NOTES:


2. SEE STD. DRAWING NO. 020 FOR Poured IN PLACE CONCRETE MANHOLE BASE.

3. ALL JOINTS AND RUBBER GASKETS SHALL CONFORM TO THE REQUIREMENTS OF ASTM C-443.

4. SEE STD. DRAWING NO. 030. ALL PIPE CONNECTIONS TO MANHOLE SHALL BE WATERTIGHT.

5. PIPE CONNECTIONS OF 24" OR GREATER SHALL REQUIRE A MANHOLE AND CHANNEL DETAIL.

6. PIPE CONNECTIONS OF FOUR OR MORE MAINLINES SHALL REQUIRE A MANHOLE CONNECTION AND CHANNEL DETAIL.

7. PROVIDE A MINIMUM OF 8" OF INTACT (UNDISTURBED) MANHOLE WALL BETWEEN PIPE BREAKOUTS AS MEASURED ON THE INSIDE FACE OF THE MANHOLE.

8. BREAKOUT OF WALL FOR PIPE SHALL BE 2" MINIMUM AND 4" MAXIMUM CLEAR OF PIPE WALL.

9. THIS DETAIL LIMITED TO MAXIMUM INTERIOR DROP OF 12" FOR SANITARY CONNECTION AND 48" FOR STORM CONNECTION.

10. WATERTIGHT/TAMPER PROOF MANHOLE FRAME AND COVER SHALL BE USED IN ALL EASEMENT AND OFF STREET AREAS. SEE STD. DRAWING NO. 130.

---

STANDARD MANHOLE

DRAWING NO. 010

REVISED 10-31-19

CleanWater Services
NOTES:
1. ALL MANHOLE SECTIONS SHALL CONFORM TO THE REQUIREMENTS OF ASTM C-478 AND APPLICABLE PROVISIONS OF STANDARD MANHOLE, DRAWING NO. 010.
2. ALL POURED IN PLACE CONCRETE SHALL HAVE A 28 DAY STRENGTH OF 3000 PSI AND A SLUMP OF 2" TO 4".

PRE-CAST/POURED IN PLACE MANHOLE BASE

DRAWING NO. 020

REVISED 10-31-19
NOTES:
2. ALTERNATE METHODS TO BE APPROVED BY CITY/DISTRICT.
3. BOOTS TO BE SIZED PER MANUFACTURER’S RECOMMENDATIONS/SPECIFICATIONS.
NOTES:

1. ALL JOINTS AND RUBBER GASKETS SHALL CONFORM TO THE REQUIREMENTS OF ASTM C-433.

2. ALL MANHOLE SECTIONS SHALL CONFORM TO THE REQUIREMENTS OF ASTM C-478 AND APPLICABLE PROVISIONS OF STANDARD MANHOLE, SEE STD DRAWING NO. 010.

3. CENTER OPENING FLAT TOP REQUIRED.

4. NO STEPS ALLOWED IN SHALLOW FLAT TOP MANHOLE.

5. ALL POURED IN PLACE CONCRETE SHALL HAVE A 28 DAY STRENGTH OF 3000 PSI AND A SLUMP OF 2" TO 4".

6. SEE DRAWING 030 FOR WATERTIGHT MANHOLE CONNECTIONS.

7. ALL MANHOLE FLAT TOPS SHALL CONFORM TO ASTM C-478 AND ARE DESIGNED TO MEET H-20 TRAFFIC LOADING.
NOTES:

1. ALL JOINTS AND RUBBER GASKETS SHALL CONFORM TO THE REQUIREMENTS OF ASTM C-433.

2. ALL MANHOLE SECTIONS SHALL CONFORM TO THE REQUIREMENTS OF ASTM C-478 AND APPLICABLE PROVISIONS OF STANDARD MANHOLE, SEE STD DRAWING NO. 010.

3. STEPS REQUIRED ON FLAT TOP MANHOLES DEEPER THAN 48" FROM FINISHED GRADE TO I.E. OUT.

4. SEE DRAWING 030 FOR WATERTIGHT MANHOLE CONNECTIONS.

5. ALL MANHOLE FLAT TOPS SHALL CONFORM TO ASTM C-478 AND ARE DESIGNED TO MEET H-20 TRAFFIC LOADING.
SPECIFICATIONS:
1) CLAMP AND BRACKETS ARE TYPE 304 STAINLESS STEEL, 11 GAUGE (.1196").
2) 3/8" @ PINCH BOLT AND NUTS IS TYPE 18-8 STAINLESS STEEL
3) RELINER CLAMP/BRACKET AND ANCHOR OR APPROVED EQUIVALENTS.

