTAINED AT ALL TIMES, EXCEPT WHERE SHEETING IS TO BE USED AS FORMWORK.

ADDITIONAL STEEL REINF.

LONGITUDINAL BARS
3-#6 OVER PILES FOR ALL SIZES OF PIPES
1-#6 ON EACH SIDE FOR 15" AND 18" PIPES

TRANSVERSE BARS
3-#6 OVER PILES
#8@12" O.C. BETWEEN PILES

1" CLEARANCE
OVER PILES

2" CLEARANCE

6" MIN.

ASSISTANT COMMISSIONER, DESIGN
DEPARTMENT OF DESIGN AND CONSTRUCTION

7/9/07

DIRECTOR OF ENGINEERING
DEPARTMENT OF ENVIRONMENTAL PROTECTION

8/10/07
# Standard for Circular Precast Reinforced Concrete Pipe on Concrete Cradle on Earth or on Rock

**Section on Rock**

**Section on Earth**

**Notes:**

1. Cradle and encasement are Class 40 concrete.
2. Entire cradle or encasement is to be placed monolithically.
3. Encasement required on pipe which has a cover, from final grade to the inner top of the pipe, or less than four (4) feet or when the upper limit of cover for Class V pipe is exceeded.
4. Unless otherwise approved by the engineer, the max. width of trench shall be such that the max. width between inner faces of the lowest stage of sheeting or rock cut lines, from subgrade of trench to a min. height of two (2) feet above the outer top of the pipe, shall not be greater than the standard cradle width plus eighteen (18) inches maximum each side.
5. Six (6) inch minimum shall be maintained at all times, except where sheeting is to be used as formwork.
6. Cradle width "A" is based on wall "B" for Class II, IV & V P.R.C.P.

<table>
<thead>
<tr>
<th>D</th>
<th>A</th>
<th>h</th>
<th>C</th>
<th>Conc. Cradle Cu. Yd./F.</th>
<th>Conc. Encsmt Cu. Yd./F.</th>
<th>Max. Cover for Pipe Class</th>
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<tr>
<td>24&quot;</td>
<td>3'-6&quot;</td>
<td>6&quot;</td>
<td>1'-2&quot;</td>
<td>0.1124</td>
<td>0.2719</td>
<td>12'-0&quot;</td>
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<td>30&quot;</td>
<td>4'-1&quot;</td>
<td>6&quot;</td>
<td>1'-4&quot;</td>
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<td>0.3410</td>
<td>12'-6&quot;</td>
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<td>4'-8&quot;</td>
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<td>1'-6&quot;</td>
<td>0.1939</td>
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<td>0.6348</td>
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<td>60&quot;</td>
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<td>2'-5&quot;</td>
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<td>66&quot;</td>
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<td>3'-2&quot;</td>
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<td>1.5099</td>
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<td>3'-8&quot;</td>
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<td>1.6662</td>
<td>14'-0&quot;</td>
</tr>
<tr>
<td>96&quot;</td>
<td>10'-6&quot;</td>
<td>18&quot;</td>
<td>3'-11&quot;</td>
<td>0.9972</td>
<td>1.8470</td>
<td>14'-0&quot;</td>
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</table>
STANDARD FOR 24" DIA. TO 48" DIA. CIRCULAR PRECAST REINFORCED CONCRETE PIPE ON CONCRETE CRADLE ON PILES - 2 PILE BENTS (20' AND 25' COVER)

ADDITIONAL STEEL REINF.

**LONGITUDINAL BARS**
3-#6 OVER PILES
6" MIN. BETWEEN BARS
SEE TABLE FOR TOTAL NUMBER OF LONG. BARS

**TRANSVERSE BARS**
3-#6 OVER PILES
12" O.C. BETWEEN PILES

MAXIMUM WIDTH OF TRENCH (SEE NOTE 4)
1'-6" MAX.

ENCASMENT WHERE REQUIRED (SEE NOTE 3)

MAXIMUM PILE BENT SPACING
20' COVER 25' COVER
24" 11' 10' 2'-0" 11' 5'-0" 5'-0" 7 16.85 16.85 0.1192 0.1204
30" 11' 10' 9" 2'-3" 8' 5'-0" 5'-0" 7 17.69 18.40 0.1099 0.1312
36" 10' 9" 12" 2'-8" 6' 4'-6" 4'-6" 7 19.03 19.20 0.0885 0.1420
42" 9" 2'-2" 12" 3'-3" 5' 4'-2" 4'-2" 8 22.45 23.10 0.0972 0.1528
48" 9" 2'-3" 12" 3'-10" 6' 3'-6" 3'-6" 9 28.74 25.32 0.1081 0.1636

ADDITIONAL ITEMS/L.F.
ADD. STL. REINF. (LBS.)
ADD. CONC. CU. YD.
STONE BALLAST CU. YD. PER L.F.

NOTES:
(1) CRADLE AND ENCASEMENT ARE CLASS 40 CONCRETE, REBARS-Grade 60.
(2) ENTIRE CRADLE OR ENCASEMENT IS TO BE PLACED MONOLITHICALLY ABOVE THE CONSTRUCTION JOINT.
(3) ENCASEMENT REQUIRED ON PIPE WHICH HAS A COVER, FROM FINAL GRADE TO INNER TOP OF THE PIPE, OF LESS THAN FOUR (4) FEET OR WHEN THE UPPER LIMIT OF COVER FOR CLASS V PIPE IS EXCEEDED.
(4) UNLESS OTHERWISE APPROVED BY THE ENGINEER, THE MAX. WIDTH OF TRENCH SHALL BE SUCH THAT THE MAX. WIDTH BETWEEN INNER FACES OF THE LOWEST STAGE OF SHEETING OR ROCK CUT LINES, FROM SUBGRADE OF TRENCH TO A MIN. HEIGHT OF TWO (2) FEET ABOVE THE OUTER TOP OF THE PIPE, SHALL NOT BE GREATER THAN THE STANDARD CRADLE WIDTH PLUS EIGHTEEN (18) INCHES MAXIMUM EACH SIDE.
(5) SIX (6) INCH MINIMUM SHALL BE MAINTAINED AT ALL TIMES, EXCEPT WHERE SHEETING IS TO BE USED AS FORMWORK.
(6) CRADLE WIDTH "A" IS BASED ON WALL "B" FOR CLASS III, IV & V P.R.C.P.
(7) CONSTRUCTION JOINT TO BE UTILIZED WHENEVER GROUND CONDITIONS PREVENT PROPER SUPPORT OF PIPE.
CITY OF NEW YORK
DEPARTMENT OF ENVIRONMENTAL PROTECTION

STANDARD FOR 54" DIA. TO 96" DIA. CIRCULAR PRECAST REINFORCED CONCRETE PIPE ON CONCRETE CRADLE ON PILES - 3 PILE BENTS
(20' AND 25' COVER)

Maximum Width of Trench

<table>
<thead>
<tr>
<th>DIA (&quot;D&quot;)</th>
<th>20' COVER (&quot;A&quot;)</th>
<th>25' COVER (&quot;B&quot;)</th>
</tr>
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<tbody>
<tr>
<td>54&quot;</td>
<td>1' 6&quot; - 5' 9&quot;</td>
<td>1' 6&quot; - 5' 9&quot;</td>
</tr>
<tr>
<td>60&quot;</td>
<td>2' 0&quot; - 5' 9&quot;</td>
<td>2' 0&quot; - 5' 9&quot;</td>
</tr>
<tr>
<td>66&quot;</td>
<td>2' 3&quot; - 6' 11&quot;</td>
<td>2' 3&quot; - 6' 11&quot;</td>
</tr>
<tr>
<td>72&quot;</td>
<td>2' 6&quot; - 7' 3&quot;</td>
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<td>78&quot;</td>
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</tr>
<tr>
<td>90&quot;</td>
<td>3' 3&quot; - 9' 0&quot;</td>
<td>3' 3&quot; - 9' 0&quot;</td>
</tr>
<tr>
<td>96&quot;</td>
<td>3' 6&quot; - 9' 3&quot;</td>
<td>3' 6&quot; - 9' 3&quot;</td>
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Maximum Pile Bent Spacing

<table>
<thead>
<tr>
<th>DIA (&quot;D&quot;)</th>
<th>20' COVER (&quot;A&quot;)</th>
<th>25' COVER (&quot;B&quot;)</th>
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<tbody>
<tr>
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<tr>
<td>90&quot;</td>
<td>3' 3&quot; - 9' 0&quot;</td>
<td>3' 3&quot; - 9' 0&quot;</td>
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<tr>
<td>96&quot;</td>
<td>3' 6&quot; - 9' 3&quot;</td>
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Maximum Pile Bent Spacing

<table>
<thead>
<tr>
<th>DIA (&quot;D&quot;)</th>
<th>20' COVER (&quot;A&quot;)</th>
<th>25' COVER (&quot;B&quot;)</th>
</tr>
</thead>
<tbody>
<tr>
<td>54&quot;</td>
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<td>1' 6&quot; - 5' 9&quot;</td>
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<tr>
<td>60&quot;</td>
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<tr>
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<td>2' 3&quot; - 6' 11&quot;</td>
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<tr>
<td>96&quot;</td>
<td>3' 6&quot; - 9' 3&quot;</td>
<td>3' 6&quot; - 9' 3&quot;</td>
</tr>
</tbody>
</table>

NOTES:
1. CRADLE AND ENCASEMENT ARE CLASS 40 CONCRETE, REBARS GRADE 60.
2. ENTIRE CRADLE OR ENCASEMENT IS TO BE PLACED MONOLITHICALLY ABOVE THE CONSTRUCTION JOINT.
3. ENCASEMENT REQUIRED ON PIPE WHICH HAS A COVER, FROM FINAL GRADE TO INNER TOP OF THE PIPE, OF LESS THAN FOUR (4) FEET OR WHEN THE UPPER LIMIT OF COVER FOR CLASS V PIPE IS EXCEEDED.
4. UNLESS OTHERWISE APPROVED BY THE ENGINEER, THE MAX. WIDTH OF TRENCH SHALL BE SUCH THAT THE MAX. WIDTH BETWEEN INNER FACES OF THE LOWEST STAGE OF SHEETING OR ROCK CUT LINES, FROM SUBGRADE OF TRENCH TO A MIN. HEIGHT OF TWO (2) FEET ABOVE THE OUTER TOP OF THE PIPE, SHALL NOT BE GREATER THAN THE STANDARD CRADLE WIDTH PLUS EIGHTEEN (18) INCHES MAXIMUM EACH SIDE.
5. SIX (6) INCH MINIMUM SHALL BE MAINTAINED AT ALL TIMES, EXCEPT WHERE SHEETING IS TO BE USED AS FORMWORK.
6. CRADLE WIDTH "A" IS BASED ON WALL, "B" FOR CLASS III, IV & V P.R.C.P.
7. CONSTRUCTION JOINT TO BE UTILIZED WHENEVER GROUND CONDITIONS PREVENT PROPER SUPPORT OF PIPE.
CITY OF NEW YORK
DEPARTMENT OF ENVIRONMENTAL PROTECTION

STANDARD FOR 24" DIA. TO 60" DIA. CIRCULAR PRECAST REINFORCED CONCRETE PIPE ON CONCRETE CRADLE ON PILES - 2 PILE BENTS
(5', 10' AND 15' COVER)

MAXIMUM WIDTH OF TRENCH
(SEE NOTE 4)

<table>
<thead>
<tr>
<th>D</th>
<th>A</th>
<th>h</th>
<th>C</th>
<th>E</th>
<th>F</th>
<th>G</th>
<th>MAXIMUM</th>
<th>ADDITIONAL ITEMS/L.F.</th>
<th>STONE BALLAST CUR. YD. PER L.F.</th>
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<tr>
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<td></td>
<td>10' COVER</td>
<td>15' COVER</td>
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<td>9&quot;</td>
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<td>9&quot;</td>
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<td>2'-6&quot;</td>
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<td>6&quot;</td>
<td>6'-0&quot;</td>
<td>4'-3&quot;</td>
<td>30.86</td>
</tr>
</tbody>
</table>

NOTES:
(1) CRADLE AND ENCASMENT ARE CLASS 40 CONCRETE, REBARS-GRADE 60.
(2) ENTIRE CRADLE OR ENCASMENT IS TO BE PLACED MONOLITHICALLY ABOVE THE CONSTRUCTION JOINT.
(3) ENCASMENT REQUIRED ON PIPE WHICH HAS A COVER, FROM FINAL GRADE TO INNER TOP OF THE PIPE, OF LESS THAN FOUR (4) FEET OR WHEN THE UPPER LIMIT OF COVER FOR CLASS V PIPE IS EXCEEDED.
(4) UNLESS OTHERWISE APPROVED BY THE ENGINEER, THE MAX. WIDTH OF TRENCH SHALL BE SUCH THAT THE MAX. WIDTH BETWEEN INNER FACES OF THE LOWEST STAGE OF SHEETING OR ROCK CUT LINES, FROM SUBGRADE OF TRENCH TO A MIN. HEIGHT OF TWO (2) FEET ABOVE THE OUTER TOP OF THE PIPE, SHALL NOT BE GREATER THAN THE STANDARD CRADLE WIDTH PLUS EIGHTEEN (18) INCHES MAXIMUM EACH SIDE.
(5) SIX (6) INCH MINIMUM SHALL BE MAINTAINED AT ALL TIMES, EXCEPT WHERE SHEETING IS TO BE USED AS FORMWORK.
(6) CRADLE WIDTH "A" IS BASED ON WALL "B" FOR CLASS III, IV & V P.R.C.P.
(7) CONSTRUCTION JOINT TO BE UTILIZED WHENEVER GROUND CONDITIONS PREVENT PROPER SUPPORT OF PIPE.
CITY OF NEW YORK
DEPARTMENT OF ENVIRONMENTAL PROTECTION

STANDARD FOR 66" DIA. TO 96" DIA. CIRCULAR PRECAST REINFORCED CONCRETE PIPE ON CONCRETE CRADLE ON PILES - 3 PILE BENTS (5', 10' AND 15' COVER)

**NOTES:**

(1) CRADLE AND ENCASMENT ARE CLASS 40 CONCRETE. REBARS-GRADE 60.

(2) ENTIRE CRADLE OR ENCASMENT IS TO BE PLACED MONOLITHICALLY ABOVE THE CONSTRUCTION JOINT.

(3) ENCASMENT REQUIRED ON PIPE WHICH HAS A COVER, FROM FINAL GRADE TO INNER TOP OF THE PIPE, OF LESS THAN FOUR (4) FEET OR WHEN THE UPPER LIMIT OF COVER FOR CLASS V PIPE IS EXCEEDED.

(4) UNLESS OTHERWISE APPROVED BY THE ENGINEER, THE MAX. WIDTH OF TRENCH SHALL BE SUCH THAT THE MAX. WIDTH BETWEEN INNER FACES OF THE LOWEST STAGE OF SHEETING OR ROCK CUT LINES, FROM SUBGRADE OF TRENCH TO A MIN. HEIGHT OF TWO (2) FEET ABOVE THE OUTER TOP OF THE PIPE, SHALL NOT BE GREATER THAN THE STANDARAD CRADLE WIDTH PLUS EIGHTEEN (18) INCHES MAXIMUM EACH SIDE.

(5) SIX (6) INCH MINIMUM SHALL BE MAINTAINED AT ALL TIMES, EXCEPT WHERE SHEETING IS TO BE USED AS FORMWORK.

