# LIST OF SEWER DETAIL DRAWINGS

<table>
<thead>
<tr>
<th>S#</th>
<th>TITLE</th>
</tr>
</thead>
<tbody>
<tr>
<td>S-1</td>
<td>4' STANDARD MANHOLE FOR PIPE 15&quot; OR SMALLER (FOR DEPTHS UP TO 15')</td>
</tr>
<tr>
<td>S-2</td>
<td>STRADDLE MANHOLE</td>
</tr>
<tr>
<td>S-3</td>
<td>INSIDE DROP MANHOLE</td>
</tr>
<tr>
<td>S-4</td>
<td>WATERTIGHT MANHOLE FRAME</td>
</tr>
<tr>
<td>S-5</td>
<td>WATERTIGHT MANHOLE COVER</td>
</tr>
<tr>
<td>S-6</td>
<td>SANITARY SEWER LATERAL</td>
</tr>
<tr>
<td>S-7</td>
<td>DOUBLE LATERAL COMBINED 6&quot; BY TWO 4&quot; LATERALS</td>
</tr>
<tr>
<td>S-8</td>
<td>FORCE MAIN TO GRAVITY LATERAL CONNECTION</td>
</tr>
<tr>
<td>S-9</td>
<td>FORCE MAIN FLUSHING ASSEMBLY</td>
</tr>
<tr>
<td>S-10</td>
<td>PRESSURE LATERAL ASSEMBLY</td>
</tr>
<tr>
<td>S-11</td>
<td>JOINING DISSIMILAR PIPE FOR USE WITH EXISTING PIPE</td>
</tr>
<tr>
<td>S-12</td>
<td>MANHOLE VENT - ADJACENT</td>
</tr>
<tr>
<td>S-13</td>
<td>MANHOLE VENT - OFFSET</td>
</tr>
<tr>
<td>S-14</td>
<td>AUTOMATIC AIR/VACUUM RELEASE ASSEMBLY FOR USE ON SEWER FORCE MAIN</td>
</tr>
<tr>
<td>S-15</td>
<td>SANITARY SEWER PIPE ABANDONMENT AT A MANHOLE</td>
</tr>
<tr>
<td>S-16</td>
<td>SANITARY SEWER MANHOLE ABANDONMENT</td>
</tr>
<tr>
<td>S-17</td>
<td>GREASE INTERCEPTOR</td>
</tr>
<tr>
<td>S-18</td>
<td>LOW-PRESSURE AIR TESTING TABLE</td>
</tr>
</tbody>
</table>
1. MATERIALS AND FABRICATION IN ACCORDANCE WITH ASTM C478-09.
2. WHEN USED AS SAMPLING MANHOLE FLOW SHALL PASS STRAIGHT THROUGH, i.e., 180°.
3. STEPS SHALL BE VERTICALLY ALIGNED. FIRST STEP SHALL BE WITHIN 12" OF COVER, BOTTOM STEP SHALL BE WITHIN 24" OF BOTTOM OF MANHOLE.
4. FRAME AND COVER SHALL BE PROPERLY ALIGNED WITH THE 2 FOOT OPENING OF THE MANHOLE STRUCTURE AND BOLTED IN PLACE.
5. FLAT TOP MANHOLES MAY ONLY BE SUBSTITUTED WITH THE PERMISSION OF THE PARTICIPATING UTILITY.
6. FLEXIBLE JOINT MANHOLE CONNECTION SHALL BE AS MANUFACTURED BY PRES-SEAL GASKET CORPORATION OR EQUAL.
7. GROUT ANNULAR SPACE BETWEEN PIPE AND PRECAST MANHOLE ON INSIDE OF MANHOLE.
8. WHEN REPLACING AN EXISTING MANHOLE OR INSTALLING A NEW PRECAST MANHOLE ON AN EXISTING SEWER, A MINIMUM OF SIX FEET (6') OF EXISTING PIPE SHALL BE REMOVED AND REPLACED WITH NEW MATERIAL ON INLET AND OUTLET OF MANHOLE.
9. MANHOLES WHERE THE INVERT IS LOWER THAN THE NORMAL GROUNDWATER ELEVATION (I.E., ALONG CREEKS, RIVERS, LOW-LYING AREAS, ETC.) SHALL HAVE A FULL EXTERIOR COATING AND JOINT WRAP APPLIED IN ADDITION TO JOINT SEALANT. SEE NOTES 10 & 11.
10. IF REQUIRED EXTERIOR VERTICAL WALL SURFACES SHALL BE FACTORY COATED IN ACCORDANCE WITH THE MANUFACTURERS RECOMMENDATION. COATING SHALL BE HIGH BUILD COAL TAR EPOXY MEETING ASTM D1227. COATING SHALL BE APPLIED IN TWO COATS TO A MINIMUM TOTAL THICKNESS OF 16 MILS.
11. IF REQUIRED ALL MANHOLES SHALL UTILIZE AN EXTERNAL FRAME AND JOINT SEAL AT ALL JOINTS AND AT THE FRAME/CHIMNEY INTERFACE. SEAL SHALL BE MADE OF EPDM RUBBER IN ACCORDANCE WITH ASTM D412 OR POLYOLEFIN BACKED EXTERIOR JOINT WRAP IN ACCORDANCE WITH ASTM E-1745, C-877, AND C-990. EDM SEAL SHALL HAVE A MINIMUM THICKNESS OF 60 MILS. POLYOLEFIN BACKED EXTERIOR JOINT WRAP SHALL HAVE A BACKING BAND ELEMENT WITH MINIMUM THICKNESS OF 4 MILS. AND BUTYL ROLLER ADHESIVE WITH MINIMUM THICKNESS OF 60 MILS. SEAL SHALL AGGRESSIVELY BOND TO CONCRETE AND METAL STRUCTURES.
12. FOR PIPE LARGER THAN 15 INCHES IN DIAMETER, THE MINIMUM INSIDE DIAMETER OF THE MANHOLE SHALL BE IN ACCORDANCE WITH MANUFACTURERS RECOMMENDATIONS BASED ON PIPE SIZE AND ANGLE BETWEEN INLET AND OUTLET PIPING.
13. 6' MINIMUM DIAMETER MANHOLE SHALL BE REQUIRED WHEN DEPTHS EXCEED 15' UNLESS OTHERWISE APPROVED BY PARTICIPATING UTILITY.