ANALOG DETAIL
N.T.S.

11 GAUGE (.1196")

3/8" DIAMETER STAINLESS STEEL PINCH BOLT

MINIMUM OF 2 CLAMPS, MAXIMUM DISTANCE BETWEEN CLAMPS IS 3' OR ADDITIONAL CLAMPS WILL BE REQUIRED.

NOTES:
1. PIPE AND FITTINGS SHALL BE SAME SIZE AS INFLOW PIPE TO MANHOLE.
2. PIPE AND FITTINGS FOR DROP ASSEMBLY SHALL BE: DUCTILE IRON ANSI A21.50-1, AWWA C150-1, AWWA C-900 OR PVC ASTM 3034 SDR 35.

MECHANICAL INSIDE DROP MANHOLE

DRAWING NO. 060
REVISED 10-31-19
OPEN INSIDE DROP WITH BEAVER SLIDE

SANITARY

PIPE PROJECTING BEYOND INTERIOR SURFACE OF MANHOLE WALL IS NOT ALLOWED

12" MAXIMUM FOR SANITARY

WATERTIGHT SEAL USING NON-SHRINKING GROUT SEE DRAWING 030

PIECE TYPE, SIZE, AND CONNECTION PER PLAN, AS APPROVED

CONSTRUCT CHANNEL AND SLIDE SIMULTANEOUSLY

STORM

WATERTIGHT SEAL USING NON-SHRINKING GROUT SEE DRAWING 030.

48" MAXIMUM FOR STORM

PIECE TYPE, SIZE, AND CONNECTION PER PLAN, AS APPROVED

CONSTRUCT CHANNEL AND SLIDE SIMULTANEOUSLY

OPEN INSIDE DROP MANHOLE

DRAWING NO. 080 REVISED 10-31-19
**ANCHOR DETAIL**

- 3/8 x 16 x 1.25" ANCHOR ZINC ALLOY LEAD
- 3/8 x 7/8" SS WASHER
- 3/8 x 16 x 3" SS REDHEAD

**NOTES:**
1. DROP BOWL AS MANUFACTURED BY RELINER-DURAN INC. OR APPROVED EQUAL.
2. DROP BOWL TO BE SIZED PER MANUFACTURER'S RECOMMENDATIONS (INFORMATION AVAILABLE @ RELINER.COM) OR AS REQUIRED BY DISTRICT OR CITY.
3. PIPE AND FITTING FOR DROP ASSEMBLY SHALL BE: AWWA CL50-1, AWWA C-900 OR PVC ASTM 3034 SDR 35.
4. NO MORE THAN ONE DROP BOWL PER MANHOLE WITHOUT WRITTEN APPROVAL BY DISTRICT OR CITY.
5. WRITTEN APPROVAL BY DISTRICT OR CITY IS REQUIRED FOR DROP BOWL INSTALLATION ON PIPELINES WITH A SLOPE OF 5% OR GREATER.

**CLAMP DETAIL**

- 3/8" DIAMETER STAINLESS STEEL PINCH BOLT

**NOTES:**
- WATERTIGHT SEAL USING NON-SHRINKING GROUT SEE DETAIL 030.
- PIPE TYPE, SIZE, AND CONNECTION PER PLAN, AS APPROVED.
- PIPE LENGTH AS REQUIRED
- 3'-0" MAXIMUM
- 45° BEND
- CHANNEL BOTTOM

**INSIDE DROP MANHOLE W/BOWL**

DRAWING NO. 090  
REvised 10-31-19
MATERIALS:

PLASTIC:
MUST CONFORM WITH ASTM C-478. STEEL REINFORCING
BAR MINIMUM 1/2” GRADE 60.
MEETING REQUIREMENTS OF
ASTM A-615 ENCAPSULATED
WITH INJECTION MOLDED
COPOLYMER POLYPROPYLENE
WITH SERRATED SURFACES.

NOTES:
1. ALL STEPS SHALL CONFORM TO
   THE REQUIREMENTS OF ASTM
   C-478.

2. MANHOLE STEPS MUST BE
   TIGHT AND FIRMLY EMBEDDED.

3. ALL STEPS WITHIN A MANHOLE
   SHALL BE OF THE SAME
   DESIGN, TYPE, AND SIZE.
   (MIXING OF UNMATCHED STEPS
   IS NOT PERMITTED).

4. STEPS ADJUSTED OR ADDED
   SHALL BE EPOXYED IN HOLES
   THAT ARE FREE OF MOISTURE
   AND DEBRIS. (EPOXY TO MEET
   ASTM C881).