(6) CRADLE WIDTH "A" IS BASED ON WALL "B" FOR CLASS III, IV & V P.R.C.P.

(7) CONSTRUCTION JOINT TO BE UTILIZED WHENEVER GROUND CONDITIONS PREVENT PROPER SUPPORT OF PIPE.
### Notes:

1. Cradle and encasement are Class 40 concrete.

2. Entire cradle or encasement is to be placed monolithically.

3. Encasement required on pipe which has a cover, from final grade to inner top of the pipe, of less than four (4) feet or when the upper limit of cover for Class HE-IV pipe is exceeded.

4. Unless otherwise approved by the engineer, the max. width of trench shall be such that the max. width between inner faces of the lowest stage of sheeting or rock cut lines, from subgrade of trench to a min. height of two (2) feet above the outer top of the pipe, shall not be greater than the standard cradle width plus eighteen (18) inches maximum each side.

5. Six (6) inch minimum shall be maintained at all times, except where sheeting is to be used as formwork.

6. Cradle width "A" is based on minimum wall thickness (ASTM C507) for Class HE-III and HE-IV P.R.C.P.
### Standard for 23"W x 14"H to 76"W x 48"H Horizontal Elliptical Precast Reinforced Concrete Pipe on Concrete Cradle on Piles - 2 Pile Bents

(5', 10' and 15' Cover)

#### Notes:
1. Cradle and Encasement are Class 40 Concrete. Rebars-Grade 60.
2. Entire Cradle or Encasement is to be placed monolithically above the construction joint.
3. Encasement is required on pipe which has a cover, from final grade to inner top of the pipe, of less than four (4) feet or when the upper limit of cover for Class HE-IV Pipe is exceeded.
4. Unless otherwise approved by the engineer, the max. width of trench shall be such that the max. width between inner faces of the lowest stage of sheeting or rock cut lines, from subgrade of trench to a min. height of two (2) feet above the outer top of the pipe, shall not be greater than the standard cradle width plus eighteen (18) inches maximum each side.
5. Six (6) inch minimum shall be maintained at all times, except where sheeting is to be used as formwork.
6. Cradle width "A" is based on minimum wall thickness (ASTM C657) for Class HE-II and HE-IV P.R.C.P.
7. Construction joint to be utilized whenever ground conditions proper support of pipe.

#### Table:

<table>
<thead>
<tr>
<th>W x H</th>
<th>Equivalent Dial.</th>
<th>A (&quot;x&quot;)</th>
<th>h</th>
<th>C (&quot;x&quot;)</th>
<th>E (&quot;x&quot;)</th>
<th>F (&quot;x&quot;)</th>
<th>G</th>
<th>Max. Width of Trench</th>
</tr>
</thead>
</table>
| 23" x 14" | 18" | 3'-4" | 8" | 1'-4" | 9" | 2'-0" | 8" | 6'-0" 6'-0" 6'-0" | 7
| 30" x 19" | 24" | 4'-1" | 8" | 1'-6" | 9" | 2'-7" | 8" | 6'-0" 6'-0" 6'-0" | 7
| 38" x 24" | 30" | 4'-10" | 9" | 1'-7" | 12" | 2'-10" | 8" | 6'-0" 6'-0" 6'-0" | 8
| 45" x 30" | 36" | 5'-0" | 9" | 1'-8" | 12" | 3'-0" | 7" | 6'-0" 5'-0" 4'-6" | 8
| 53" x 42" | 42" | 6'-3" | 7" | 1'-0" | 12" | 4'-0" | 6" | 6'-0" 5'-0" 4'-0" | 9
| 60" x 48" | 48" | 6'-11" | 9" | 2'-0" | 12" | 4'-11" | 8" | 6'-0" 4'-0" 4'-0" | 10
| 68" x 54" | 54" | 7'-8" | 9" | 2'-2" | 15" | 5'-2" | 7" | 6'-0" 4'-3" 3'-4" | 10
| 76" x 60" | 60" | 8'-5" | 11" | 2'-5" | 19" | 5'-11" | 8" | 5'-0" 4'-0" 3'-3" | 11

#### ADDITIONAL ITEMS/L.F.: 8

- 6" Minimum Stone Ballast
- Construction Joint
- Transverse Bars: 3-#6 Over Piles
- Longitudinal Bars: 3-#6 Over Piles
- Notes:
  1. Cradle and Encasement are Class 40 Concrete. Rebars-Grade 60.
  2. Entire Cradle or Encasement is to be placed monolithically above the construction joint.
  3. Encasement is required on pipe which has a cover, from final grade to inner top of the pipe, of less than four (4) feet or when the upper limit of cover for Class HE-IV Pipe is exceeded.
  4. Unless otherwise approved by the engineer, the max. width of trench shall be such that the max. width between inner faces of the lowest stage of sheeting or rock cut lines, from subgrade of trench to a min. height of two (2) feet above the outer top of the pipe, shall not be greater than the standard cradle width plus eighteen (18) inches maximum each side.
  5. Six (6) inch minimum shall be maintained at all times, except where sheeting is to be used as formwork.
  6. Cradle width "A" is based on minimum wall thickness (ASTM C657) for Class HE-II and HE-IV P.R.C.P.
  7. Construction joint to be utilized whenever ground conditions proper support of pipe.
STANDARD FOR 83"W x 53"H TO 121"W x 77"H HORIZONTAL ELLIPTICAL PRECAST REINFORCED CONCRETE PIPE ON CONCRETE CRADLE ON PILES - 3 PILE BENTS (5', 10' AND 15' COVER)

NOTES:

1. CRADLE AND ENCASMENT ARE CLASS 40 CONCRETE. REBARS- GRADE 60.
2. ENTIRE CRADLE OR ENCASMENT IS TO BE PLACED MONOLITHICALLY ABOVE THE CONSTRUCTION JOINT.
3. ENCASMENT REQUIRED ON PIPE WHICH HAS A COVER, FROM FINAL GRADE TO INNER TOP OF PIPE, OF LESS THAN FOUR (4) FEET OR WHEN THE UPPER LIMIT OF COVER FOR CLASS HE-IV PIPE IS EXCEEDED.
4. UNLESS OTHERWISE APPROVED BY THE ENGINEER, THE MAX. WIDTH BETWEEN INNER FACES OF THE LOWEST STAGE OF SHEETING OR ROCK CUT LINES, FROM SUBGRADE OF TRENCH TO A MIN. HEIGHT OF TWO (2) FEET ABOVE THE OUTER TOP OF THE PIPE, SHALL NOT BE GREATER THAN THE STANDARD CRADLE WIDTH PLUS EIGHTEEN (18) INCHES MAXIMUM EACH SIDE.
5. SIX (6) INCH MINIMUM SHALL BE MAINTAINED AT ALL TIMES, EXCEPT WHERE SHEETING IS TO BE USED AS FORMWORK.
6. CRADLE WIDTH "A" IS BASED ON MINIMUM WALL THICKNESS (ASTM C507) FOR CLASS HE-III AND HE-IV P.R.C.P.
7. CONSTRUCTION JOINT TO BE UTILIZED WHENEVER GROUND CONDITIONS PREVENT PROPER SUPPORT OF PIPE.
STANDARD FOR MANHOLE ON 8" DIA. TO 30" DIA. PIPE SEWERS IN DRY LOCATION
TYPE A-1 (12' MAX. COVER) AND TYPE A-2 (25' MAX. COVER)

NOTES:
(1) WHEN LEGAL GRADE IS BELOW FINAL GRADE SEE SEWER STANDARD NO. 38.
(2) KEYED CONSTRUCTION JOINTS ARE REQUIRED BETWEEN ANY SUCCESSIVE POURS.
(3) CONCRETE IS TO BE CLASS 40. REBARS-GRADE 60.
(4) FOR ALL PIPE SEWERS EIGHTEEN (18) INCHES IN DIAMETER AND GREATER, ADD 3-#6@3" ABOVE AND BELOW THE PIPE.

DIRECTOR OF ENGINEERING
DEPARTMENT OF ENVIRONMENTAL PROTECTION

ASSISTANT COMMISSIONER, DESIGN
DEPARTMENT OF DESIGN AND CONSTRUCTION
STANDARD FOR MANHOLE ON 8" DIA. TO 30" DIA.
PIPE SEWERS ON PILES IN DRY LOCATIONS
TYPE A-1 (12' MAX. COVER) AND TYPE A-2 (25' MAX. COVER)

NOTES:
1. WHEN LEGAL GRADE IS BELOW FINAL GRADE SEE SEWER STANDARD NO. 38.
2. KEYED CONSTRUCTION JOINTS ARE REQUIRED BETWEEN ANY SUCCESSIVE POOLS.
3. CONCRETE IS TO BE CLASS 40. REBARS-GRADE 60.
4. FOR ALL PIPE SEWERS EIGHTEEN (18) INCHES IN DIAMETER AND GREATER, ADD 3-#6@3" ABOVE AND BELOW THE PIPE.
5. CONSTRUCTION JOINT TO BE UTILIZED WHENEVER GROUND CONDITIONS PREVENT SUPPORT OF PIPE.
STANDARD FOR SHALLOW MANHOLE ON 8" DIA. TO 30" DIA. PIPE SEWERS
TYPE A-3 (LESS THAN 4'-0" COVER)

NOTES:
(1) WHEN PILES ARE REQUIRED, REFER TO STANDARD MANHOLE TYPE A-2 FOR PILE DETAILS.
(2) CONCRETE IS TO BE CLASS 40. REBARS-GRADE 60.

City of New York
Department of Environmental Protection

DATE: 7/9/07
ASSISTANT COMMISSIONER, DESIGN
DEPARTMENT OF DESIGN AND CONSTRUCTION

DATE: 8/10/07
DIRECTOR OF ENGINEERING
DEPARTMENT OF ENVIRONMENTAL PROTECTION
STANDARD FOR MANHOLE ON 8" DIA. TO 30" DIA. PIPE SEWERS IN WET LOCATION

TYPE B-1 (12' MAX. COVER) AND TYPE B-2 (25' MAX. COVER)

NOTES:

(1) WHEN LEGAL GRADE IS BELOW FINAL GRADE SEE SEWER STANDARD NO. 38.
(2) KEYED CONSTRUCTION JOINTS ARE REQUIRED BETWEEN ANY SUCCESSIVE POURS.
(3) CONCRETE IS TO BE CLASS 40. REBARS-GRADE 60.
(4) FOR ALL PIPE SEWERS EIGHTEEN (18) INCHES IN DIAMETER AND GREATER, ADD 3-#6@3" ABOVE AND BELOW THE PIPE.

ASSISTANT COMMISSIONER, DESIGN
DEPARTMENT OF DESIGN AND CONSTRUCTION

DIRECTOR OF ENGINEERING
DEPARTMENT OF ENVIRONMENTAL PROTECTION
CITY OF NEW YORK
DEPARTMENT OF ENVIRONMENTAL PROTECTION

STANDARD FOR MANHOLE ON 8" DIA. TO 30" DIA.
PIPE SEWERS ON PILES IN WET LOCATION

TYPE B-1 (12' MAX. COVER) AND TYPE B-2 (25' MAX. COVER)

NOTES:
(1) WHEN LEGAL GRADE IS BELOW FINAL GRADE SEE SEWER STANDARD NO. 38.
(2) KEYED CONSTRUCTION JOINTS ARE REQUIRED BETWEEN ANY SUCCESSIVE POURS.
(3) CONCRETE IS TO BE CLASS 40, REBARS-GRADE 60.
(4) FOR ALL PIPE SEWERS EIGHTEEN (18) INCHES IN DIAMETER AND GREATER,
ADD 3-#6@3" ABOVE AND BELOW THE PIPE.
(5) CONSTRUCTION JOINT TO BE UTILIZED WHENEVER GROUND CONDITIONS PREVENT SUPPORT OF PIPE.

ASSISTANT COMMISSIONER, DESIGN
DEPARTMENT OF DESIGN AND CONSTRUCTION

DIRECTOR OF ENGINEERING
DEPARTMENT OF ENVIRONMENTAL PROTECTION
STANDARD FOR MANHOLE ON 36" DIA. TO 60" DIA. PIPE SEWERS

TYPE C-1 (12' MAX. COVER) AND TYPE C-2 (25' MAX. COVER)

NOTES:
(1) WHEN LEGAL GRADE IS BELOW FINAL GRADE SEE SEWER STANDARD NO. 38.
(2) KEYED CONSTRUCTION JOINTS ARE REQUIRED BETWEEN ANY SUCCESSIVE POURS.
(3) CONCRETE IS TO BE CLASS 40, REBARS-GRADE 60.
(4) STEEL REINFORCEMENT IS #6@12" UNLESS OTHERWISE SPECIFIED COVER FOR ALL REINFORCEMENT IS 2" CLEARANCE UNLESS OTHERWISE SPECIFIED.
STANDARD FOR MANHOLE ON 36" DIA. TO 60" DIA. PIPE SEWERS ON PILES
TYPE C-1 (12' MAX. COVER) AND TYPE C-2 (25' MAX. COVER)

NOTES:
(1) WHEN LEGAL GRADE IS BELOW FINAL GRADE SEE SEWER STANDARD NO. 38.
(2) KEYED CONSTRUCTION JOINTS ARE REQUIRED BETWEEN ANY SUCCESSIVE POURS.
(3) CONCRETE IS TO BE CLASS 40. REBARS-GRD. 60.
(4) STEEL REINFORCEMENT IS #6@12" UNLESS OTHERWISE SPECIFIED. COVER FOR ALL REINFORCEMENT IS 2" CLEARANCE UNLESS OTHERWISE SPECIFIED.
(5) CONSTRUCTION JOINT TO BE UTILIZED WHENEVER GROUND CONDITIONS PREVENT SUPPORT OF PIPE.

ASSISTANT COMMISSIONER, DESIGN
DEPARTMENT OF DESIGN AND CONSTRUCTION

DIRECTOR OF ENGINEERING
DEPARTMENT OF ENVIRONMENTAL PROTECTION
CITY OF NEW YORK
DEPARTMENT OF ENVIRONMENTAL PROTECTION

STANDARD FOR MANHOLE ON 66" DIA. TO 96" DIA. PIPE SEWERS

TYPE D-1 (12' MAX. COVER) AND TYPE D-2 (25' MAX. COVER)

NOTES:

1) WHEN LEGAL GRADE IS BELOW FINAL GRADE SEE SEWER STANDARD NO. 38.
(2) KEYED CONSTRUCTION JOINTS ARE REQUIRED BETWEEN ANY SUCCESSIVE POURS.
(3) CONCRETE IS TO BE CLASS 40. REBARS-GRADE 60.
(4) STEEL REINFORCEMENT IS #6@12" UNLESS OTHERWISE SPECIFIED. COVER
FOR ALL REINFORCEMENT IS 2" CLEARANCE UNLESS OTHERWISE SPECIFIED.