ADJUSTMENT RINGS IF NECESSARY
(1'-0" MAX ADJUSTMENT)
SEE FRAME & COVER DETAILS

BUTYL MASTIC JOINT SEALER OR GASKETS
MEETING ASTM C443 AND ASTM C1244 TESTING STANDARD (NO MORTAR)

MINIMUM SLOPE FOR SERVICE CONNECTION
4" Ø=1/4" PER 1'-0"
6" Ø=1/8" PER 1'-0"

PRECAST HOLE WITH FLEXIBLE BOOT & STAINLESS STEEL BAND

SERVICE CONNECTION

SLOPE BENCH
1/4" PER 1'-0"

PRECAST HOLE (TYP.)
GROUT ANNULAR SPACE (TYP. INLET & OUTLET)
FLEXIBLE BOOT WITH STAINLESS STEEL BAND (TYP.)

3/4" Ø SS THREADED ROD
(IF ADJUSTMENT RINGS ARE REQUIRED)

ECCENTRIC CONE HEIGHT VARIES
RISER SECTIONS HEIGHT VARIES
BASE HEIGHT VARIES
STONE BASE (6" MIN. DEPTH)
#57 OR EQUIVALENT

MANHOLE WITH PRECAST INVERT

WESTERN VIRGINIA REGIONAL - CONSTRUCTION DETAIL
4' STANDARD MANHOLE
FOR PIPE 15" OR SMALLER
(FOR DEPTHS UP TO 15 FEET)