MANHOLE STEP
NOTES:
1. SUBURBAN TYPE FOR USE IN TRAFFIC AREAS OF LOCAL AND NEIGHBORHOOD STREETS.
2. STANDARD TYPE FOR USE IN TRAFFIC AREAS OF COLLECTOR AND ARTERIAL STREETS.
4. COVER AND FRAME TO BE MACHINED TO A TRUE BEARING ALL AROUND.
5. 1 1/2” PICKHOLE IN LID FOR LIFTING HOOK.

SUBURBAN AND STANDARD
MANHOLE FRAME AND COVER
SANITARY

DRAWING NO. 110
REVISED 10-31-19
SEE DETAIL #110 FOR MANHOLE FRAME SPECIFICATIONS.

STORM WATER MANHOLE LID
WATERTIGHT MANHOLE RING

Frame will be attached to the manhole top/cone section by using a "red head" anchor (or equal) that is a min 1-1/4" O.D. w/s. steel washer 3/32" thick. If grade rings need to be installed, a hole will be cored through the ring so the bolt can be attached to top section.

SECTION A–A

NOTES:
1. COMPOSITE WATERTIGHT/TAMPER PROOF MANHOLE FRAME AND COVER SHALL BE USED IN ALL EASEMENT AND OFF STREET AREAS.

2. THE WATERTIGHT MANHOLE COVER FRAME SHALL BE GMI 2600 SERIES COMPOSITE FRAME AND COVER MANUFACTURED BY TITUS INDUSTRIAL GROUP, INC. OR ITS EQUAL.

3. THE LOCKING MECHANISM SHALL BE A TWISTLIFT® MANUFACTURED BY TITUS INDUSTRIAL GROUP, INC. OR ITS EQUAL.

4. THE TWISTLIFT® COMPOSITE ACCESS COVER LOCK IS DESIGNED AS A SECURITY BOLT REQUIRING A SPECIAL TOOL TO OPERATE THE QUARTER TURN BOLT AND LIFT THE COVER FROM THE FRAME. IT FUNCTIONS WITH EITHER THE STANDARD CAM LOCK QUARTER TURN PADDLE, OR THE EXTENDED 'SURCHARGE' PADDLE.

5. THE BOLT SHALL BE MACHINED FROM 316 STAINLESS STEEL.

6. THE BOLT FEATURES A DOMED HEAD WITH 3 EQUALLY SPACED 'J' SLOTS RUNNING HORIZONTALLY AROUND THE BOLT HEAD.

7. STANDARD BOLT SIZES ARE 14 MM COARSE THREAD WITH A FLAT MACHINED ON TWO SIDES TO ENGAGE PADDLE.

8. THE PADDLE IS DIE CAST FROM 304 STAINLESS STEEL AND ALSO AVAILABLE IN BOTH STANDARD CAM LOCK DESIGN, OR EXTENDED SURCHARGE CONFIGURATION.

9. THE BOLT AND PADDLE WILL BE ASSEMBLED USING TWO STAINLESS STEEL 14 MM NUT'S. THE BOTTOM NUT IS A STANDARD NUT THAT WILL BE TORQUE TO 35 FT. LBS. TO GIVE THE DESIRED TENSION ON THE BOLT. A SECOND NYLOCK™ LOCK NUT IS USED AS A JAM NUT, AND TORQUE TO 80 FT. LBS. STAINLESS STEEL WASHERS ARE USED TO PROVIDE CONSISTENT TURNING RESISTANCE.

10. A 5/16 STAINLESS STEEL SET SCREW, SET IN A THREADED HOLE IN THE COVER PROVIDES FOR A STOP AT 3/4 TURN OF OPERATION.

11. THE BOLT WILL BE OPERATED BY MEANS OF A SPECIAL KEY CONSISTING OF A SPECIAL SLEEVE ATTACHED TO A "T" HANDLE USED TO BOTH TURN THE BOLT, AND LIFT OUT THE COVER.

12. ONE SET OF REPLACEMENT OPENING KEYS WILL BE PROVIDED TO CLEAN WATER SERVICES AT TIME OF INSTALLATION.

13. THE BOLT HEAD IS PROTECTED BY A WEATHER RESISTANT PLASTIC O-RING CAP. THE CAP IS INCLUDED WITH EACH LOCK.

14. SEE LOCAL JURISDICTION REQUIREMENTS FOR USE IN TRAFFIC AREAS.
CONCRETE FOR CLOSURE COLLAR SHALL BE READY-MIXED CONFORMING WITH ASTM C94, ALTERNATE 2 AND SHALL HAVE A COMPRESSION STRENGTH OF 3000 PSI @ 28 DAYS.