ASSISTANT COMMISSIONER, DESIGN
DEPARTMENT OF DESIGN AND CONSTRUCTION

DIRECTOR OF ENGINEERING
DEPARTMENT OF ENVIRONMENTAL PROTECTION

P.E. 7/9/97
DATE

P.E. 8/10/07
DATE
NOTES:
(1) WHEN LEGAL GRADE IS BELOW FINAL GRADE SEE SEWER STANDARD NO. 38.
(2) KEYED CONSTRUCTION JOINTS ARE REQUIRED BETWEEN ANY SUCCESSIVE POURS.
(3) CONCRETE IS TO BE CLASS 40. REBARS-GRADE 60.
(4) STEEL REINFORCEMENT IS #6 UNLESS OTHERWISE SPECIFIED. COVER FOR ALL REINFORCEMENT IS 2" CLEARANCE UNLESS OTHERWISE SPECIFIED.
(5) CONSTRUCTION JOINT TO BE UTILIZED WHENEVER GROUND CONDITIONS PREVENT SUPPORT OF PIPE.
(6) USE FOUR PILES PER BENT FOR COVER OVER 15'.
STANDARD FOR MANHOLE ON 23"W x 14"H TO 60"W x 38"H
HORIZONTAL ELLIPTICAL PIPE SEWERS
TYPE E-1 (12' MAX. COVER)

NOTES:
(1) WHEN LEGAL GRADE IS BELOW FINAL GRADE SEE SEWER STANDARD NO. 38.
(2) KEYED CONSTRUCTION JOINTS ARE REQUIRED BETWEEN ANY SUCCESSIVE POURS.
(3) CONCRETE IS TO BE CLASS 40. REBARS-GRADE 60.
(4) STEEL REINFORCEMENT IS #6@12" UNLESS OTHERWISE SPECIFIED. COVER FOR ALL REINFORCEMENT IS 2" CLEARANCE UNLESS OTHERWISE SPECIFIED.

W H I A B C E F N
23' 14' 2 3/4' 6'-0" 4'-1" 14' 9" - -
30' 18' 3 1/4' 6'-0" 4'-1" 14' 10" - -
38' 24' 3 3/4' 6'-6" 5'-1" 15' 10" 0'-8" 2
45' 29' 4 1/2' 7'-0" 6'-0" 16' 11" 1'-0" 4
53' 34' 5' 7'-11" 6'-1" 16' 11" 1'-11" 5
60' 38' 5 1/2' 8'-6" 6'-7" 17' 12" 2'-0" 6

SECTION A-A

SECTION B-B

SECTION C-C

SECTION D-D

ASSISTANT COMMISSIONER, DESIGN
DEPARTMENT OF DESIGN AND CONSTRUCTION

DIRECTOR OF ENGINEERING
DEPARTMENT OF ENVIRONMENTAL PROTECTION
STANDARD FOR MANHOLE ON 23"W x 14"H TO 60"W x 38"H
HORIZONTAL ELLIPTICAL PIPE SEWERS ON PILES
TYPE E-1 (12' MAX. COVER)

NOTES:
(1) WHEN LEGAL GRADE IS BELOW FINAL GRADE SEE SEWER STANDARD NO. 38.
(2) KEYED CONSTRUCTION JOINTS ARE REQUIRED BETWEEN ANY SUCCESSIVE POURS.
(3) CONCRETE IS TO BE CLASS 40. REBARS-GRAD. 60.
(4) STEEL REINFORCEMENT IS #6@12" UNLESS OTHERWISE SPECIFIED. COVER FOR ALL REINFORCEMENT IS 2" CLEARANCE UNLESS OTHERWISE SPECIFIED.
(5) CONSTRUCTION JOINT TO BE UTILIZED WHENEVER GROUND CONDITIONS PREVENT SUPPORT OF PIPE.

SECTION A-A

SECTION B-B

SECTION C-C/SECTION D-D

PILE PLAN

ASSISTANT COMMISSIONER, DESIGN
DEPARTMENT OF DESIGN AND CONSTRUCTION

DIRECTOR OF ENGINEERING
DEPARTMENT OF ENVIRONMENTAL PROTECTION

DATE

7/9/07

8/10/07
STANDARD FOR MANHOLE ON 68" W x 43" H TO 121" W x 77" H
HORIZONTAL ELLIPtical PIPE SEwERS
TYPE E-2 (12" MAX. COVER)

NOTES:
1. WHEN LEGAL GRADE IS BELOW FINAL GRADE SEE SEWER STANDARD NO. 38.
2. KEYED CONSTRUCTION JOINTS ARE REQUIRED BETWEEN ANY SUCCESSIVE POURS.
3. CONCRETE IS TO BE CLASS 40. REBARS-GRADE 60.
4. STEEL REINFORCEMENT IS #6@12" UNLESS OTHERWISE SPECIFIED. COVER FOR ALL REINFORCEMENT IS 2" CLEARANCE UNLESS OTHERWISE SPECIFIED.

ASSISTANT COMMISSIONER, DESIGN
DEPARTMENT OF DESIGN AND CONSTRUCTION

P.E.
7/1/07
DATE

DIRECTOR OF ENGINEERING
DEPARTMENT OF ENVIRONMENTAL PROTECTION

P.E.
6/10/07
DATE
CITY OF NEW YORK
DEPARTMENT OF ENVIRONMENTAL PROTECTION

STANDARD FOR MANHOLE ON 68"W X 43"H TO 121"W X 77"H
HORIZONTAL ELLIPTICAL PIPE SEWERS ON PILES

TYPE E-2 (12" MAX. COVER)

NOTES:
(1) WHEN LEGAL GRADE IS BELOW FINAL GRADE SEE SEWER STANDARD NO. 38.
(2) KEYED CONSTRUCTION JOINTS ARE REQUIRED BETWEEN ANY SUCCESSIVE POURS.
(3) CONCRETE IS TO BE CLASS 40. REBARS-GRADE 60.
(4) STEEL REINFORCEMENT IS #16@12" UNLESS OTHERWISE SPECIFIED. COVER FOR ALL REINFORCEMENT IS 2" CLEARANCE UNLESS OTHERWISE SPECIFIED.
(5) CONSTRUCTION JOINT TO BE UTILIZED WHENEVER GROUND CONDITIONS PREVENT SUPPORT OF PIPE.
STANDARD FOR DROP PIPE MANHOLE (TYPE I)
ON 10" DIA. TO 24" DIA. PIPE SEWERS
(25' MAX. COVER)

NOTES:
1) WHEN LEGAL GRADE IS BELOW FINAL GRADE SEE SEWER STANDARD NO. 38.
2) KEYED CONSTRUCTION JOINTS ARE REQUIRED BETWEEN ANY SUCCESSIVE POURS.
3) CONCRETE IS TO BE CLASS 40. REBARS-GRADE 60.
4) STEEL REINFORCEMENT IS #6@12" UNLESS OTHERWISE SPECIFIED. COVER FOR ALL REINFORCEMENT IS 2" CLEARANCE UNLESS OTHERWISE SPECIFIED.
STANDARD FOR DROP PIPE MANHOLE (TYPE I) ON 10" DIA. TO 24" DIA. PIPE SEWERS ON PILES (25' MAX. COVER)

NOTES:

1. WHEN LEGAL GRADE IS BELOW FINAL GRADE SEE SEWER STANDARD NO. 38.
2. KEYED CONSTRUCTION JOINTS ARE REQUIRED BETWEEN ANY SUCCESSIVE POURS.
3. CONCRETE IS TO BE CLASS 40. REBARS-GRADE 60.
4. STEEL REINFORCEMENT IS #6@12" UNLESS OTHERWISE SPECIFIED. COVER FOR ALL REINFORCEMENT IS 2" CLEARANCE UNLESS OTHERWISE SPECIFIED.
5. CONSTRUCTION JOINT TO BE UTILIZED WHENEVER GROUND CONDITIONS PREVENT SUPPORT OF PIPE.

ASSISTANT COMMISSIONER, DESIGN  DATE
DEPARTMENT OF DESIGN AND CONSTRUCTION

DIRECTOR OF ENGINEERING  DATE
DEPARTMENT OF ENVIRONMENTAL PROTECTION
STANDARD FOR DROP PIPE MANHOLE (TYPE II)
(FOR 10" TO 24" INCOMING DROP PIPE SEWERS)

NOTES:
(1) WHEN LEGAL GRADE IS BELOW FINAL GRADE SEE SEWER STANDARD NO. 38.
(2) KEYED CONSTRUCTION JOINTS ARE REQUIRED BET. ANY SUCCESSIVE POURS.
(3) CONCRETE IS TO BE CLASS 40. REBARS-GRADE 60.
(4) STEEL REINFORCEMENT IS #6@12" UNLESS OTHERWISE SPECIFIED. COVER
FOR ALL REINFORCEMENT IS 2" CLEARANCE UNLESS OTHERWISE SPECIFIED.
(5) FOR PIPE SEWERS 10" TO 30" IN DIAMETER 'H' SHALL BE D/2.
FOR PIPE SEWERS 36" TO 60" IN DIAMETER 'H' SHALL BE ZERO.

ASSISTANT COMMISSIONER, DESIGN
DEPARTMENT OF DESIGN AND CONSTRUCTION

DIRECTOR OF ENGINEERING
DEPARTMENT OF ENVIRONMENTAL PROTECTION
STANDARD FOR DROP PIPE MANHOLE (TYPE II) ON PILES

(For 10" to 24" incoming drop pipe sewers)

NOTES:

1. When legal grade is below final grade, see sewer standard NO. 38.
2. Keyed construction joints are required at any successive pours.
3. Concrete is to be Class 40. Rebars—Grade 60.
4. Steel reinforcement is #6@12" unless otherwise specified.
5. Cover for all reinforcement is 2" clearance unless otherwise specified.
6. For pipe sewers 10" to 30" in diameter, 'H' shall be D/2.
7. For pipe sewers 36" to 60" in diameter, 'H' shall be zero.
8. Construction joint to be utilized whenever ground conditions prevent support of pipe.

Assistant Commissioner, Design
Department of Design and Construction

Director of Engineering
Department of Environmental Protection
STANDARD FOR 4'-0" DIAMETER PRECAST MANHOLE (DWG. 1 OF 3)
(LOOSE TOP SLAB AND MONOLITHIC BASE SECTION)

SECTION A-A

final grade

8'-0" MAXIMUM; 1'-0" MINIMUM, IN INCREMENTS OF 1'-0"

2'-0" MAXIMUM; 1'-0" MINIMUM, IN INCREMENTS OF 1'-0"

4'-0" DIA. (TYP.)

MANHOLE STEPS TO BE LOCATED AS DIRECTED BY THE ENGINEER

4'-10" O.D.

4'-0" I.D.

WWM-AS=0.12 X 0.06 (ALL AROUND)

WWM-AS=0.12 X 0.06 (ALL AROUND)

INERT SHELF CAST IN PLACE 2" ABOVE TOP OF PIPE

(SEE NOTE 10) (DWG. 3 OF 3)

WWM-AS=0.12 X 0.06 (SEE NOTE 3) (DWG. 3 OF 3)

WWM-AS=0.12 X 0.06 (SEE NOTE 2) (DWG. 3 OF 3)

WWM-AS=0.12 X 0.06 (SEE NOTE 2) (DWG. 3 OF 3)

WWM-AS=0.12 X 0.06 (ALL AROUND)

WWM-AS=0.12 X 0.06 (ALL AROUND)

3" MIN. (SEE NOTE 12) (DWG. 3 OF 3)

2# HOOPS (TYP.) AROUND OPENING

(SEE NOTE 12) (DWG. 3 OF 3)

WWM-AS=0.12 B.W.

WWM-AS=0.12 B.W.

WWM-AS=0.12 B.W.

#4 DOWELS

1/2" AROUND OPENING

1" AROUND OPENING

5"

5"

1"

1"

1/2"

1/2"

1/2"

1/2"

1/2"

1/2" (TYP.)

1" (TYP.)

1" (TYP.)

1" (TYP.)

3'-0" BOTTOM (3 SIDES)

#4 HOOPS (TYP.)

(SEE NOTE 8 - DWG. 3 OF 3)

(SEE NOTE 2)

(SEE NOTE 2)

WWM-AS=0.12 B.W. (BOT.)

WWM-AS=0.12 B.W. (BOT.)

WWM-AS=0.12 B.W. (BOT.)

10# DOWELS @ 1" O.C.

(21"V X 21") (LAID RAD.)

SECTION

MONOLITHIC BASE

PLAN OF BOTTOM REINFORCING

PLAN OF LOOSE TOP SLAB
STANDARD FOR 4'-0" DIAMETER PRECAST MANHOLE (DWG. 2 OF 3)
(MONOLITHIC TOP SECTION AND ALTERNATE LOOSE BOTTOM SLAB)
SE2BC

CITY OF NEW YORK
DEPARTMENT OF ENVIRONMENTAL PROTECTION

STANDARD FOR 4'-0" DIAMETER PRECAST MANHOLE (DWG. 3 OF 3)
(MISCELLANEOUS DETAIL, NOTES AND SCHEDULE)

DATE

GENERAL NOTES:

(1) THIS 4'-0" DIA. PRECAST MANHOLE MAY BE SUBSTITUTED FOR STANDARD MANHOLE TYPES A-1, A-2, B-1 AND B-2 ON SEWERS 24" IN DIAMETER AND LESS ONLY.

(2) MANHOLE RISER REINFORCING COMPLIES WITH AREA REQUIREMENTS OF ASTM C478, EXCEPT THAT ALL WALL SECTIONS SHALL BE REINFORCED WITH WRB, AS= 0.06 LONG., E.F. WITH 2-#4 LOOPS AROUND ALL CAST PIPE OPENINGS (1-E.F.). THE 2-#4 HOOPS WILL NOT BE REQUIRED AT CORED OPENINGS FOR BASIN CONNECTIONS.

(3) CORED OPENINGS WILL BE PERMITTED FOR 12" DIA. BASIN CONNECTIONS ONLY. THE MAXIMUM CORED OPENING SHALL BE 16" FOR THESE BASIN CONNECTIONS.

(4) FOR DETAILS OF STEPS, JOINTS, GASKETS, PRECAST COLLARS, PIPE TO MANHOLE CONNECTIONS, PILE CAPANO POURED IN PLACE ALTERNATE MONOLITHIC BASE SECTIONS SEE STANDARD FOR PRECAST MANHOLE DETAILS, STANDARD FOR MANHOLE STEPS AND STANDARD FOR ALTERNATE MONOLITHIC BASE SECTIONS FOR PRECAST MANHOLES (POURED IN PLACE).

(5) THE MAXIMUM DEPTH OF COVER OF THE 4'-0" DIA. PRECAST MANHOLE, FROM FINAL GRADE TO THE OUTER TOP OF THE PIPE, SHALL BE TWENTY FIVE (25) FEET.

(6) ALL COVER DISTANCES SHOWN FOR REINFORCEMENT ARE CLEAR DISTANCES.

(7) LIFTING HOLES SHALL BE LOCATED IN THE SECTIONS AS PER MANUFACTURERS RECOMMENDATIONS AND GROUTED PRIOR TO BACKFILLING.

(8) THE VALUES OF THE WALL AND SLAB THICKNESSES ARE A MINIMUM.

(9) CONCRETE DESIGN MIX = 5,000 PSI (MIN. 28 DAY STRENGTH = 4,000 PSI; MAX. W/C = 0.47). REBARS - FS = 60,000 PSI; WAM - FS = 65,000 PSI.

(10) INVERT SHELVES SHALL HAVE A 1/2" PER LINEAR FOOT PITCH TOWARDS THE SEWER.

(11) THE OPENING DIAMETERS SHOWN IN THE SCHEDULE ARE MAXIMUM VALUES. THE MINIMUM OPENING DIAMETERS SHALL BE AS FOLLOWS: 8" TO 24" DIA. PIPES = O.D. - 3".