08/01/15
1. STRADDLE MANHOLE NOT ACCEPTABLE UNLESS APPROVED BY PARTICIPATING UTILITY.
2. MATERIALS AND FABRICATION IN ACCORDANCE WITH ASTM C478-09, AND ASTM C1619.
3. SEE DETAIL S-1 FOR ADDITIONAL MANHOLE REQUIREMENTS.
4. WATERSTOP TO BE GREENSTREAM HYDROTITE OR LEAKMASTER LV-1. WATERSTOP MUST BE ALLOWED TO FULLY CURE BEFORE CONTACT WITH WET CONCRETE IS ALLOWED.
5. FIRST POUR: TOP SURFACE OF FIRST POUR SHALL CREATE A SMOOTH, FLAT, LEVEL BEARING SURFACE TO FACILITATE A WATERTIGHT SEAL BETWEEN POURED BASE AND PRECAST MANHOLE SECTION. CONCRETE SHALL BE 3,000 PSI CONCRETE AND MUST CURE 7-DAYS BEFORE SETTING MANHOLE SECTION.
6. SECOND POUR: MANHOLE SHALL BE COMPLETELY SET INCLUDING FRAME AND COVER BEFORE PLACING SECOND POUR. CONCRETE BONDING AGENT SHALL BE APPLIED TO ALL SURFACES/COLD JOINTS WHERE NEW CONCRETE IS TO BE POURED AGAINST EXISTING. CONCRETE SHALL BE 3,000 PSI AND SHALL BE ALLOWED TO CURE FOR 3-DAYS PRIOR TO PLACING BACKFILL.
1. MATERIALS AND FABRICATION IN ACCORDANCE WITH ASTM C478-09.
2. STEPS SHALL BE VERTICALLY ALIGNED. FIRST STEP SHALL BE WITHIN 12" OF COVER, BOTTOM STEP SHALL BE WITHIN 24" OF BOTTOM OF MANHOLE.
3. THE FRAME AND COVER SHALL BE PROPERLY ALIGNED WITH THE 2 FOOT OPENING OF THE MANHOLE STRUCTURE AND BOLTED IN PLACE.
4. RELINER BY DURAN INSIDE DROP BOWLS AND PIPE BRACKETS WILL BE ALLOWED.
5. GROUT ANNULAR SPACE BETWEEN PIPE AND PRECAST MANHOLE ON INSIDE OF MANHOLE.
6. STEPS SHALL BE A MINIMUM OF 90 DEGREES FROM DROP & ALIGNED VERTICALLY.
7. INSIDE DROP ONLY ALLOWED WHEN DEPTH EXCEEDS 12' AND APPROVED BY PARTICIPATING UTILITY.
8. 6' MINIMUM DIAMETER MANHOLE REQUIRED FOR TWO OR MORE INSIDE DROP CONNECTIONS (MAIN LINE OR LATERAL).
9. SEE FRAME AND COVER DETAIL.
10. SEE DETAIL S-01 FOR EXTERIOR COATING AND JOINT SEAL REQUIREMENTS.

WESTERN VIRGINIA REGIONAL - CONSTRUCTION DETAIL

INSIDE DROP MANHOLE

01/01/14
1. Watertight manhole frame model #1045Z by East Jordan Iron Works, Inc. or equivalent.
2. HDPE adjustment rings shall meet H-20 load rating, and shall be interlocking or utilize butyl mastic joint sealant between each ring to form a watertight joint.
3. Concrete adjustment rings shall meet H-20 load rating and utilize butyl mastic joint sealant between each ring and frame an cover to form a watertight joint.
4. Frame height shall be 7" for buried locations and 4" for exposed locations.
FOR PARTICIPATING UTILITIES OTHER THAN THE WWA, GENERIC NON-LOGO MANHOLE COVERS LABELED "SEWER" SHALL BE SUBSTITUTE.