ADJUSTMENT GRADE RINGS AND CASTING FRAME SET IN 1" OF NON-SHRINKING GROUT

1 1/2"
12" MAXIMUM
ADJUSTMENT

4"

FORM AS APPROVED

CONCRETE MANHOLE CLOSURE COLLAR

DRAWING NO. 140

REVISED 10-31-19
NARROW EXTERNAL RUBBER SEAL

TO SPAN CHIMNEY HEIGHTS OF:

0–3”  -  NARROW (6”) SEAL ONLY
OVER 3” – 6 1/2”   -  STANDARD (9”) SEAL ONLY
OVER 6 1/2” – 12”   -  STD. SEAL + EXTENSION
OVER 12”   -  SEAL + MULT. EXTENSIONS

NOTES:
1. SLEEVES AND EXTENSIONS SHALL HAVE A MINIMUM OF 3/16” THICKNESS.
2. RUBBER SHALL BE EXTRUDED HIGH GRADE COMPOUND CONFORMING TO ASTM C-923.
3. BANDS SHALL BE FABRICATED FROM 16 GAUGE STAINLESS STEEL CONFORMING TO ASTM A-240, TYPE 304.
4. NUTS AND BOLTS SHALL BE STAINLESS STEEL CONFORMING TO ASTM F-593 AND 594, TYPE 304.
5. ALL GRAY RING AND CASTING FRAME SHALL BE SET IN NON-SHRINKING GROUT.
6. PRE CAST MANHOLE SECTIONS SHALL CONFORM TO THE REQUIREMENTS OF ASTM C-476, AND APPLICABLE PROVISIONS OF STANDARD MANHOLE DRAWING NO. 010.

INTERNAL MANHOLE CHIMNEY SEAL

TO SPAN CHIMNEY HEIGHTS OF:

0–4 1/2”   -  CHIMNEY SEAL ONLY
OVER 4 1/2” – 9”   -  SEAL + 7” EXTENSION
OVER 9”– 12”   -  SEAL + 10” EXTENSION
OVER 12”   -  SEAL + MULT. EXTENSIONS

EXTERNAL MANHOLE CHIMNEY SEAL

MANHOLE FRAME AND COVER

RUBBER SLEEVE

STAINLESS STEEL EXPANSION BANDS

PRE CAST CONCRETE ADJUSTING RINGS

PRE CAST MANHOLE CONE

RUBBER SLEEVE

STAINLESS STEEL TOP BAND

EXTERNAL RUBBER SLEEVE

STAINLESS STEEL BOTTOM BAND

PRE CAST CONCRETE ADJUSTING RINGS

PRE CAST MANHOLE CONE

EXTERNAL RUBBER EXTENSION

MANHOLE FRAME AND COVER

MANHOLE CHIMNEY SEAL

DRAWING NO. 150

CleanWater Services

REVISED 10–31–19
NOTES:
1. ALL Poured in place concrete shall have a 28 day ultimate strength of 4000 psi and a 2" to 4" slump.
2. All reinforcement shall have a minimum yield strength of 60,000 psi (grade 60).
3. All precast joints shall be grouted or rubber gasketed.
4. Sections and cone shall be in accordance with ASTM C47B.

MAXIMUM THROUGH PIPE SIZES

<table>
<thead>
<tr>
<th>BARREL DIA</th>
<th>MAX. PIPE DIA</th>
</tr>
</thead>
<tbody>
<tr>
<td>60&quot;</td>
<td>36&quot;</td>
</tr>
<tr>
<td>72&quot;</td>
<td>48&quot;</td>
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<tr>
<td>84&quot;</td>
<td>60&quot;</td>
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<tr>
<td>96&quot;</td>
<td>72&quot;</td>
</tr>
<tr>
<td>108&quot;</td>
<td>84&quot;</td>
</tr>
<tr>
<td>120&quot;</td>
<td>96&quot;</td>
</tr>
</tbody>
</table>

Break out manhole wall 2" minimum, 4" maximum clear of pipe wall. Grout space with non-shrink grout.

Concrete fill as required.