(12) BELL-UP TYPE JOINTS SHALL BE ALLOWED FOR 4'-0" DIA. PRECAST MANHOLE, WITH THE FOLLOWING MODIFICATION TO THE LOOSE TOP SLAB: (A) THE MINIMUM SLAB THICKNESS SHALL BE X+6" (WHERE 'X' IS JOINT DEPTH) AND (B) THE EMBEDMENT LENGTH SHALL BE T-1" (WHERE 'T' IS THE THICKNESS OF RISER WALL), SEE DETAIL "A" ON DWG. 2 OF 3.

NOTE 'A':
6" MIN. TO 20" MAX.; 9" BRICK MIN. LAID RADIIALLY, USE 1 OR 2 PRECAST COLLARS OR BRICK AS REQUIRED. (4" BRICK MIN. ONLY FOR SHALLOW MANHOLE CONSTRUCTION.)

NOTE 'B':
ALTERNATE LOOSE BOTTOM SLAB TO BE USED ONLY IN SHALLOW MANHOLE CONSTRUCTION. A SHALLOW MANHOLE IS A MANHOLE ON A SEWER WHICH HAS A COVER FROM FINAL GRADE TO THE OUTER TOP OF THE PIPE OF LESS THAN 4'.

NOTE 'C':
PIPE OPENINGS WILL NOT BE PERMITTED THROUGH JOINTS. DISTANCE FROM TOP OR BOTTOM OF ANY SECTION SHALL BE A MINIMUM OF 3" PLUS THE JOINT DEPTH FOR CAST PIPE OPENINGS AND A MINIMUM OF 12" PLUS THE JOINT DEPTH FOR CORED OPENINGS FOR BASIN CONNECTIONS.

NOTE 'D':
THE MANUFACTURER SHALL ENSURE THAT ALL PRECAST MANHOLE SECTIONS ARE ADDITIONALLY REINFORCED WHERE REQUIRED TO RESIST DAMAGE FROM HANDLING, SHIPING AND INSTALLATION STRESSES.

SCHEDULE

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* SEE NOTE 11

PLAN OF BASE SECTION

OPENING (SEE SCHEDULE)

NOTE: "A" "OPENING" (SEE SCHEDULE THIS PAGE)

A, B

R (RADIUS OF CURVATURE) = 2 / TAN (A/2)

NOTE: "A" "OPENING" (SEE SCHEDULE THIS PAGE)

A, B

5+ DEFLECTION ANGLE (SEE SCHEDULE THIS PAGE)

DEPARTMENT OF DESIGN AND CONSTRUCTION
DEPARTMENT OF ENVIRONMENTAL PROTECTION

ASSISTANT COMMISSIONER, DESIGN OFFICE
DATE

DIRECTOR OF ENGINEERING
DATE
STANDARD FOR 5'-0" DIAMETER PRECAST MANHOLE (DWG. 1 OF 3)

(LOOSE TOP SLAB AND MONOLITHIC BASE SECTION)
STANDARD FOR 5'-0" DIAMETER PRECAST MANHOLE (DWG. 2 OF 3)

(MONOLITHIC TOP SECTION AND ALTERNATE LOOSE BOTTOM SLAB)

SECTION B-B

- 6" x 8"W PRECAST COLLAR
- 6" O.D. (TYP.)
- 5'-0" I.D.
- REMOVAL OF THIS SECTION FROM THE RISER IS STRICTLY PROHIBITED AND SHALL NOT BE PERMITTED UNDER ANY CIRCUMSTANCES

ALTERNATE LOOSE BOTTOM SLAB

- 10-#5 DOWELS @18" O.C. (LAI D RADIALY)
- [8@21"V x 28"H]
- [2@21"V x 12"H]

PLAN OF BOTTOM REINFORCING

- OPENING (SEE SCHEDULE)
- INSERT & DOWEL (SEE PIPE TO MANHOLE CONNECTION DETAILS OF STANDARD FOR PRECAST M.H. DETAILS - DWG. 1 OF 3)

PLAN OF MONOLITHIC TOP SECTION

- 2-#4 HOOPS (TYP.) AROUND OPENING
- INVERT SHELF CAST IN PLACE 2" ABOVE TOP OF PIPE (SEE NOTE 10) (DWG. 3 OF 3)

DETAIL "A"

- BELL-UP TYPE JOINT
- (SEE NOTE 12 - DWG. 3 OF 3)
- [3"MINIMUM (SEE NOTE 'C') (DWG. 3 OF 3)]
- [3-#6@3" (TYP.) (SEE NOTE 'A') (DWG. 3 OF 3)]
- [3"MINIMUM (SEE NOTE 'C') (DWG. 3 OF 3)]

ASSISTANT COMMISSIONER, DESIGN
DEPARTMENT OF ENVIRONMENTAL PROTECTION

DIRECTOR OF ENGINEERING
DEPARTMENT OF ENVIRONMENTAL PROTECTION

P.E. 7/9/07
P.E. 8/10/07
STANDARD FOR 5'-0" DIAMETER PRECAST MANHOLE (DWG. 3 OF 3)

(MISCELLANEOUS DETAIL, NOTES AND SCHEDULE)

NOTE 'A':
IF MIN. TO 20" MAX., 9" BRICK MIN. LAIRED RADIALY, USE 1 OR 2 PRECAST COLLARS OR BRICK AS REQUIRED. (4" BRICK MIN. ONLY FOR SHALLOW MANHOLE CONSTRUCTION.)

NOTE 'B':
ALTERNATE LOOSE BOTTOM SLAB TO BE USED ONLY IN SHALLOW MANHOLE CONSTRUCTION. A SHALLOW MANHOLE IS A MANHOLE ON A SEWER WHICH HAS A COVER FROM FINAL GRADE TO THE OUTER TOP OF THE PIPE OF LESS THAN 4'-0".

NOTE 'C':
PRIPE OPENINGS WILL NOT BE PERMITTED THROUGH JOINTS. DISTANCE FROM TOP OR BOTTOM OF ANY SECTION SHALL BE A MINIMUM OF 3" PLUS THE JOINT DEPTH FOR CAST PIPE OPENINGS AND A MINIMUM OF 12" PLUS THE JOINT DEPTH FOR CORED OPENINGS FOR BASIN CONNECTIONS.

NOTE 'D':
THE MANUFACTURER SHALL ENSURE THAT ALL PRECAST MANHOLE SECTIONS ARE ADDITIONALLY REINFORCED WHERE REQUIRED TO RESIST DAMAGE FROM HANDLING, SHIPPING AND INSTALLATION STRESSES.

GENERAL NOTES:

(1) THIS 5'-0" DIA. PRECAST MANHOLE MAY BE SUBSTITUTED FOR STANDARD MANHOLE TYPES A-1, A-2, B-1, B-2, C-1 AND C-2 ON SEWERS 36" IN DIAMETER AND LESS ONLY.

(2) MANHOLE RISER REINFORCEMENT COMPLIES WITH AREA REQUIREMENTS OF ASTM C478, EXCEPT THAT ALL WALL SECTIONS SHALL BE REINFORCED WITH WWM, AS = 0.1S CIR. X 0.07 LONG. - E.F. WITH 2-#4 HOOPS AROUND ALL CAST PIPE OPENINGS (1-E.F.). (THE 2-#4 HOOPS WILL NOT BE REQUIRED AT Cored OPENINGS FOR BASIN CONNECTIONS.) (ALL VALUES OF AREA OF STEEL (AS) ARE IN SQUARE INCHES AND ARE A MINIMUM.)

(3) CORED OPENINGS WILL BE PERMITTED FOR 12" DIA. BASIN CONNECTIONS ONLY. THE MAXIMUM CORED OPENING SHALL BE 16" FOR THESE BASIN CONNECTIONS.

(4) FOR DETAILS OF STEPS, JOINTS, GASKETS, PRECAST COLLARS, PIPE TO MANHOLE CONNECTIONS, PILE CAP AND SLOPED IN PLACE ALTERNATE MONOLITHIC BASE SECTIONS SEE STANDARD FOR PRECAST MANHOLE DETAILS, STANDARD FOR MANHOLE STEPS AND STANDARD FOR ALTERNATE MONOLITHIC BASE SECTIONS FOR PRECAST MANHOLES (POURED IN PLACE).

(5) THE MAXIMUM DEPTH OF COVER OF THE 5'-0" DIA. PRECAST MANHOLE, FROM FINAL GRADE TO THE OUTER TOP OF THE PIPE, SHALL BE TWENTY FIVE (25) FEET.

(6) ALL COVER DISTANCES SHOWN FOR REINFORCEMENT ARE CLEAR DISTANCES.

(7) LIFTING HOLES SHALL BE LOCATED IN THE SECTIONS AS PER MANUFACTURER'S RECOMMENDATIONS AND GROUTED PRIOR TO BACKFILLING.

(8) THE VALUES OF THE WALL AND SLAB THICKNESSES ARE A MINIMUM.

(9) CONCRETE DESIGN MIX = 5,000 PSI (MIN. 28 DAY STRENGTH = 4,000 PSI; MAX. W/C = 0.47). REBARS - FS = 60,000 PSI. WWM - FS = 55,000 PSI.

(10) INVERT SHELVES SHALL HAVE A 1/2" PER LINEAR FOOT PITCH TOWARDS THE SEWER.

(11) THE OPENING DIAMETERS SHOWN IN THE SCHEDULE ARE MAXIMUM VALUES. THE MINIMUM OPENING DIAMETERS SHALL BE AS FOLLOWS: 8" TO 24" DIA. PIPES = O.D. + 3"; 30" TO 36" DIA. PIPES = O.D. + 4".

(12) BELL-UP TYPE JOINTS SHALL BE ALLOWED FOR 5'-0" DIA. PRECAST MANHOLE, WITH THE FOLLOWING MODIFICATION TO THE LOOSE TOP SLAB: (A) THE MINIMUM SLAB THICKNESS SHALL BE X'-0" (WHERE X IS JOINT DEPTH), BUT IN NO CASE SHALL IT BE LESS THAN 10" THICK AND (B) THE EMBEDMENT LENGTH SHALL BE 1'-0" (WHERE I IS THE THICKNESS OF RISER WALL); SEE DETAIL "A".

SCHEDULE

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* SEE NOTE 11
STANDARD FOR PRECAST MANHOLE (DWG. 3 OF 4)

FOR 6'-0", 7'-0", 8'-0" AND 10'-0" DIA. PRECAST MANHOLE

(PRECAST MANHOLE MISCELLANEOUS DETAIL, NOTES AND SCHEDULES)

NOTE 'A':
9" MIN. TO 20" MAX.; 8" BRICK MIN. LAID RADIALY, USE 1 OR 2 PRECAST COLLARS OR BRICK AS REQUIRED. (8" BRICK MIN. ONLY FOR SHALLOW MANHOLE CONSTRUCTION.)

NOTE 'B':
ALTERNATE LOOSE BOTTOM SLAB TO BE USED ONLY IN SHALLOW MANHOLE CONSTRUCTION. A SHALLOW MANHOLE IS A MANHOLE ON A SEWER WHICH HAS A COVER FROM FINAL GRADE TO THE OUTER TOP OF THE PIPE OF LESS THAN 4'-0". MINIMUM HEADROOM FOR SHALLOW MANHOLE SHALL BE 1'-0".

NOTE 'C':
Pipe openings will not be permitted through joints. Distance from top or bottom of any section shall be a minimum of 3" plus the joint depth for cast pipe openings and a minimum of 12" plus the joint depth for cored openings for basin connections.

NOTE 'D':
THE MANUFACTURER SHALL ENSURE THAT ALL PRECAST MANHOLE SECTIONS ARE ADDITIONALLY REINFORCED WHERE REQUIRED TO RESIST DAMAGE FROM HANDLING, SHIPPING AND INSTALLATION STRESSES.

GENERAL NOTES:
(1) THESE PRECAST MANHOLE MAY BE SUBSTITUTED FOR STANDARD MANHOLE TYPES A-1, A-2, B-1, B-2, C-1, C-2, D-1 AND D-2 ON SEWERS 8" IN DIAMETER AND LESS ONLY (AS SHOWN IN SCHEDULES).
(2) MANHOLE RISER REINFORCING COMPLIES WITH AREA REQUIREMENTS OF ASTM C478, EXCEPT THAT ALL WALL SECTIONS SHALL BE REINFORCED WITH VERTICAL ASHES AREA CHART A - DWG. 4 OF 4 IF WITH 2-#4 HOOPS AROUND ALL CAST PIPE OPENINGS (1-E.F.). (THE 2-#4 HOOPS WILL NOT BE REQUIRED AT CORED OPENINGS FOR BASIN CONNECTIONS.) ALL VALUES OF AREA OF STEEL (AS) ARE IN SQUARE INCHES AND ARE A MINIMUM.
(3) CORED OPENINGS WILL BE PERMITTED FOR 12" DIA. BASE CONNECTIONS ONLY. THE MAXIMUM CORED OPENING SHALL BE 16" FOR THESE BASE CONNECTIONS.
(4) FOR DETAIL OF STEPS, JOINTS, GASKETS, PRECAST COLLARS, PIPE TO MANHOLE CONNECTIONS, PIPE CAP, POURER IN PLACE ALTERNATE MONOLITHIC BASE SECTIONS AND 4'-0" DIA. PRECAST MANHOLE UNITS SEE STANDARD FOR PRECAST MANHOLE DETAILS, STD. FOR R.H. STEPS AND STD. FOR ALTERNATE MONOLITHIC BASE SECTIONS FOR PRECAST MANHOLE (POURED IN PLACE).
(5) THE MAXIMUM DEPTH OF COVER OF THE 6'-0", 7'-0", 8'-0" AND 10'-0" DIA. PRECAST MANHOLES, FROM FINAL GRADE TO THE OUTER TOP OF THE PIPE, SHALL BE TWENTY FIVE (25) FEET.
(6) ALL COVER DISTANCES SHOWN FOR REINFORCEMENT ARE CLEAR DISTANCES.
(7) LIFTING HOLES SHALL BE LOCATED IN THE SECTIONS AS PER MANUFACTURER'S RECOMMENDATIONS AND GROUTED PRIOR TO BACKFILLING.
(8) THE VALUES OF THE WALL AND SLAB THICKNESSES ARE A MINIMUM.
(9) CONCRETE DESIGN MIX = 5,000 PSI (MIN. 28 DAY STRENGTH = 4,000 PSI; MAX. W/C = 0.47). REBARS - FS = 60,000 PSI; VWVM - FS = 65,000 PSI.
(10) INVERT SHELVES SHALL HAVE A 1/2" PER LINEAR FOOT PITCH TOWARDS THE SEWER.
(11) THE OPENING DIAMETERS SHOWN IN THE SCHEDULE ARE MAXIMUM VALUES. THE MINIMUM OPENING DIAMETERS SHALL BE AS FOLLOWS: 8" TO 24" DIA. PIPES = O.D.+3"; 30" TO 36" DIA. PIPES = O.D.+4" AND 54" TO 8" DIA. PIPES = O.D.+5".
(12) BELL-UP TYPE JOINTS SHALL BE ALLOWED FOR 6'-0", 7'-0", 8'-0" AND 10'-0" DIA. PRECAST MANHOLE, WITH THE FOLLOWING MODIFICATION TO THE LOOSE TOP SLAB: (A) THE MINIMUM SLAB THICKNESS SHOULD BE X+6" (WHERE 'X' IS JOINT DEPTH), BUT IN NO CASE SHOULD IT BE LESS THAN 13" THICK AND (B) THE EMBEDMENT LENGTH SHALL BE 1'-1" (WHERE 'T' IS THE THICKNESS OF RISER WALL). SEE DETAIL "A" ON DRAWING 30B.