SECTION VIEW

1. BOLT-DOWN MANHOLE COVER MODEL #1040ACLGS BY EAST JORDAN IRON WORKS, INC OR EQUIVALENT.

2. HEX HEAD BOLTS (6-SIDED) SHALL BE USED.

3. BOLT-DOWN MANHOLE COVERS SHALL BE USED WHEN SHOWN ON PLANS OR AS DIRECTED BY THE PARTICIPATING UTILITY.

STANDARD MANHOLE COVER

BOLT-DOWN MANHOLE COVER
1. TRAFFIC BEARING BOX AND LID REQUIRED IN TRAFFIC AREAS (CAPITOL FOUNDRY VB-9'S).
2. SEWER LATERAL AND CLEANOUT PIPING SHALL BE ASTM D3034 SDR 26. SEWER LATERAL FITTINGS SHALL BE OF SAME SDR RATING AS THE SEWER MAIN. SCHEDULE 40 SOLVENT WELD PIPE AND FITTINGS MAY BE USED FOR THE SEWER LATERAL AND CLEANOUT ASSEMBLY WITH APPROVAL FROM THE PARTICIPATING UTILITY.
3. ALL PIPE SHALL BE OF SAME SIZE.
4. NO BENDS ARE ALLOWED IN THE LATERAL FROM THE MAIN TO THE CLEANOUT STACK WYE. (EXCEPT FOR DEEP SEWER, AS SHOWN BELOW).
5. ALL MAIN LINE TAPS ON ACTIVE MAINS SHALL BE PERFORMED BY PARTICIPATING UTILITY.
6. PIPING ON PRIVATE SIDE OF CLEANOUT TO BE INSTALLED PER GOVERNING JURISDICTION REQUIREMENTS.
7. MINIMUM LATERAL SIZE: 4" FOR RESIDENTIAL SERVICE, 6" FOR NON-RESIDENTIAL SERVICE.
8. SEWER CLEANOUTS SHALL BE SAME SIZE AS SEWER LATERAL.
9. MINIMUM COVER FOR ALL SEWER LATERALS SHALL BE THREE (3') FEET.
10. PROPERTY OWNER RESPONSIBLE FOR INSTALLING CLEANOUT ON PROPERTY LINE (IN ACCORDANCE WITH THIS DETAIL) WHEN MAINTENANCE OCCURS.
11. LOWEST SERVED FINISHED FLOOR ELEVATION SHALL BE A MINIMUM OF THREE FEET (3') ABOVE THE TOP OF THE MAIN AT THE POINT WHERE THE SERVICE LATERAL CONNECTS TO THE MAIN.
12. WHEN CONNECTING TO EXISTING LATERAL USE FERNCO FLEXIBLE COUPLING.

WESTERN VIRGINIA REGIONAL - CONSTRUCTION DETAIL

SANITARY SEWER LATERAL

01/01/14 S-6
1. TRAFFIC BEARING BOX REQUIRED IN TRAFFIC AREAS.
2. SEWER LATERAL AND CLEANOUT PIPING SHALL BE ASTM D3034 SDR 26. SEWER LATERAL FITTINGS SHALL BE OF SAME SDR RATING AS THE SEWER MAIN. SCHEDULE 40 SOLVENT WELD PIPE AND FITTINGS MAY BE USED FOR THE SEWER LATERAL AND CLEANOUT ASSEMBLY WITH APPROVAL FROM THE PARTICIPATING UTILITY.
3. ALL PIPE SHALL BE OF SIZE SHOWN.
4. NO BENDS ARE ALLOWED IN THE LATERAL FROM THE MAIN TO THE CLEAN-OUT STACK WYE. (EXCEPT AS NOTED.)
5. ALL MAIN LINE TAPS ON ACTIVE MAIN SHALL BE PERFORMED BY PARTICIPATING UTILITY.
6. PIPING ON PRIVATE SIDE OF CLEANOUT TO BE INSTALLED PER GOVERNING JURISDICTION REQUIREMENTS.
7. MINIMUM COVER FOR ALL SEWER LATERALS SHALL BE THREE (3') FEET.
8. PROPERTY OWNER RESPONSIBLE FOR INSTALLING CLEANOUT ON PROPERTY LINE WHEN MAINTENANCE OCCURS, IN ACCORDANCE WITH THIS DETAIL.
9. LOWEST SERVED FINISHED FLOOR ELEVATION SHALL BE A MINIMUM OF THREE FEET (3') ABOVE THE TOP OF THE MAIN AT THE POINT WHERE THE SERVICE LATERAL CONNECTS TO THE MAIN.
10. WHEN CONNECTING TO EXISTING LATERAL USE FERNCO FLEXIBLE COUPLING.