Steps for precast manhole see std. drawing no. 100

Finish grade of street

Grade rings (2", 4", or 6") maximum 12"

Standard top slab see std. drawing no. 220

Standard manhole section(s) see std. drawing no. 200 and no. 210

LARGE PRECAST CONCRETE MANHOLE

Drawing No. 160

Revised 10-31-19
LARGE PRECAST CONCRETE MANHOLE — BASES

Drawn No. 170
Revised 10-31-19

NOTES:
1. MANHOLE TYPE 1 IS CONTINUOUS FROM BOTTOM SLAB TO 12" ABOVE PIPE BREAKOUT.
2. MANHOLE TYPES 1 & 2 MAY HAVE EITHER PRECAST OR CAST-IN-PLACE BASE.
3. MANHOLE SECTIONS SHALL BE MANUFACTURED IN ACCORDANCE TO THE REQUIREMENTS SHOWN ON STD. DRAWING NO. 180 AND 190.
4. MANHOLE TYPE 2 SHALL HAVE NO JOINTS BETWEEN 1" ABOVE PIPE BREAKOUT OPENING AND 2" BELOW PIPE SPRING LINE.
5. MANHOLE SECTIONS SHALL BE MANUFACTURED IN ACCORDANCE WITH ASTM C76 OR C478 EXCEPT LONGITUDINAL (VERT.) STEEL SHALL MEET OR EXCEED THAT SHOWN ON STD. DRAWING NO. 190.
Note: Wall to slab joint shall be grouted when slab is cast separately.

PRECAST BASE SLAB TYPE 1

Note: Grout not required for slab cast in contact with manhole section.

PRECAST BASE SLAB TYPE 2

CAST-IN-PLACE BASE
(OR PRECAST BASE TYPE 4)

<table>
<thead>
<tr>
<th>SIZE</th>
<th>60&quot;</th>
<th>72&quot;</th>
<th>84&quot;</th>
<th>96&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type</td>
<td>Depth*</td>
<td>0'–15'</td>
<td>15'–30'</td>
<td>0'–15'</td>
</tr>
<tr>
<td>1</td>
<td>D Bars</td>
<td>#3 @ 12&quot;</td>
<td>#3 @ 12&quot;</td>
<td>#3 @ 12&quot;</td>
</tr>
<tr>
<td></td>
<td>E Bars</td>
<td>#4 @ 12&quot;</td>
<td>#4 @ 9&quot;</td>
<td>#4 @ 9&quot;</td>
</tr>
<tr>
<td>2</td>
<td>T S</td>
<td>11.0&quot;</td>
<td>12.0&quot;</td>
<td>11.0&quot;</td>
</tr>
<tr>
<td></td>
<td>E Bars</td>
<td>#4 @ 12&quot;</td>
<td>#4 @ 8&quot;</td>
<td>#4 @ 9&quot;</td>
</tr>
<tr>
<td>3</td>
<td>T S</td>
<td>7.0&quot;</td>
<td>9.0&quot;</td>
<td>7.0&quot;</td>
</tr>
<tr>
<td></td>
<td>D Bars</td>
<td>#3 @ 12&quot;</td>
<td>#3 @ 12&quot;</td>
<td>#4 @ 10&quot;</td>
</tr>
<tr>
<td></td>
<td>E Bars</td>
<td>#4 @ 12&quot;</td>
<td>#4 @ 9&quot;</td>
<td>#4 @ 9&quot;</td>
</tr>
<tr>
<td>4</td>
<td>T S</td>
<td>7.0&quot;</td>
<td>9.0&quot;</td>
<td>7.0&quot;</td>
</tr>
<tr>
<td></td>
<td>E Bars</td>
<td>#4 @ 12&quot;</td>
<td>#4 @ 9&quot;</td>
<td>#4 @ 9&quot;</td>
</tr>
<tr>
<td></td>
<td>F Bars</td>
<td>#4 @ 12&quot;</td>
<td>#4 @ 9&quot;</td>
<td>#4 @ 9&quot;</td>
</tr>
</tbody>
</table>

*Invert to Street Grade
Concrete: f = 4,000 psi
Steel: f = Grade 60

**Fabricator required to cast lifting loops in base slab for handling Type 1 & 2 bases.

LARGE PRECAST CONCRETE MANHOLE – TYPES

DRAWING NO.180

REVISED 10–31–19
**PRECAST BASE SLAB TYPE 5**

1. Add bottom mat of No. 3 bars each way at same spacing as top mat.
2. Wall to slab joint shall be field grouted.
3. Curb is continuous all around base slab.
4. If curb is not cast monolithic with base slab, provide construction joint as shown.

**PRECAST OR CAST-IN-PLACE BASE SLAB TYPE 6**

1. Add bottom mat of No. 3 bars each way at same spacing as top mat.
2. Wall to slab joint shall be field grouted. Grout is not required for slab cast in contact with manhole section.
3. Curb is continuous all around base slab.
4. If curb is not cast monolithic with base slab, provide construction joint as shown.
5. Base slab Type 6 may be precast or cast-in-place concrete.
6. Ts for base slab Type 6 assumes a 6 1/4" spigot depth. Adjust Ts for actual spigot depth.
7. Curb may be cast in place against riser pipe without grouting.