NOTE 'E':
DISTANCE FROM TOP OR BOTTOM OF ANY SECTION SHALL BE 9" MIN. TO 20" MAX.; 9" BRICK MIN. Laid radially, use 1 or 2 precast collars or brick as required. (9" brick min. only for shallow manhole construction.)

NOTE 'F':
THE MANUFACTURER SHALL ENSURE THAT ALL PRECAST MANHOLE SECTIONS ARE ADDITIONALLY REINFORCED WHERE REQUIRED TO RESIST DAMAGE FROM HANDLING, SHIPPING AND INSTALLATION STRESSES.

NOTE 'G':
THE MANUFACTURER SHALL ENSURE THAT ALL PRECAST MANHOLE SECTIONS ARE ADDITIONALLY REINFORCED WHERE REQUIRED TO RESIST DAMAGE FROM HANDLING, SHIPPING AND INSTALLATION STRESSES.

SCHEDULE (6'-0" DIA. PRECAST MANHOLE)

<table>
<thead>
<tr>
<th>PIPE DIA.</th>
<th>OPENING DIA.</th>
<th>MAX.</th>
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<tbody>
<tr>
<td>18&quot;</td>
<td>20&quot;</td>
<td>114&quot;</td>
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<tr>
<td>24&quot;</td>
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<td>98&quot;</td>
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<td>30&quot;</td>
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</tr>
<tr>
<td>54&quot;</td>
<td>54&quot;</td>
<td>18&quot;</td>
</tr>
</tbody>
</table>

* SEE NOTE 11

SCHEDULE (7'-0" DIA. PRECAST MANHOLE)

<table>
<thead>
<tr>
<th>PIPE DIA.</th>
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</thead>
<tbody>
<tr>
<td>18&quot;</td>
<td>26&quot;</td>
<td>194&quot;</td>
</tr>
<tr>
<td>24&quot;</td>
<td>30&quot;</td>
<td>114&quot;</td>
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<tr>
<td>60&quot;</td>
<td>60&quot;</td>
<td>18&quot;</td>
</tr>
</tbody>
</table>

* SEE NOTE 11

SCHEDULE (8'-0" DIA. PRECAST MANHOLE)

<table>
<thead>
<tr>
<th>PIPE DIA.</th>
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</thead>
<tbody>
<tr>
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<td>114&quot;</td>
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<tr>
<td>60&quot;</td>
<td>60&quot;</td>
<td>18&quot;</td>
</tr>
</tbody>
</table>

* SEE NOTE 11

SCHEDULE (10'-0" DIA. PRECAST MANHOLE)

<table>
<thead>
<tr>
<th>PIPE DIA.</th>
<th>OPENING DIA.</th>
<th>MAX.</th>
</tr>
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<tr>
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<td>28&quot;</td>
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</tbody>
</table>

* SEE NOTE 11

GENERAL NOTES:

ASSISTANT COMMISSIONER DESIGN DEPARTMENT OF DESIGN AND CONSTRUCTION

DATE 7/9/07

DIRECTOR OF ENGINEERING DEPARTMENT OF ENVIRONMENTAL PROTECTION

DATE 8/10/07

ASSISTANT COMMISSIONER DESIGN DEPARTMENT OF DESIGN AND CONSTRUCTION

DATE 7/9/07

DIRECTOR OF ENGINEERING DEPARTMENT OF ENVIRONMENTAL PROTECTION

DATE 8/10/07
# STANDARD FOR PRECAST MANHOLE (DWG. 4 OF 4)

## CHART A

<table>
<thead>
<tr>
<th>d</th>
<th>D</th>
<th>t</th>
<th>H</th>
<th>AS</th>
<th>E</th>
<th>F</th>
<th>h</th>
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<tbody>
<tr>
<td>6'-0&quot;</td>
<td>7'-2&quot;</td>
<td>7&quot;</td>
<td>11'-6&quot; MAX.; 3'-5&quot; MIN.</td>
<td>7'-4&quot; MAX.; 3'-5&quot; MIN.</td>
<td>0.18 X 0.09</td>
<td>#4</td>
<td>#5@12&quot;</td>
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<tr>
<td>7'-0&quot;</td>
<td>8'-4&quot;</td>
<td>6&quot;</td>
<td>11'-6&quot; MAX.; 3'-5&quot; MIN.</td>
<td>7'-11&quot; MAX.; 3'-5&quot; MIN.</td>
<td>0.21 X 0.10</td>
<td>#4</td>
<td>#6@12&quot;</td>
</tr>
<tr>
<td>8'-0&quot;</td>
<td>9'-6&quot;</td>
<td>9&quot;</td>
<td>11'-6&quot; MAX.; 4'-1&quot; MIN.</td>
<td>9'-1&quot; MAX.; 4'-1&quot; MIN.</td>
<td>0.24 X 0.12</td>
<td>#5</td>
<td>#7@9&quot;</td>
</tr>
<tr>
<td>10'-0&quot;</td>
<td>11'-10&quot;</td>
<td>11&quot;</td>
<td>11'-6&quot; MAX.; 5'-4&quot; MIN.</td>
<td>10'-10&quot; MAX.; 5'-0&quot; MIN.</td>
<td>0.30 X 0.15</td>
<td>#6</td>
<td>#8@8&quot;</td>
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</tbody>
</table>

## CHART B

<table>
<thead>
<tr>
<th>d</th>
<th>DOWELS IN MONOLITHIC TOP SECTION</th>
<th>DOWELS IN MONOLITHIC BASE SECTION</th>
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</thead>
<tbody>
<tr>
<td>6'-0&quot;</td>
<td></td>
<td>15-#6 DOWELS @17&quot; O.C. (32&quot;V x 32&quot;H)</td>
</tr>
<tr>
<td></td>
<td>19-#5 DOWELS @12&quot; O.C. (17@23&quot;V x 32&quot;H); (2@23&quot;V x 10&quot;H)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>15-#5 DOWELS @17&quot; O.C. (32&quot;V x 32&quot;H)</td>
</tr>
<tr>
<td>7'-0&quot;</td>
<td></td>
<td>20-#6 DOWELS @15&quot; O.C. (38&quot;V x 38&quot;H)</td>
</tr>
<tr>
<td></td>
<td>23-#6 DOWELS @12&quot; O.C. (21@23&quot;V x 38&quot;H); (2@23&quot;V x 10&quot;H)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>25-#6 DOWELS @13 3/4&quot; O.C. (46&quot;V x 46&quot;H)</td>
</tr>
<tr>
<td>8'-0&quot;</td>
<td></td>
<td>34-#7 DOWELS @12 3/4&quot; O.C. (48&quot;V x 48&quot;H)</td>
</tr>
<tr>
<td></td>
<td>27-#6 DOWELS @12&quot; O.C. (25@23&quot;V x 40&quot;H); (2@23&quot;V x 10&quot;H)</td>
<td></td>
</tr>
<tr>
<td>10'-0&quot;</td>
<td></td>
<td>31-#7 DOWELS @12&quot; O.C. (25@23&quot;V x 46&quot;H); (2@23&quot;V x 25&quot;H)</td>
</tr>
</tbody>
</table>

Assistant Commissioner, Design
Department of Design and Construction

Assistant Commissioner, Design
Department of Design and Construction

Director of Engineering
Department of Environmental Protection
STANDARD FOR PRECAST MANHOLE DETAILS (DWG. 1 OF 3)

(PIPE TO MANHOLE CONNECTION DETAILS)

LIMITS OF EPOXY BONDING AGENT ON PIPE (ALL AROUND) (TYP.)

CONCRETE ENCASMENT

CONCRETE CRADLE TRANSITION SECTION FOR CONNECTION

SECTIONAL PROFILE

NOTE A:
LEVELING PAD AND/OR PILE CAP - FOR MH'S ON GRADE, USE 8" WELL COMPACTED STONE BALLAST. FOR MH'S ON PILES, USE A CLASS 40 REINFORCED CONCRETE PILE CAP AS SHOWN ON THE STANDARD FOR PRECAST MANHOLE DETAILS DWG. 3 OF 3. IN EACH CASE, THE SHAPE SHALL BE SQUARE AND 3" LARGER THAN THE O.D. OF THE STRUCTURE, UNLESS OTHERWISE SPECIFIED.

GENERAL NOTES:
(1) EPOXY BONDING AGENT TO BE ROCKWELL 'C' AS MANUFACTURED BY PRECO CHEMICAL CO. OR EQUAL.
(2) NON-SHRINK GROUT TO BE SIKA-SET MORTAR AS MANUFACTURED BY SIKA CO. OR EQUAL.
(3) THERMOPLASTIC INSERT AS MANUFACTURED BY PENNSYLVANIA INSERT CORP. OR EQUAL.

SECTION A-A

CONCRETE CRADLE TRANSITION SECTION FOR CONNECTION

CONCRETE ENCASMENT (TYP.)

CONCRETE CRADLE

3/4" DIA. THREADED DOWELS @12" WITH THERMOPLASTIC INSERT (INSTALLED AT PLANT) (TYP.) (SEE NOTE 3)

SEE NOTE 'A'

SEE NOTE 'A'

EPOXY BONDING AGENT (TYP.) (SEE NOTE 1)

NON-SHRINK GROUT (TYP.) (SEE NOTE 2)

CONCRETE ENCASMENT (TYP.)
STANDARD FOR PRECAST MANHOLE DETAILS (DWG. 2 OF 3)
(JOINTS, GASKETS AND PRECAST COLLAR DETAILS)

PLAN OF 6"H X 8"W PRECAST COLLAR

<table>
<thead>
<tr>
<th>JOINT DETAILS</th>
<th>M.H. I.D.</th>
<th>X'</th>
<th>D'</th>
</tr>
</thead>
<tbody>
<tr>
<td>4'-0&quot;</td>
<td>3' TO 5'</td>
<td>5/8&quot; DIA.</td>
<td></td>
</tr>
<tr>
<td>5'-0&quot;</td>
<td>3' TO 5&quot;</td>
<td>3/4&quot; DIA.</td>
<td></td>
</tr>
<tr>
<td>6'-0&quot; AND 7'-0&quot;</td>
<td>3' TO 6&quot;</td>
<td>3/4&quot; DIA.</td>
<td></td>
</tr>
<tr>
<td>8'-0&quot; AND 10'-0&quot;</td>
<td>3' TO 8&quot;</td>
<td>3/4&quot; DIA.</td>
<td></td>
</tr>
</tbody>
</table>

7/8" X 7/8" OR 1" DIA. SELF SEALING BUTYL GASKET
QUALITY EQUAL TO FEDERAL SPEC. #SS-S-00210 (TYP.)

#2 HOOPS (TYP.)

SECTION A-A

ASSISTANT COMMISSIONER, DESIGN DATE
DEPARTMENT OF DESIGN AND CONSTRUCTION

DIRECTOR OF ENGINEERING DATE
DEPARTMENT OF ENVIRONMENTAL PROTECTION
STANDARD FOR PRECAST MANHOLE DETAILS (DWG. 3 OF 3)
(PRECAST MANHOLE PILE CAP DETAILS)

NOTES:
(1) CONCRETE SHALL BE CLASS 40. STEEL REINFORCEMENT BARS SHALL BE GRADE 60.
(2) COST FOR ALL LABOR, MATERIAL, ETC. REQUIRED FOR THE PLACEMENT OF PILE CAP(S) SHALL BE MADE UNDER THE FOLLOWING CONTRACT ITEMS:
(A) ADDITIONAL EARTH EXCAVATION
(B) ADDITIONAL CONCRETE
(C) ADDITIONAL STEEL REINFORCING BARS
(D) STONE BALLAST

 минимальное количество бетона 6 тонн

SECTION A-A

<table>
<thead>
<tr>
<th>M.H. DIA</th>
<th>L</th>
<th>A</th>
<th>N/B</th>
<th>P/S</th>
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<td>15&quot;</td>
<td>2</td>
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<td>5'-0&quot;</td>
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<td>17&quot;</td>
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<td>8'-0&quot;</td>
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<td>21&quot;</td>
<td>3</td>
<td>3'-3&quot;</td>
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<tr>
<td>10'-0&quot;</td>
<td>12'-4&quot;</td>
<td>23&quot;</td>
<td>4</td>
<td>2'-10&quot;</td>
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</table>
STANDARD FOR ALTERNATE MONOLITHIC BASE SECTION FOR PRECAST MANHOLES (POURED IN PLACE)

(FOR 4'-0", 5'-0", 6'-0", 7'-0", 8'-0" AND 10'-0" DIA. PRECAST MANHOLES)

NOTES:

(1) ALL STEEL REINFORCEMENT SHALL BE AS SHOWN. COVER DISTANCES SHOWN ARE CLEAR DISTANCES.

(2) FOR ALTERNATE MONOLITHIC BASE SECTION ON PILES SEE PRECAST MANHOLE PILE CAP DETAILS OF STANDARD FOR PRECAST MANHOLE DETAILS DWG. 3 OF 3. ALL PILE CAP DIMENSIONS SHALL REMAIN THE SAME, WITH THE EXCEPTIONS OF DIMENSION "L" WHICH SHALL BE EQUAL TO THE DIMENSION OF THE ALTERNATE MONOLITHIC BASE SECTION AND DIMENSION "X" WHICH SHALL BE ADJUSTED ACCORDINGLY.

(3) CONCRETE SHALL BE CLASS 40. STEEL REINFORCEMENT BARS SHALL BE GRADE 60.

(4) INVERT SHELVES SHALL HAVE A 1/2" PER LINEAR FOOT PITCH TOWARDS THE SEWER.

(5) TRANSITIONAL RISER SECTION SHALL CONFORM TO ALL REQUIREMENTS OF THE STANDARDS FOR PRECAST MANHOLES.

THE CONTRACTOR SHALL BE ALLOWED TO POUR IN PLACE EITHER A CIRCULAR OR SQUARE SHAPED OUTER WALL FOR THE ALTERNATE MONOLITHIC BASE SECTION.

SECTION A-A

SECTION B-B

SECTION C-C

NOTE: STEEL FORM TO BE UTILIZED TO MAKE JOINT COMPATIBLE WITH RISER SECTION.
STANDARD FOR PRECAST DROP PIPE MANHOLE (TYPE I)
(ON 10" DIA. TO 24" DIA. SEWERS)

NOTES:
(1) THERMOPLASTIC INSERT AS MANUFACTURED BY PENNSYLVANIA INSERT CORP. OR EQUAL.
(2) INVERT SHELVES SHALL HAVE A 1/2" PER LINEAR FOOT PITCH TOWARDS THE SEWER.
(3) EXCEPT AS OTHERWISE SHOWN OR SPECIFIED THE PRECAST MANHOLE SHALL CONFORM TO ALL REQUIREMENTS OF THE STANDARD FOR 6'-0" TO 10'-0" DIA. PRECAST MANHOLES.