WESTERN VIRGINIA REGIONAL - CONSTRUCTION DETAIL

DOUBLe LATERAL
COMBINED 6" BY TWO 4" LATERALS

01/01/14 S-7
1. TRAFFIC BEARING BOX REQUIRED IN TRAFFIC AREAS.
2. ALL PIPE AND FITTINGS SHALL BE OF SIMILAR MATERIAL.
3. ALL PIPE SHALL BE OF SAME SIZE.
4. NO BENDS ARE ALLOWED IN THE LATERAL FROM THE MAIN TO THE CLEAN-OUT STACK WYE (EXCEPT AS NOTED.)
5. ALL MAIN LINE TAPS ON ACTIVE MAINS WILL BE PERFORMED BY THE WESTERN VIRGINIA WATER AUTHORITY.
6. MINIMUM COVER FOR ALL SEWER LATERALS SHALL BE THREE (3') FEET.
7. GRAVITY SECTION AND CLEANOUT SHALL BE 6" DIAMETER FOR PUBLIC FORCE MAINS AND 4" DIAMETER FOR PRIVATE FORCE MAINS.
8. PUBLIC FORCE MAINS SHALL CONNECT TO SEWER MANHOLES.
9. PROPERTY OWNER RESPONSIBLE FOR INSTALLING CLEANOUT ON PROPERTY LINE WHEN MAINTENANCE OCCURS, IN ACCORDANCE WITH THIS DETAIL.

WESTERN VIRGINIA REGIONAL - CONSTRUCTION DETAIL

FORCE MAIN TO GRAVITY LATERAL CONNECTION

01/01/14
1. INSTALL AT END OF LINES AND AT 1,000 FOOT INTERVALS.

CAST IRON LID LABELED "SEWER"
SOLID LID - NO HOLES
SEE DETAIL W-1

STANDARD WATER METER BOX
SEE DETAIL W-1

ANDREWS 1" 100-DC-AL DUST CAP
ANDREWS 1" 100-F-AL
1" BALL CHECK
1" BRASS BALL VALVE
2" X 1" BRASS NIPPLE
2" THREADED PACK JOINT

3,000 PSI CONCRETE
6" MIN.

HDPE FORCE MAIN
FUSED 90° BEND
OR TEE IF IN-LINE

WESTERN VIRGINIA REGIONAL - CONSTRUCTION DETAIL

FORCE MAIN
FLUSHING ASSEMBLY

01/01/14
1. ALL CONNECTIONS BETWEEN FORCE MAIN AND BALL VALVE SHALL BE FUSED HDPE.
2. USE ELECTRO FUSION TEE TO CONNECT TO HDPE FORCE MAIN.
3. USE 1 1/4" TAPING SADDLE TO CONNECT TO PVC OR DUCTILE IRON FORCE MAIN.

WESTERN VIRGINIA REGIONAL - CONSTRUCTION DETAIL
PRESSURE LATERAL ASSEMBLY
01/01/14
1. SEE DETAIL S-1.

SIPHON BOX VENT

SEWER VENT CHECK VALVE
WITH STAINLESS STEEL SCREEN
WAGER MODEL 1700 OR
APPROVED EQUAL

HEIGHT 2'
UNLESS SPECIFIED
ON PLAN SET

NOTE:
1. ANCHOR HOLES SHALL NOT EXTEND THROUGH
MANHOLE WALL.