<table>
<thead>
<tr>
<th>SIZE</th>
<th>108&quot;</th>
<th>120&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type</td>
<td>Depth*</td>
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<tr>
<td>5</td>
<td>Ts</td>
<td>10&quot;</td>
</tr>
<tr>
<td></td>
<td>&quot;D&quot; Bars</td>
<td>No.4 @ 12&quot;</td>
</tr>
<tr>
<td></td>
<td>&quot;E&quot; Bars</td>
<td>No.5 @ 12&quot;</td>
</tr>
<tr>
<td>6</td>
<td>Ts</td>
<td>15.5&quot;</td>
</tr>
<tr>
<td></td>
<td>&quot;D&quot; Bars</td>
<td>No.4 @ 12&quot;</td>
</tr>
<tr>
<td></td>
<td>&quot;E&quot; Bars</td>
<td>No.5 @ 12&quot;</td>
</tr>
</tbody>
</table>

*Invert to Street Grade

Concrete: $f_c = 4,000$ psi
Steel: Grade 60

---

**LARGE PRECAST CONCRETE MANHOLE BASE SLABS**

**CleanWater Services**

**DRAWING NO. 190**

**REvised 10-31-19**
### 60”Ø Manhole Section

<table>
<thead>
<tr>
<th>Invert to Street Grade</th>
<th>Tw = 5.0”</th>
<th>Tw = 6.0”</th>
<th>Tw = 6.75”</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type 1</td>
<td>0 Ft to 15 Ft</td>
<td>0.16</td>
<td>0.15</td>
</tr>
<tr>
<td></td>
<td>15 Ft to 30 Ft</td>
<td>0.32</td>
<td>0.18</td>
</tr>
<tr>
<td>Type 2</td>
<td>0 Ft to 15 Ft</td>
<td>0.17</td>
<td>0.15</td>
</tr>
<tr>
<td></td>
<td>15 Ft to 30 Ft</td>
<td>0.37</td>
<td>0.18</td>
</tr>
</tbody>
</table>

'C' Bars—1 No. 4 hoop req’d. for less than 2”-0” clr. between blockout and top of section.

### 72”Ø Manhole Section

<table>
<thead>
<tr>
<th>Invert to Street Grade</th>
<th>Tw = 6.0”</th>
<th>Tw = 7.0”</th>
<th>Tw = 7.75”</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type 1</td>
<td>0 Ft to 15 Ft</td>
<td>0.19</td>
<td>0.19</td>
</tr>
<tr>
<td></td>
<td>15 Ft to 30 Ft</td>
<td>0.33</td>
<td>0.28</td>
</tr>
<tr>
<td>Type 2</td>
<td>0 Ft to 15 Ft</td>
<td>0.19</td>
<td>0.13</td>
</tr>
<tr>
<td></td>
<td>15 Ft to 30 Ft</td>
<td>0.36</td>
<td>0.13</td>
</tr>
</tbody>
</table>

'C' Bars—2 No. 5 hoops 2” clr. of top of manhole barrel} req’d. for less than 2”-0” clr. between blockout and top of section.

### 84”Ø Manhole Section

<table>
<thead>
<tr>
<th>Invert to Street Grade</th>
<th>Tw = 7.0”</th>
<th>Tw = 8.0”</th>
<th>Tw = 8.75”</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type 1</td>
<td>0 Ft to 15 Ft</td>
<td>0.20</td>
<td>0.13</td>
</tr>
<tr>
<td></td>
<td>15 Ft to 30 Ft</td>
<td>0.33</td>
<td>0.23</td>
</tr>
<tr>
<td>Type 2</td>
<td>0 Ft to 15 Ft</td>
<td>0.23</td>
<td>0.15</td>
</tr>
<tr>
<td></td>
<td>15 Ft to 30 Ft</td>
<td>0.36</td>
<td>0.15</td>
</tr>
</tbody>
</table>

'C' Bars—2 No. 5 hoops 2” clr. of top of manhole barrel} req’d. for less than 2”-0” clr. between blockout and top of section.

### 96”Ø Manhole Section

<table>
<thead>
<tr>
<th>Invert to Street Grade</th>
<th>Tw = 8.0”</th>
<th>Tw = 9.0”</th>
<th>Tw = 9.75”</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type 1</td>
<td>0 Ft to 15 Ft</td>
<td>0.25</td>
<td>0.18</td>
</tr>
<tr>
<td></td>
<td>15 Ft to 30 Ft</td>
<td>0.41</td>
<td>0.26</td>
</tr>
<tr>
<td>Type 2</td>
<td>0 Ft to 15 Ft</td>
<td>0.26</td>
<td>0.17</td>
</tr>
<tr>
<td></td>
<td>15 Ft to 30 Ft</td>
<td>0.43</td>
<td>0.17</td>
</tr>
</tbody>
</table>

'C' Bars—2 No. 5 hoops 2” clr. of top of manhole barrel} req’d. for less than 2”-0” clr. between blockout and top of section.