SECTION A-A

7/1/07
P.E.
ASSISTANT COMMISSIONER, DESIGN
DEPARTMENT OF DESIGN AND CONSTRUCTION

8/10/07
P.E.
DIRECTOR OF ENGINEERING
DEPARTMENT OF ENVIRONMENTAL PROTECTION
CITY OF NEW YORK
DEPARTMENT OF ENVIRONMENTAL PROTECTION

STANDARD FOR PRECAST DROP PIPE MANHOLE (TYPE II)
(FOR 10" DIA. TO 24" DIA. INCOMING DROP PIPE SEWERS)

NOTES:
(1) THERMOPLASTIC INSERT AS MANUFACTURED BY PENNSYLVANIA INSERT CORP. OR EQUAL.
(2) INVERT SHELVES SHALL HAVE A 1/2" PER LINEAR FOOT PITCH TOWARDS THE SEWER.
(3) EXCEPT AS OTHERWISE SHOWN OR SPECIFIED THE PRECAST MANHOLE SHALL CONFORM TO ALL REQUIREMENTS OF THE STANDARD FOR 6'-0" TO 10'-0" DIA. PRECAST MANHOLES.

SECTION B-B

ASSISTANT COMMISSIONER, DESIGN
DEPARTMENT OF DESIGN AND CONSTRUCTION

7/10/07

DIRECTOR OF ENGINEERING
DEPARTMENT OF ENVIRONMENTAL PROTECTION

8/10/07
STANDARD FOR REMOVABLE PRECAST REINFORCED CONCRETE SLAB

NOTES:
(1) ALL STEEL REINFORCEMENT ARE #6 BARS.
(2) CONCRETE IS TO BE CLASS 40. REBARS-GRADE 60.
STANDARD FOR REMOVABLE PRECAST REINFORCED CONCRETE SLAB FOR DROP PIPE MANHOLE (TYPE I)

NOTES:

(1) ALL STEEL REINFORCEMENT ARE #6 BARS.

(2) CONCRETE IS TO BE CLASS 40, REBARS-GRADE 60.
STANDARD FOR REMOVABLE PRECAST REINFORCED CONCRETE SLAB FOR DROP PIPE MANHOLE (TYPE II)

NOTES:
(1) ALL STEEL REINFORCEMENT ARE #6 BARS.
(2) CONCRETE IS TO BE CLASS 40, REBARS-GRADE 60.
STANDARD FOR MANHOLE CHIMNEY DETAIL

(WHEN FINAL GRADE IS ABOVE LEGAL GRADE)

- 17" STD. 27" DIA. M.H. FRAME(S) AND COVER(S) FOR ACCESS AND CLEANOUT ON THREE COURSES OF BRICK LAYED RADALLY
- 8" STD. REMOVABLE PRECAST R.C. SLAB (AS SHOWN IN M.H. STANDARD) SET IN MORTAR
- 0.5" MORTAR JOINT
- TAR PAPER JOINT
- STD. M.H. STEPS @ 12" O.C.

STANDARD SQUARE MANHOLE CHIMNEY

ASSISTANT COMMISSIONER, DESIGN
DEPARTMENT OF DESIGN AND CONSTRUCTION

DATE

DIRECTOR OF ENGINEERING
DEPARTMENT OF ENVIRONMENTAL PROTECTION

DATE
STANDARD FOR 27" DIAMETER CAST IRON MANHOLE FRAME AND COVER

(For Access or Cleanout)

NOTES:

(1) FRAME MATERIAL: GRAY CAST IRON ASTM A-48 CLASS 35B. MINIMUM WEIGHT OF FRAME IS 345 LBS.

(2) COVER MATERIAL: GRAY CAST IRON ASTM A-48 CLASS 35B. MINIMUM WEIGHT OF COVER IS 195 LBS.

(3) DESIGN LOADING: HS20-44 HIGHWAY LOADING.

(4) ALL MANHOLE FRAMES & COVERS SHALL HAVE THE MANUFACTURER'S IDENTIFICATION, CAST DATE OR HEAT NUMBER AND COUNTRY OF ORIGIN INTEGRALLY CAST ON INDIVIDUAL PIECES AT THE TIME OF MANUFACTURE IN ACCORDANCE WITH THE DEP SPECIFICATION.

SECTION A-A

SECTION OF FRAME

SECTION OF COVER

BOTTOM VIEW OF COVER

PLAN VIEW OF FRAME AND COVER

NOTES:

(1) FRAME MATERIAL: GRAY CAST IRON ASTM A-48 CLASS 35B. MINIMUM WEIGHT OF FRAME IS 345 LBS.

(2) COVER MATERIAL: GRAY CAST IRON ASTM A-48 CLASS 35B. MINIMUM WEIGHT OF COVER IS 195 LBS.

(3) DESIGN LOADING: HS20-44 HIGHWAY LOADING.

(4) ALL MANHOLE FRAMES & COVERS SHALL HAVE THE MANUFACTURER'S IDENTIFICATION, CAST DATE OR HEAT NUMBER AND COUNTRY OF ORIGIN INTEGRALLY CAST ON INDIVIDUAL PIECES AT THE TIME OF MANUFACTURE IN ACCORDANCE WITH THE DEP SPECIFICATION.
STANDARD FOR 27" DIAMETER CAST IRON EXTENSION RING
FOR 27" DIAMETER MANHOLE FRAME AND COVER

NOTES:
(1) MATERIAL: GRAY CAST IRON ASTM A-48, CLASS 35B. MINIMUM WEIGHT OF EXTENSION RINGS:
2" = 120 LBS.; 3" = 150 LBS.; 4" = 170 LBS.
(2) DESIGN LOADING: HS20-44 HIGHWAY LOADING.
(3) ALL MANHOLE FRAMES & COVERS SHALL HAVE THE MANUFACTURER'S IDENTIFICATION, CAST DATE
OR HEAT NUMBER AND COUNTRY OF ORIGIN INTEGRALLY CAST ON INDIVIDUAL PIECES AT THE TIME
OF MANUFACTURE IN ACCORDANCE WITH THE DEP SPECIFICATION.
CITY OF NEW YORK
DEPARTMENT OF ENVIRONMENTAL PROTECTION
STANDARD FOR 36" DIAMETER MANHOLE FRAME AND COVER FOR CLEANOUT

PLAN VIEW OF FRAME AND COVER

NOTES:
1) FRAME MATERIAL: GRAY CAST IRON ASTM A-48 CLASS 358. MINIMUM WEIGHT OF FRAME IS 480 LBS.
2) COVER MATERIAL: GRAY CAST IRON ASTM A-48 CLASS 358. MINIMUM WEIGHT OF COVER IS 400 LBS.
3) DESIGN LOADING: HS20-44 HIGHWAY LOADING.
4) ALL MANHOLE FRAMES & COVERS SHALL HAVE THE MANUFACTURER'S IDENTIFICATION, CAST DATE OR HEAT NUMBER AND COUNTRY OF ORIGIN INTEGRALLY CAST ON INDIVIDUAL PIECES AT THE TIME OF MANUFACTURE IN ACCORDANCE WITH THE DEP SPECIFICATION.

ASSISTANT COMMISSIONER, DESIGN
DEPARTMENT OF DESIGN AND CONSTRUCTION

DIRECTOR OF ENGINEERING
DEPARTMENT OF ENVIRONMENTAL PROTECTION

DATE

DATE
CITY OF NEW YORK
DEPARTMENT OF ENVIRONMENTAL PROTECTION

STANDARD FOR 24" DIAMETER CAST IRON MANHOLE COVER

NOTES:

(1) COVER MATERIAL: GRAY CAST IRON ASTM A-48 CLASS 35B.
   MINIMUM WEIGHT OF COVER IS 150 LBS.

(2) DESIGN LOADING: HS20-44 HIGHWAY LOADING.

(3) ALL MANHOLE COVERS SHALL HAVE THE MANUFACTURER'S IDENTIFICATION, CAST DATE
   OF HEAT NUMBER AND COUNTRY OF ORIGIN INTEGRALLY CAST ON INDIVIDUAL PIECES AT
   THE TIME OF MANUFACTURE IN ACCORDANCE WITH THE DEP SPECIFICATION.

(4) TO BE USED ONLY TO REPLACE BROKEN OR DAMAGED EXISTING 24" DIAMETER
   SEWER MANHOLE COVER.

---

PLAN VIEW OF COVER

BOTTOM VIEW OF COVER

SECTION OF COVER
CITY OF NEW YORK
DEPARTMENT OF ENVIRONMENTAL PROTECTION

STANDARD FOR CAST IRON MANHOLE STEP

NOTES:
(1) MATERIAL: GRAY CAST IRON ASTM A-48 CLASS 35B. MINIMUM WEIGHT OF STEP IS 11 LBS.
(2) ALL MANHOLE STEPS SHALL HAVE THE MANUFACTURER'S IDENTIFICATION, CAST DATE OR HEAT NUMBER AND COUNTRY OF ORIGIN INTEGRALLY CAST ON INDIVIDUAL PIECES AT THE TIME OF MANUFACTURE IN ACCORDANCE WITH THE DEP SPECIFICATION.

PLAN

SECTION

SECTION OF STEP IN PLACE
STANDARD FOR CAST IRON MANHOLE STEP
(BOLT-ON TYPE)

NOTES:
(1) MATERIAL: GRAY CAST IRON ASTM A-48 CLASS 35B. MINIMUM WEIGHT OF BOLT-ON STEP IS 13 LBS.
(2) THERMOPLASTIC INSERT AS MANUFACTURED BY PENNSYLVANIA INSERT CORP., OR EQUAL, WITH
5/8"-11 X 2 1/2" STAINLESS STEEL BOLT AND WASHER,
OR
1 1/8" X 2" CORED HOLE FOR 5/8"-11 X 2 1/2" STAINLESS STEEL BOLT AND WASHER,
WITH ACKERMAN-JOHNSON EXPANSIVE SCREW ANCHOR WITH NONCORROSIVE BRASS CONES,
CATALOG NO. 701-62.
(3) ALL MANHOLE STEPS SHALL HAVE THE MANUFACTURER'S IDENTIFICATION, CAST DATE
OR HEAT NUMBER AND COUNTRY OF ORIGIN INTEGRALLY CAST ON INDIVIDUAL PIECES
AT THE TIME OF MANUFACTURE IN ACCORDANCE WITH THE DEP SPECIFICATION.
STANDARD FOR CIRCULAR CAST IRON MANHOLE STEP (BOLT-ON TYPE)

NOTES:

1. MATERIAL: GRAY CAST IRON ASTM A-48 CLASS 35B. MINIMUM WEIGHT OF CIRCULAR BOLT-ON STEP IS 13 LBS.

2. THERMOPLASTIC INSERT AS MANUFACTURED BY PENNSYLVANIA INSERT CORP. OR EQUAL, WITH 5/8"-11 X 2 1/2" STAINLESS STEEL BOLT AND WASHER.

OR

1 1/8" X 2" CORED HOLE FOR 5/8"-11 X 2 1/2" STAINLESS STEEL BOLT AND WASHER, WITH ACKERMAN-JOHNSON EXPANSIVE SCREW ANCHOR WITH NONCORROSIVE BRASS CONES, CATALOG NO. 701-62.

3. ALL MANHOLE STEPS SHALL HAVE THE MANUFACTURER'S IDENTIFICATION, CAST DATE OR HEAT NUMBER AND COUNTRY OF ORIGIN INTEGRALLY CAST ON INDIVIDUAL PIECES AT THE TIME OF MANUFACTURE IN ACCORDANCE WITH THE DEP SPECIFICATION.
STANDARD FOR PLASTIC MANHOLE STEP
(COPOLYMER POLYPROPYLENE PLASTIC MANHOLE STEP)

NOTE:
PLASTIC MANHOLE STEP MAY BE SUBSTITUTED FOR CAST IRON MANHOLE STEP,
UNLESS OTHERWISE DIRECTED BY THE ENGINEER.
STANDARD FOR TYPE 1 CATCH BASIN
(WITH CURB PIECE)

NOTES:
(1) LOCATION AND ANGLE OF BASIN CONNECTION MAY BE VARIED TO SUIT FIELD CONDITIONS.
(2) KEYED CONSTRUCTION JOINTS ARE REQUIRED BETWEEN ANY SUCCESSIVE POURS.
(3) THE MINIMUM DROP FROM BASIN TO SEWER SHALL BE 6".
(4) EXPANSION JOINTS ARE REQUIRED IN THE CONCRETE SIDEWALK AREA AT A DISTANCE OF 1'-0" AROUND THE PERIMETER OF THE BASIN.
(5) CONCRETE IS TO BE CLASS 40, REBARS-GRADE 60.
NOTES:
(1) LOCATION OF CURB SHALL BE AS SHOWN UNLESS OTHERWISE DIRECTED BY THE ENGINEER.
(2) LOCATION AND ANGLE OF BASIN CONNECTION MAY BE VARIED TO SUIT FIELD CONDITIONS.
(3) KEYED CONSTRUCTION JOINTS ARE REQUIRED BETWEEN ANY SUCCESSIVE POURS.
(4) THE MINIMUM DROP FROM BASIN TO SEWER SHALL BE 6".
(5) EXPANSION JOINTS ARE REQUIRED IN THE CONCRETE SIDEWALK AREA AT A DISTANCE OF 1'-0" AROUND THE PERIMETER OF THE BASIN.
(6) CONCRETE IS TO BE CLASS 40. REBARS-GRADE 60.
CITY OF NEW YORK
DEPARTMENT OF ENVIRONMENTAL PROTECTION

STANDARD FOR TYPE 3 CATCH BASIN
(WITHOUT CURB PIECE)

NOTES:
1. LOCATION OF CURB SHALL BE AS SHOWN UNLESS OTHERWISE DIRECTED BY THE ENGINEER.
2. LOCATION AND ANGLE OF BASIN CONNECTION MAY BE VARIED TO SUIT FIELD CONDITIONS.
3. THE MINIMUM DROP FROM BASIN TO SEWER SHALL BE 6".
4. KEYED CONSTRUCTION JOINTS ARE REQUIRED BETWEEN ANY SUCCESSIVE POORS.
5. EXPANSION JOINTS ARE REQUIRED IN THE CONC. SIDEWALK AREA AT A DISTANCE OF 1'-6" AROUND THE PERIMETER OF THE BASIN.
6. ALL REINFORCEMENT IS #6 REINFORCING BARS UNLESS OTHERWISE SHOWN.
7. CONCRETE IS TO BE CLASS 40, REBAR-GRADE 60.

SECTION A-A

SECTION B-B

SECTION C-C

LIFTING BAR DETAIL

DATE 7/9/07

DIRECTOR OF ENGINEERING
DEPARTMENT OF ENVIRONMENTAL PROTECTION

DATE 8/10/07

ASSISTANT COMMISSIONER, DESIGN
DEPARTMENT OF DESIGN AND CONSTRUCTION

P.E.

P.E.
NOTES:
(1) LOCATION OF CURB SHALL BE AS SHOWN UNLESS OTHERWISE DIRECTED BY THE ENGINEER.
(2) LOCATION AND ANGLE OF BASIN CONNECTION MAY BE VARIED TO SUIT FIELD CONDITIONS.
(3) KEYED CONSTRUCTION JOINTS ARE REQUIRED BETWEEN ANY SUCCESSIVE POURS.
(4) THE MINIMUM DROP FROM BASIN TO SEWER SHALL BE 6".
(5) EXPANSION JOINTS ARE REQUIRED IN THE CONCRETE SIDEWALK AREA AT A DISTANCE OF 1'-0" AROUND THE PERIMETER OF THE BASIN.
(6) CONCRETE IS TO BE CLASS 40. REBARS-GRADE 60.
STANDARD FOR PRECAST TYPE 1 CATCH BASIN

NOTES:

(1) LOCATION OF OPENING SHALL BE DETERMINED PRIOR TO MANUFACTURE OF BASIN BY LOCATION AND ANGLE OF BASIN CONNECTION REQUIRED DUE TO FIELD CONDITIONS AND OPENING SHALL BE PLACED IN THE PROPER WALL AT THE TIME OF MANUFACTURE.