MANHOLE VENT SUPPORT

SEWER VENT CHECK VALVE
WITH STAINLESS STEEL SCREEN
WAGER MODEL 1700 OR
APPROVED EQUAL

WATERTIGHT
FRAME & COVER
(ALL MANHOLES)

HEIGHT 3'
UNLESS SPECIFIED
ON PLAN SET

1' X 1' X 1' 3,000 PSI
CONC. PAD

MANHOLE VENT
SUPPORT
(SEE ABOVE)

CORE BORE
HOLE (UNLESS
CAST-IN-PLACE
BOOT IS USED)

FLEXIBLE
BOOT

MANHOLE VENT SUPPORT

WESTERN VIRGINIA REGIONAL - CONSTRUCTION DETAIL

MANHOLE VENT - ADJACENT

S-12

01/01/14
1. PLACE THREE GUARDPOSTS 2'-6" UPSTREAM OF CENTERLINE OF VALVE ASSEMBLY SPACED 2'-0" ON CENTERS.

GUARDPOST (TYP. 1 OF 3) (SEE NOTE)

4" DIP

SEWER VENT CHECK VALVE WITH STAINLESS STEEL SCREEN WAGER MODEL 1700 OR APPROVED EQUAL

HEIGHT 3' UNLESS SPECIFIED ON PLAN SET

2 #4 EACH WAY
MJ 90° BEND

1/4" per 1'-0" SLOPE

SQ

FILL WITH CONCRETE

4" MJ DIP VENT PIPE

RUBBER SEAL SEE DETAIL BELOW

SECTION NO SCALE

6" SCH. 40 STEEL PIPE PAINT YELLOW

SLOPE TO DRAIN
ADJACENT SURFACE

4'-0"

5'-0"

6" MIN. CONCRETE ENCASEMENT

GUARDPOST DETAIL NO SCALE

INSIDE FACE OF MANHOLE

MH RISER

FILL VOID W/BITUMINOUS FILLER

VENT PIPE

MODULAR RUBBER SEAL

DETAIL NO SCALE

WESTERN VIRGINIA REGIONAL - CONSTRUCTION DETAIL

MANHOLE VENT - OFFSET

01/01/14 S-13
1. Saddles must be used with all plastic & thickness Class 50 ductile iron pipe 4" and larger in diameter.
2. Tees with the branch leg of 2" shall be used for all force mains less than 4" in diameter.
3. A 2" diameter port shall be provided from the force main to air/vacuum valve.

Non-watertight frame & cover (labeled sanitary sewer)

4' dia. precast water valve vault or precast manhole section(s) if over 4' deep

Provide SS screen Christy's VC2 or approved equal

Copper piping

2" gate valve

2" corp. stop

6" minimum bedding no. 57 stone

Sewer force main

Crispin model 20S, A.R.I. D-025, Val-Matic 302A, or approved equal

12" min.
1. FOR PIPES 18" AND LARGER PROVIDE A MASONRY BULKHEAD IN LIEU OF MECHANICAL PLUGS.
1. FOR PIPES 18" IN DIAMETER AND SMALLER SET MECHANICAL PLUGS INTO ALL PIPES ENTERING MANHOLE.
2. FOR PIPES 18" AND LARGER PROVIDE A MASONRY BULKHEAD IN LIEU OF MECHANICAL PLUGS.
3. DOWNSTREAM PIPE TO BE PLUGGED IN ACCORDANCE WITH PIPE ABANDONMENT DETAIL.