Provide min. longitud. reinf. as shown, 1” clr. of inside and outside faces, or at center of wall. Areas are in²/ft of circumference and may be welded wire fabric, bars or a combination of both.

Large Precast Concrete Manhole—Long. Base Section Reinforcement.

Drawing No. 200 Revised 10-31-19
Notes:
1. Manufacture manhole base section and risers above in conformance with ASTM C478 except as noted in specifications and herein. Lap length for hoop reinforcement in band "h" shall be 30 bar diameters and laps shall be staggered.
2. Steel reinforcement in bands "h" and "b" is in addition to that required by ASTM C478 and is shown in square inches per foot of band width. Bar spacing shall not exceed 6".
3. Manhole base sections shall have no joints below top of band "h".
4. Concrete: $f'c = 4,000$ psi
   Reinforcement steel: Grade 60
5. There shall be no penetrations in hoop band "h" above main line pipe penetrations or in longitudinal bands "b" next to both sides of all openings.
6. Additional longitudinal reinforcement area can be reduced 50% outside of "b" bands.
7. Thickness "Tw" is minimum manhole base section wall thickness for a given pipe diameter.
8. Do not backfill until concrete fill over the manhole base has achieved 90% of its compressive strength (4,000 psi). For shape of concrete fill see Std. Drawing NO. 650.
9. Provide 6"x6" concrete collar around pipe penetrations per Std. Drawing NO. 655.

### Partial Manhole Base Section Rollout

<table>
<thead>
<tr>
<th>MH Dia. (in)</th>
<th>Thickness Tw (in)</th>
<th>Band Width h=b (in)</th>
<th>Depth to Invert max. (ft)</th>
<th>Inside Pipe Dia. (in)</th>
<th>Additional Reinforcement Required</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Hoop Reinf. (b) / Long. Reinf. (b)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Outside Face / Inside Face</td>
</tr>
<tr>
<td>108</td>
<td>9</td>
<td>1.00</td>
<td>15</td>
<td>48 or less</td>
<td>.381 / .381</td>
</tr>
<tr>
<td>108</td>
<td>10</td>
<td>1.25</td>
<td>15</td>
<td>54-60</td>
<td>.381 / .381</td>
</tr>
<tr>
<td>108</td>
<td>10</td>
<td>1.75</td>
<td>15</td>
<td>66-84</td>
<td>.381 / .381</td>
</tr>
<tr>
<td>108</td>
<td>11</td>
<td>1.00</td>
<td>30</td>
<td>48 or less</td>
<td>.790 / .790</td>
</tr>
<tr>
<td>108</td>
<td>12</td>
<td>1.25</td>
<td>30</td>
<td>54-60</td>
<td>.790 / .790</td>
</tr>
<tr>
<td>108</td>
<td>16</td>
<td>1.75</td>
<td>30</td>
<td>66-84</td>
<td>.790 / .790</td>
</tr>
<tr>
<td>120</td>
<td>10</td>
<td>1.00</td>
<td>15</td>
<td>48 or less</td>
<td>.423 / .423</td>
</tr>
<tr>
<td>120</td>
<td>10</td>
<td>1.50</td>
<td>15</td>
<td>54-72</td>
<td>.423 / .423</td>
</tr>
<tr>
<td>120</td>
<td>11</td>
<td>2.00</td>
<td>15</td>
<td>78-96</td>
<td>.423 / .423</td>
</tr>
<tr>
<td>120</td>
<td>11</td>
<td>1.00</td>
<td>30</td>
<td>48 or less</td>
<td>.880 / .880</td>
</tr>
<tr>
<td>120</td>
<td>14</td>
<td>1.50</td>
<td>30</td>
<td>54-72</td>
<td>.880 / .880</td>
</tr>
<tr>
<td>120</td>
<td>17</td>
<td>2.00</td>
<td>30</td>
<td>78-96</td>
<td>.880 / .880</td>
</tr>
</tbody>
</table>

### Large Precast Concrete Manhole Base Section Reinf. 108” & 120”

CleanWater Services

DRAWING NO. 210  REVISED 10-31-19
NOTES:

1. All concrete shall have a 28 day ultimate compressive strength of 4,000 psi.
2. All reinforcement shall have a minimum yield strength of 60,000 psi, (Grade 60).
3. All lap splices shall be 24 bar diameters unless noted otherwise.
4. Add steps as required by Standard Drawing NO. 010