(2) LIFTING HOOKS SHALL BE LOCATED IN THE SECTION AS PER MANUFACTURERS RECOMMENDATIONS AND GROUTED PRIOR TO BACKFILLING. (FOUR (4) LIFTING HOOKS SHALL BE PROVIDED FOR EACH SECTION AND SHALL BE PLACED SYMMETRICALLY AND IN SUCH A MANNER AS TO PROVIDE FOR THE EVEN LIFTING OF THE SECTION.)

(3) CONCRETE IS TO BE CLASS 40 AND 5% AIR ENTRAINED. REBARS-GRADE 60. WWM-FS=65,000 PSI.
NOTES:
(1) LOCATION OF OPENING SHALL BE DETERMINED PRIOR TO MANUFACTURE OF BASIN BY LOCATION AND ANGLE OF BASIN CONNECTION REQUIRED DUE TO FIELD CONDITIONS AND OPENING SHALL BE PLACED IN THE PROPER WALL AT THE TIME OF MANUFACTURE.

(2) LIFTING HOOKS SHALL BE LOCATED IN THE SECTION AS PER MANUFACTURERS RECOMMENDATIONS AND GROUTED PRIOR TO BACKFILLING. (FOUR (4) LIFTING HOOKS SHALL BE PROVIDED FOR EACH SECTION AND SHALL BE PLACED SYMMETRICALLY AND IN SUCH A MANNER AS TO PROVIDE FOR THE EVEN LIFTING OF THE SECTION.)

(3) CONCRETE IS TO BE CLASS 40 AND 5% AIR ENTRAINED. REBARS-GRADE 60. WWM-FS=65,000 PSI.

(4) SPLIT BASINS WILL ONLY BE PERMITTED WHERE STANDARD BASINS CAN NOT BE INSTALLED DUE TO VERTICAL HEIGHT RESTRICTIONS SUCH AS STRUCTURES OR AERIAL ELECTRICAL FACILITIES.
NOTES:

(1) LOCATION OF OPENING SHALL BE DETERMINED PRIOR TO MANUFACTURE OF BASIN BY LOCATION AND ANGLE OF BASIN CONNECTION REQUIRED DUE TO FIELD CONDITIONS AND OPENING SHALL BE PLACED IN THE PROPER WALL AT THE TIME OF MANUFACTURE.

(2) LIFTING HOOKS SHALL BE LOCATED IN THE SECTION AS PER MANUFACTURERS RECOMMENDATIONS AND GROUTED PRIOR TO BACKFILLING. (FOUR (4) LIFTING HOOKS SHALL BE PROVIDED FOR EACH SECTION AND SHALL BE PLACED SYMMETRICALLY AND IN SUCH A MANNER AS TO PROVIDE FOR THE EVEN LIFTING OF THE SECTION.)

(3) CONCRETE IS TO BE CLASS 40 AND 5% AIR ENTRAINED. REBARS - GRADE 60. WWM-FS = 65,000 PSI.

ASSISTANT COMMISSIONER, DESIGN
DEPARTMENT OF DESIGN AND CONSTRUCTION

DATE

DIRECTOR OF ENGINEERING
DEPARTMENT OF ENVIRONMENTAL PROTECTION

DATE
STANDARD FOR SPLIT PRECAST TYPE 2 CATCH BASIN

NOTES:
(1) LOCATION OF OPENING SHALL BE DETERMINED PRIOR TO MANUFACTURE OF BASIN BY LOCATION AND ANGLE OF BASIN CONNECTION REQUIRED DUE TO FIELD CONDITIONS AND OPENING SHALL BE PLACED IN THE PROPER WALL AT THE TIME OF MANUFACTURE.

(2) LIFTING HOOKS SHALL BE LOCATED IN THE SECTION AS PER MANUFACTURERS RECOMMENDATIONS AND GROUTED PRIOR TO BACKFILLING. (FOUR (4) LIFTING HOOKS SHALL BE PROVIDED FOR EACH SECTION AND SHALL BE PLACED SYMMETRICALLY AND IN SUCH A MANNER AS TO PROVIDE FOR THE EVEN LIFTING OF THE SECTION.)

(3) CONCRETE IS TO BE CLASS 40 AND 5% AIR ENTRAINED. REBARS-GRADE 60. WWM-FL=65,000 PSI.

(4) SPLIT BASINS WILL ONLY BE PERMITTED WHERE STANDARD BASINS CANNOT BE INSTALLED DUE TO VERTICAL HEIGHT RESTRICTIONS SUCH AS STRUCTURES OR AERIAL ELECTRICAL FACILITIES.
STANDARD FOR PRECAST TYPE 3 CATCH BASIN

NOTES:

1. LOCATION OF OPENING SHALL BE DETERMINED PRIOR TO MANUFACTURE OF BASIN BY LOCATION & ANGLE OF BASIN CONNECTION REQUIRED DUE TO FIELD CONDITIONS & OPENING SHALL BE PLACED IN THE PROPER WALL AT THE TIME OF MANUFACTURE. IF LOCATION OF OPENING IS NOT IN THE FRONT WALL AS SHOWN, THE OPENING SHALL BE 24" X 24" WITH 2-#6@4" - 4'-9" LONG PLACED ABOVE OPENING. IN ADDITION, THE FRONT WALL SHALL BE MANUFACTURED SOLID & ADDITIONAL 2-#8@12" FOR CHUTE REINFORCEMENT SHALL BE PLACED AT THE TIME OF MANUFACTURE.

2. LIFTING HOOKS SHALL BE LOCATED IN THE SECTION AS PER MANUFACTURERS RECOMMENDATIONS & GROUTED PRIOR TO BACKFILLING. (FOUR (4) LIFTING HOOKS SHALL BE PROVIDED & PLACED SYMMETRICALLY & IN SUCH A MANNER AS TO PROVIDE FOR THE EVEN LIFTING OF THE SECTION.)

3. CONCRETE IS TO BE CLASS 40 AND AIR ENTRAINED, REBARS GRADE 60, WWM-FS=65,000 PSI.

4. ALL REINFORCEMENT SHOWN AND SPECIFIED SHALL BE INTEGRALLY PLACED AT THE TIME OF MANUFACTURE.

SECTION A-A REMOVABLE PRECAST TYPE 3 SLAB

NOTE: ALL STEEL REINF. ARE #6 BARS.
NOTES:

(1) LOCATION OF OPENING SHALL BE DETERMINED PRIOR TO MANUFACTURE OF BASIN BY LOCATION AND ANGLE OF BASIN CONNECTION REQUIRED DUE TO FIELD CONDITIONS AND OPENING SHALL BE PLACED IN THE PROPER WALL AT THE TIME OF MANUFACTURE.

(2) LIFTING HOOKS SHALL BE LOCATED IN THE SECTION AS PER MANUFACTURER'S RECOMMENDATIONS AND GROUTED PRIOR TO BACKFILLING. (FOUR (4) LIFTING HOOKS SHALL BE PROVIDED FOR EACH SECTION AND SHALL BE PLACED SYMMETRICALLY AND IN SUCH A MANNER AS TO PROVIDE FOR THE EVEN LIFTING OF THE SECTIONS.)

(3) CONCRETE IS TO BE CLASS 40 AND 5% AIR ENTRAINMENT. REBARS-GRADE 60. WWM-FS=65,000 PSI.
CITY OF NEW YORK
DEPARTMENT OF ENVIRONMENTAL PROTECTION

STANDARD FOR PRECAST DOUBLE CATCH BASIN (DWG. 2 OF 2)
(REMOVABLE PRECAST DOUBLE CATCH BASIN SLAB)

NOTES:
(1) ALL STEEL REINFORCEMENT ARE #6 BARS.
(2) CONCRETE IS TO BE CLASS 40. REBARS-GRADE 60.

ASSISTANT COMMISSIONER, DESIGN
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DEPARTMENT OF ENVIRONMENTAL PROTECTION
CITY OF NEW YORK
DEPARTMENT OF ENVIRONMENTAL PROTECTION

STANDARD FOR CAST IRON FRAME FOR CATCH BASINS
(with curb piece)

NOTES:

(1) MATERIAL: GRAY CAST IRON ASTM A-48 CLASS 35B. MINIMUM WEIGHT OF FRAME IS 360 LBS.

(2) DESIGN LOADING: HS20-44 HIGHWAY LOADING.

(3) TWO (2) - 3/4" DIA. CARBON STEEL BOLTS ASTM 307 GRADE - 3 1/2" LONG WITH HEXAGONAL HEAD AND NUT WITH TWO (2) FLAT WASHERS PER BOLT TO BE FURNISHED WITH EACH FRAME TOGETHER WITH 6" CURB PIECE OR 8" CURB PIECE. LONGER BOLTS TO BE FURNISHED FOR CURB HEIGHTS GREATER THAN 6" WHERE FILLER PIECES ARE USED.

(4) ALL CATCH BASIN FRAMES SHALL HAVE THE MANUFACTURER'S IDENTIFICATION, CAST DATE OR HEAT NUMBER AND COUNTRY OF ORIGIN INTEGRALLY CAST INDIVIDUAL PIECES AT THE TIME OF MANUFACTURE IN ACCORDANCE WITH THE DEP SPECIFICATION.
STANDARD FOR CAST IRON FRAME FOR CATCH BASINS
(WITHOUT CURB PIECE)

NOTES:

(1) MATERIAL: GRAY CAST IRON ASTM A-48 CLASS 35B. MINIMUM WEIGHT OF FRAME IS 275 LBS.

(2) DESIGN LOADING: HS20-44 HIGHWAY LOADING.

(3) ALL FRAMES SHALL HAVE THE MANUFACTURER'S IDENTIFICATION, CAST DATE OR HEAT NUMBER AND COUNTRY OF ORIGIN INTEGRALLY CAST ON INDIVIDUAL PIECES AT THE TIME OF MANUFACTURE IN ACCORDANCE WITH THE DEP SPECIFICATION.
CITY OF NEW YORK
DEPARTMENT OF ENVIRONMENTAL PROTECTION

STANDARD FOR CAST IRON GRATING, BACK PLATE, AND CURB PIECE FOR CATCH BASINS

NOTES:
(1) GRATING MATERIAL: GRAY CAST IRON ASTM A-48 CLASS 35B. MINIMUM WEIGHT OF TYPE R GRATING IS 425 LBS.
(2) CURB PIECE MATERIAL: GRAY CAST IRON ASTM A-48 CLASS 35B. MINIMUM WEIGHT OF 6" IS 172 LBS. MINIMUM WEIGHT OF 8" IS 219 LBS.
(3) BACK PLATE MATERIAL: GRAY CAST IRON ASTM A-48 CLASS 35B. MINIMUM WEIGHT IS 178 LBS.
(4) DESIGN LOADING: HS20-44 HIGHWAY LOADING.
(5) ALL MANHOLE FRAMES AND COVERS SHALL HAVE THE MANUFACTURER'S IDENTIFICATION, CAST DATE OR HEAT NUMBER AND COUNTRY OF ORIGIN INTEGRALLY CAST ON INDIVIDUAL PIECES AT THE TIME OF MANUFACTURE IN ACCORDANCE WITH THE DEP SPECIFICATION.
(6) TWO (2) - 3/4" DIA. CARBON STEEL BOLTS ASTM 307 GRADE - 3 1/2" LONG WITH HEXAGONAL HEAD AND NUT WITH TWO (2) FLAT WASHERS PER BOLT TO BE FURNISHED WITH EACH FRAME TOGETHER WITH 6" CURB PIECE OR 8" CURB PIECE.

THE FOLLOWING INFORMATION SHALL BE INCLUDED ON THE TOP SIDE OF THE BACK PLATE:
* NAME OF PRODUCING FOUNDRY
* DATE OF MANUFACTURE
* PRODUCT NUMBER
* CAST IRON ASTM A-48

THE FOLLOWING INFORMATION SHALL BE INCLUDED ON THE BACK SIDE OF THE CURB PIECE:
* NAME OF PRODUCING FOUNDRY
* DATE OF MANUFACTURE
* PRODUCT NUMBER
* CAST IRON ASTM A-48

PLAN OF GRATING

EXPANSION JOINT

CONCRETE SIDEWALK

MADE IN XXXX

CASTMARK

CURB PIECE

FRAME

BACK PLATE

SECTION B-B

SECTION D-D

SECTION C-C

ELEVATION OF CURB PIECE

SECTION A-A

PLAN OF CURB PIECE

RAISED LETTERING (RECESSED FLUSH)

MADE IN XXXX

CASTMARK

PLAN OF CURB PIECE

THE FOLLOWING INFORMATION SHALL BE INCLUDED ON THE BACK SIDE OF THE CURB PIECE:
* NAME OF PRODUCING FOUNDRY
* DATE OF MANUFACTURE
* PRODUCT NUMBER
* CAST IRON ASTM A-48

DIRECTOR OF ENGINEERING
DEPARTMENT OF ENVIRONMENTAL PROTECTION

ASSISTANT COMMISSIONER, DESIGN
DEPARTMENT OF DESIGN AND CONSTRUCTION

DATE

DATE

1/5/09

1/30/09
CITY OF NEW YORK
DEPARTMENT OF ENVIRONMENTAL PROTECTION

STANDARD FOR CAST IRON
HOOD AND HOOKS FOR CATCH BASINS

PLAN OF HOOD IN PLACE

REAR ELEVATION OF HOOD IN PLACE

SECTION OF HOOD IN PLACE

NOTES:

(1) MATERIAL FOR HOOD: GRAY CAST IRON ASTM A-48 CLASS 35B. MINIMUM WEIGHT OF HOOD IS 140 LBS.

(2) MATERIAL FOR HOOK: 18-8 STAINLESS STEEL 1/2" SQUARE BAR STOCK TYPE 303 ASTM A-582.

(3) ALL CATCH BASIN HOODS SHALL HAVE THE MANUFACTURER'S IDENTIFICATION, CAST DATE OR HEAT NUMBER AND COUNTRY OF ORIGIN INTEGRALLY CAST ON INDIVIDUAL PIECES AT THE TIME OF MANUFACTURE IN ACCORDANCE WITH THE DEP SPECIFICATION.

FRONT ELEVATION OF HOOD

HOOHEET DETAIL

(2 REQUIRED)

ASSISTANT COMMISSIONER, DESIGN
DEPARTMENT OF DESIGN AND CONSTRUCTION

P.E.

1/30/09

DATE

DIRECTOR OF ENGINEERING
DEPARTMENT OF ENVIRONMENTAL PROTECTION

P.E.

1/30/09

DATE
STANDARD FOR DUCTILE IRON PIPE ALTERNATE

PLAN TYPICAL HOUSE CONNECTION (D.I.P.) OFF D.I.P. SEWER

Typical D.I.P. Riser for House Connection off D.I.P. Sewer

NOTES:

(1) THIS ALTERNATE WILL BE PERMITTED ONLY WHEN SO STATED IN THE SPECIFICATIONS.