PAVEMENT IN ACCORDANCE WITH GOVERNING JURISDICTIONAL REQUIREMENTS

REMOVE MANHOLE FRAME AND COVER, RESTORE TO MATCH SURROUNDING AREA AND GRADE

FINISHED GRADE

REMOVE MANHOLE TO A MINIMUM OF TWO FEET BELOW FINISHED GRADE (REMOVE ALL GRADE RINGS)

#57 STONE, LEAN CONCRETE, OR FLOWABLE FILL

FILL MANHOLE SOLID WITH 3,000 PSI CONCRETE

18" MINIMUM

MECHANICAL PLUG
NOTES:
1. MINIMUM RETENTION TIME SHOULD BE 30 MINUTES AT PEAK FLOW.
2. GREASE INTERCEPTOR SHOULD BE DESIGNED TO WITHSTAND TRAFFIC LOADS IF APPLICABLE.
3. FRAMES AND COVERS SHALL BE CAST IRON & WATERTIGHT. NO PLASTIC COVERS SHALL BE ALLOWED.
   "GREASE" SHALL BE CAST INTO COVER.
4. A NON-MONOLITHIC UNIT SHALL HAVE THE FOLLOWING INSTALLED PER MANUFACTURER'S SPEC:
   A.) A CONSEAL CS - 102 BUTYL RUBBER SEALANT (OR EQUIVALENT) IN THE JOINT.
   B.) 24" CONSEAL CS - 212 POLYOLEFIN BACKED EXTERIOR WRAP (OR EQUIVALENT)
   CENTERED OVER THE EXTERIOR OF THE JOINT.
5. GREASE INTERCEPTOR SHALL BE INSPECTED AND APPROVED BY THE PARTICIPATING UTILITY
   PRIOR TO SITE RECEIVING WATER SERVICE CONNECTION.
6. FORTY-EIGHT (48) HOURS PRIOR TO INSTALLATION, THE CONTRACTOR SHALL COMPLETE THE
   FOLLOWING:
   A.) CONTACT PARTICIPATING UTILITY TO DETERMINE PROPER SUBMITTAL AND INSPECTION PROCEDURE.
   B.) FOR UNITS INSTALLED INTO THE WESTERN VIRGINIA WATER AUTHORITY'S SYSTEM:
      1.) SUBMIT SHOP DRAWINGS TO C. ALTICE, 601 S JEFFERSON ST, SUITE 300, ROANOKE, VA 24011.
      2.) CALL (540) 537-3460 TO SCHEDULE GREASE INTERCEPTOR INSPECTION. THE INSPECTION SHALL
         OCCUR PRIOR TO THE CONTRACTOR COVERING THE GREASE INTERCEPTOR.
7. CONCRETE SHALL BE TYPE III AND CONFORM TO ASTM C150.
8. ALL OTHER DETAILS SHALL BE IN ACCORDANCE WITH THE LATEST REVISION OF ASTM C1613.
9. ALL PVC PIPES SHALL EXTEND 5" ABOVE WATER SURFACE.
10. IF INTERCEPTOR IS SUBJECTED TO TRAFFIC, ACCESS FOR BAFFLE TEES SHALL BE TRAFFIC RATED CAST
     IRON FRAME & COVER.

WESTERN VIRGINIA REGIONAL - CONSTRUCTION DETAIL

GREASE INTERCEPTOR

01/01/14
<table>
<thead>
<tr>
<th>Pipe Diameter (in.)</th>
<th>4</th>
<th>6</th>
<th>8</th>
<th>10</th>
<th>12</th>
<th>14</th>
<th>16</th>
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<td>Size (ft)</td>
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<td>50</td>
<td>60</td>
<td>70</td>
<td>80</td>
<td>90</td>
<td>100</td>
<td>110</td>
<td>120</td>
<td>140</td>
<td>180</td>
<td>220</td>
<td>300</td>
</tr>
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**Specification Time for Length (1 ft shown in min:sec):**

For a size and length of pipe indicated for a 1.0 psi pressure drop:

- Minimum specified time required for 1.0 psi pressure drop.
- Pipe length longer than shown.
- For a size and length of pipe indicated for a 0.015 psi pressure drop.

Note: If there has been no leakage (zero psi drop) after one hour of testing, the test shall be accepted and the test completed.