(2) MATERIAL: THE DUCTILE IRON PIPE SHALL BE 60-42-10 GRADE AND CLASS 56, UNLESS OTHERWISE SPECIFIED.

(3) JOINTS: (A) ALL JOINTS FOR DUCTILE IRON PIPE SEWERS SHALL BE "PUSH-ON" JOINT TYPE, EXCEPT AS NOTED ABOVE FOR SPUR AND RISER PIPE WHICH SHALL BE MECHANICAL JOINT TYPE, MEETING THE REQUIREMENTS OF ANSI STANDARD A21.11, LATEST REVISION.

(B) JOINTS SHALL BE MADE IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS FOR ASSEMBLING THE TYPE OF JOINT FURNISHED.

(C) FITTINGS SHALL BE DUCTILE IRON OR GRAY IRON (250 PSI) MECHANICAL JOINTS IN ACCORDANCE WITH THE LATEST REVISIONS OF ANSI/AWWA C110/A21.10 AND ANSI/AWWA C111/A21.11.

(D) LEVELING BLOCKS ARE NOT PERMITTED.
STANDARD FOR HOUSE CONNECTIONS

(FOR 6" AND 8" DIA. CAST IRON SOIL PIPE OR VITRIFIED CLAY PIPE
ON CONCRETE CRADLE OR ENCASED IN CONCRETE ON EARTH OR ON ROCK)

NOTES:

(1) CRADLE AND ENCASEMENT ARE CLASS 40 CONCRETE FOR ALL HOUSE CONNECTIONS.

(2) ENTIRE CRADLE OR ENCASEMENT IS TO BE PLACED MONOLITHICALLY.

(3) ENCASEMENT REQUIRED ON H.C. PIPE WHICH HAS A COVER, FROM FINAL GRADE TO THE OUTER TOP OF THE PIPE, OF LESS THAN THREE (3) FEET OR WHEN THE UPPER LIMIT OF COVER IS EXCEEDED.

(4) UNLESS OTHERWISE APPROVED BY THE ENGINEER, THE MAXIMUM WIDTH OF TRENCH BETWEEN INNER FACES OF THE LOWEST STAGE OF SHEETING OR ROCK CUT LINES, FROM SUBGRADE OF TRENCH TO A MINIMUM HEIGHT OF TWO (2) FEET ABOVE THE OUTER TOP OF THE PIPE, SHALL NOT EXCEED THE WIDTH OF THE CRADLE BY MORE THAN THREE (3) FEET (1'-6" MAXIMUM EACH SIDE OF CRADLE).

(5) SIX (6) INCH MINIMUM SHALL BE MAINTAINED AT ALL TIMES, EXCEPT WHERE SHEETING IS TO BE USED AS FORMWORK.

PAYMENT LINES FOR ROCK EXCAVATION

MAXIMUM WIDTH OF TRENCH

SEE NOTE 4

SECTION ON ROCK

ENCASEMENT WHERE REQD.

SECTION ON EARTH

INNER FACE

OF SHEETING

ENCASEMENT

WHERE REQD.

6" MIN.

(SEE NOTE 5)

D2

A

8" MIN.

8" MIN.

P.E.

7/9/07

DIRECTOR OF ENGINEERING
DEPARTMENT OF ENVIRONMENTAL PROTECTION

P.E.

8/10/07

DATE

DEPARTMENT OF ENVIRONMENTAL PROTECTION

ASSISTANT COMMISSIONER, DESIGN
DEPARTMENT OF DESIGN AND CONSTRUCTION
STANDARD FOR RISER ON 10" DIA. TO 18" DIA.
VITRIFIED CLAY PIPE SEWERS ON CONCRETE CRADLE

NOTES:

(1) ALL PIPES AND FITTINGS SHALL BE EXTRA STRENGTH FULL DIAMETER VITRIFIED CLAY.
(2) THE COST OF ADDITIONAL CONCRETE, STEEL REINFORCEMENT BARS AND VITRIFIED CLAY RISER PIPE AND FITTINGS REQUIRED SHALL BE INCLUDED IN THE PRICE BID FOR RISERS.
(3) KEYED CONSTRUCTION JOINTS ARE REQUIRED BETWEEN ANY SUCCESSIVE POURS.
(4) USE STANDARD "Y" OR "DOUBLE Y" FITTING AS REQUIRED.
(5) CONCRETE IS TO BE CLASS 40. REBARS-GRADE 60.
CITY OF NEW YORK
DEPARTMENT OF ENVIRONMENTAL PROTECTION

STANDARD FOR RISER ON PRECAST REINFORCED CONCRETE PIPE SEWERS ON CONCRETE CRADLE

NOTES:

1. ALL PIPES AND FITTINGS SHALL BE EXTRA STRENGTH FULL DIAMETER VITRIFIED CLAY!

2. THE COST OF ADDITIONAL CONCRETE, STEEL REINFORCEMENT BARS AND VITRIFIED CLAY RISER PIPE AND FITTINGS REQUIRED SHALL BE INCLUDED IN THE PRICE BID FOR RISERS.

3. KEYED CONSTRUCTION JOINTS ARE REQUIRED BETWEEN ANY SUCCESSIVE POURS.

4. USE STANDARD "Y" OR "DOUBLE Y" FITTING AS REQUIRED.

5. CONCRETE IS TO BE CLASS 40. REBARS-Grade 60.
STANDARD FOR 27" DIAMETER ALUMINUM FLOOR GRATING

1 1/4" X 1 1/4" X 1/4" ALUMINUM ANGLE

1" X 3/16" ALUMINUM GRATING BEARING BARS @ 1 3/16" O.C.

3/4" X 1/8" ALUMINUM GRATING CROSS BARS @ 4" O.C.

4 ALUMINUM STRAPS 1" X 1/4" X 6" LONG

NOTE:

(1) THE FRAME IS TO HAVE A HEAVY COAT OF BITUMINOUS PAINT, OR OTHER APPROVED INSULATING MATERIAL.

(2) TYPE "A" OR TYPE "B" ALUMINUM GRATINGS MAY BE USED. HOWEVER, ONE TYPE OF GRATING SHALL BE USED EXCLUSIVELY THROUGHOUT ANY PROJECT.
STANDARD FOR 36" DIAMETER ALUMINUM FLOOR GRATING

NOTE:

(1) THE FRAME IS TO HAVE A HEAVY COAT OF BITUMINOUS PAINT, OR OTHER APPROVED INSULATING MATERIAL.

(2) TYPE "X" OR TYPE "B" ALUMINUM GRATINGS MAY BE USED; HOWEVER, ONE TYPE OF GRATING SHALL BE USED EXCLUSIVELY THROUGHOUT ANY PROJECT.
STANDARD FOR CONSTRUCTION OF CATCH BASIN
(NO EXISTING CURB)

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CONCRETE CURB AS PER HIGHWAY STANDARDS

TEMPORARY ASPHALT CURB

GRADE SOIL AREA

SETBACK

EXISTING PAVEMENT LINE

CONC. CURB AS PER HIGHWAY STANDARDS

SLOPE PAVEMENT TO CASTING

3" ASPHALTIC CONCRETE

EXIST. RDWY. (TYP.)

SECTION

STANDARD CATCH BASIN TYPE 2

P.E. 7/9/07

ASSISTANT COMMISSIONER, DESIGN
DEPARTMENT OF DESIGN AND CONSTRUCTION

P.E. 8/19/07

DIRECTOR OF ENGINEERING
DEPARTMENT OF ENVIRONMENTAL PROTECTION
STANDARD FOR RECONSTRUCTION OF EXISTING MANHOLE
AND REPLACEMENT OF EXISTING M.H. FRAME AND COVER

NOTES:

1. AT ALL LOCATIONS SHOWN ON THE PLANS, SPECIFIED IN THE CONTRACT DOCUMENTS OR ORDERED BY
THE RESIDENT ENGINEER REQUIRING THE RECONSTRUCTION OF EXISTING MANHOLES, THE FOLLOWING
WORK SHALL BE PERFORMED:

(A) ON GUNITED SEWERS:
FROM THE INNER TOP OF THE LARGEST SEWER TO THE BOTTOM OF THE CASTING, ALL LOOSE AND
MISSING BRICK, MASONRY OR CONCRETE SHALL BE REPAIRED AND/OR REMOVED AS DIRECTED BY THE
RESIDENT ENGINEER AND ALL DEBRIS, EXCESS MORTAR, ETC. SHALL BE REMOVED SO THAT THE FACE
OF THE MANHOLE WALLS IS LEFT SMOOTH AND CLEAN. IF ANY STEP(S) IS DAMAGED OR UNSAFE, ALL
THE STEPS IN THE MANHOLE CHIMNEY SHALL BE REMOVED AND NOT REPLACED. FINALLY, THE WHOLE
AREA SHALL BE PARAGED OR FLASHED (RECEIVE A ONE HALF (1/2) INCH MINIMUM FINISHING COAT OF
MORTAR WITH A FLOAT FINISH).

(B) ON LINED SEWERS:
FROM THE INVERT OF THE MANHOLE TO THE BOTTOM OF THE CASTING, ALL LOOSE AND
MISSING BRICK, MASONRY OR CONCRETE SHALL BE REPAIRED AND/OR REMOVED AS DIRECTED BY THE
RESIDENT ENGINEER AND ALL DEBRIS, EXCESS MORTAR, ETC. SHALL BE REMOVED SO THAT THE FACE
OF THE MANHOLE WALLS AND THE INVERT ARE LEFT SMOOTH AND CLEAN. IF ANY STEP(S) IS DAMAGED OR UNSAFE, ALL STEPS IN
THE MANHOLE CHIMNEY SHALL BE REMOVED AND NOT REPLACED. FINALLY, THE WHOLE AREA SHALL BE
PARAGED OR FLASHED (RECEIVE A ONE HALF (1/2) INCH MINIMUM FINISHING COAT OF MORTAR WITH A FLOAT
FINISH). (THE INVERT DISH SHALL RECEIVE A PROPORTIONATELY THICKER FINISH COAT SO AS TO PROVIDE
A SMOOTH TRANSITION FROM EXISTING SEWER TO THE INSIDE SURFACE OF THE LINER.)

2. AT ALL LOCATIONS SHOWN ON THE PLANS, SPECIFIED IN THE CONTRACT DOCUMENTS OR ORDERED BY
THE RESIDENT ENGINEER REQUIRING THE REPLACEMENT OF EXISTING MANHOLE FRAMES AND COVERS, THE
CONTRACTOR SHALL REMOVE EXISTING MANHOLE FRAMES AND COVERS WHICH ARE TWENTY FOUR (24)
INCHES IN DIAMETER OR OTHERWISE DAMAGED, DEFECTIVE OR NONSTANDARD AND REPLACE THEM WITH NEW
STANDARD TWENTY SEVEN (27) INCH CAST IRON MANHOLE FRAMES AND COVERS.
CONTRACTOR MUST PROVIDE POSITIVE GUTTER DRAINAGE TO BASINS THROUGHOUT RESURFACING AREA.

4'" DESIRABLE
2." ABSOLUTE MIN.
IF THERE IS NO CURB THEN MEET EXISTING GROUND

EXISTING CURB LINE

4'-2" TO 5'-0" MIN.
VARIES (A.O.B.E.)

NEW ROADWAY RESURFACING (ITEM 4.02 AB, 4.02 AC OR 4.02 AE)*

TOP OF EXISTING ROADWAY

TOP OF EXISTING ROADWAY

CUT EDGE

BASE MATERIAL

GRINDING LINE

STRIPPING LINE

BINDER IN KEYS (ITEM 4.02 BC)*

TACK COAT (ITEM 6.58)*

EXISTING ROADWAY

NOTES:

(1) CONTRACTOR MAY AT HIS OPTION EITHER STRIP OR GRIND THE AREA TO THE REQUIRED DEPTH.

(2) ALL CITY OWNED CASTINGS TO BE ADJUSTED TO MATCH NEW ROADWAY.

(3) PAVEMENT KEY IS TYPE B (0.51)*.

(4) (A.O.B.E.) - AS ORDERED BY ENGINEER.

(5)* - REFER TO DEPARTMENT OF TRANSPORTATION SPECIFICATIONS. (6) ALL COSTS REQUIRED TO PERFORM THIS WORK SHALL BE DEEMED INCLUDED IN THE PRICE BID PER TON FOR ASPHALT CONCRETE MIXTURE. NO SEPARATE OR ADDITIONAL PAYMENT WILL BE MADE FOR THIS WORK.
STANDARD FOR MINIMUM LOAD DIAGRAM FOR NON-WATERTIGHT SHEETING DESIGN

DESIGN CRITERIA:

\[ \gamma = \text{UNIT WEIGHT OF SOIL} \]
\[ \gamma_w = \text{UNIT WEIGHT OF WATER} \]
\[ \gamma_s = \text{UNIT WEIGHT OF SUBMERGED SOIL} \]
\[ \phi = \text{ANGLE OF INTERNAL FRICTION OF SOIL} \]
\[ K_{ra} = \frac{1-(\sin^2 \theta)}{1+(\sin^2 \theta)} \text{ FOR ACTIVE EARTH PRESSURE} \]
\[ K_{rp} = \frac{1+(\sin^2 \theta)}{1-(\sin^2 \theta)} \text{ FOR PASSIVE EARTH PRESSURE} \]
\[ H = 3 \text{ FEET MINIMUM} \]
\[ P_s = \gamma \times H = \text{SURCHARGE-MIN. 300 PSF} \]
\[ P'_1 = K_{ra} \times P_s \]
\[ P_1 = (0.8K_{ra}) \times \gamma \times H \]
\[ P_2 = P'_1 + P_1 \]
\[ D = \sqrt{\frac{2R_{\infty}}{\gamma (K_{rp} - K_{ra})}} \]

NOTES:

(1) THIS CRITERIA IS FOR BRACED SHEETING ONLY.

(2) FOR FACTOR OF SAFETY FOR TOE PENETRATION SEE SECTION 4.05.6—"DESIGN CRITERIA".
**DESIGN CRITERIA:**

- $Y =$ UNIT WEIGHT OF SOIL
- $Y_w =$ UNIT WEIGHT OF WATER
- $Y_s =$ UNIT WEIGHT OF SUBMERGED SOIL
- $\theta =$ ANGLE OF INTERNAL FRICTION OF SOIL

- $K_{ra} = \frac{(1+\sin \theta)}{(1+\sin 0)}$ FOR ACTIVE EARTH PRESSURE
- $K_{rp} = \frac{(1+\sin 0)}{(1+\sin 0)}$ FOR PASSIVE EARTH PRESSURE

- $H_1 = 3$ FEET MINIMUM
- $P_s = Y \times H_1 = SURCHARGE MIN. 300$ PSF
- $P_1 = K_{ra} \times P_s$
- $P_2 = P_1 + (0.8K_{ra}) \times (YH_1 + Y_s H_2)$
- $P_3 = Y_w \times H_2$

- $D_1 = \frac{P_3}{Y_s (K_{rp} - K_{ra})}$
- $D_2 = \sqrt{\frac{2R}{Y_s (K_{rp} - K_{ra})}}$
- $D = D_1 + D_2$

**NOTES:**

1. THIS CRITERIA IS FOR BRACED SHEETING ONLY.
2. FOR FACTOR OF SAFETY FOR TOE PENETRATION SEE SECTION 4.05.6 - "DESIGN CRITERIA."