<table>
<thead>
<tr>
<th>TOP SLAB &quot;A&quot;</th>
<th>TOP SLAB &quot;B&quot;</th>
<th>TOP SLAB &quot;B&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td>COVER DEPTH</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>6&quot; to 12&quot;</td>
<td>4'-0&quot; to 7'-0&quot;</td>
</tr>
<tr>
<td>Size</td>
<td>&quot;A&quot; Bars &quot;B&quot; Bars</td>
<td>T</td>
</tr>
<tr>
<td>60&quot;</td>
<td>No.5 @ 7½&quot; No.5 @ 7½&quot;</td>
<td>12&quot;</td>
</tr>
<tr>
<td>72&quot;</td>
<td>No.5 @ 7&quot; No.5 @ 7&quot;</td>
<td>12&quot;</td>
</tr>
<tr>
<td>84&quot;</td>
<td>No.5 @ 7&quot; No.5 @ 7&quot;</td>
<td>12&quot;</td>
</tr>
<tr>
<td>96&quot;</td>
<td>No.5 @ 6&quot; No.5 @ 6&quot;</td>
<td>12&quot;</td>
</tr>
<tr>
<td>108&quot;</td>
<td>N/A N/A N/A</td>
<td>12&quot;</td>
</tr>
<tr>
<td>120&quot;</td>
<td>N/A N/A N/A</td>
<td>12&quot;</td>
</tr>
</tbody>
</table>

LARGE PRECAST CONCRETE MANHOLE TOP SLABS

DRAWING NO. 220

CleanWater Services

REVISED 10-31-19
Standard Manhole Frame and Cover. See STD. Drawing NO. 110, 120 OR 130.
Set Frame in Non-shrink Grout.

Steps for precast manhole. See STD. Drawing NO. 100

Grout bench
No. 4 @ 12" Dowels ea. face all around
18"

"B" Reinf. ea. face in 15" wide band
"A" Reinf. all around
Class V pipe

D1 (IN.) | ADDITIONAL REINF. SQUARE INCHES (TOTAL) |
---------|----------------------------------------|
|         | "A" | "B" |
| 60 – 72 | .177 | .511 |
| 78 – 96 | .224 | .584 |
| 102 – 120 | .265 | .658 |

T-TOP MANHOLE WITH 48" RISER

Cleaning Water Services
DRAWING NO. 230 REVISED 10-31-19
ALL SNOUTS AND TRAPS FOR CATCH BASINS AND WATER QUALITY STRUCTURES SHALL BE AS MANUFACTURED BY:

BEST MANAGEMENT PRODUCTS, INC.
53 MT. ARCHER RD.
LYME, CT 06371

(860) 434–0277, (860) 434–3195
FAX TOLL FREE: (800) 504–8008,
(888) 354–7585
WEB SITE:  WWW.BMPINC.COM

OR PRE–APPROVED EQUAL.
SEE DETAIL #260

NOTES:

1. ALL MANHOLE SECTIONS SHALL CONFORM TO THE REQUIREMENTS OF ASTM C–478 AND APPLICABLE PROVISIONS OF STD. MANHOLE DRAWING NO. 010.

2. INLET AND OUTLET PIPE NOT TO EXCEED 18” DIA.

3. PROVIDE SPECIAL DETAIL FOR SNOUT, EXCEEDING 18” DIA.

4. THE SIZE AND POSITION OF THE HOOD SHALL BE DETERMINED BY THE OUTLET PIPE SIZE AS PER MANUFACTURER’S RECOMMENDATIONS.

5. ANCHORING HARDWARE FOR THE HOOD SHALL BE EMBEDDED INTO CONCRETE; ANCHORING INTO GROUT IS NOT AUTHORIZED.

6. THE SURFACE OF THE STRUCTURE WHERE THE HOOD IS MOUNTED SHALL BE FINISHED SMOOTH AND FREE OF LOOSE MATERIAL.

7. INSTALL PER MANUFACTURER’S INSTRUCTIONS.

8. ALL MANHOLE FLAT TOPS SHALL CONFORM TO ASTM C–478 AND ARE DESIGNED TO MEET H–20 TRAFFIC LOADING.

SUMMARY

MANHOLE (SNOUT) A

DRAWING NO. 250

REVISED 10–31–19
SNOUT OIL-WATER-DEBRIS SEPARATOR

NOTES:
1. ALL HOODS AND TRAPS FOR CATCH BASINS AND WATER QUALITY STRUCTURES SHALL BE AS MANUFACTURED BY BEST MANAGEMENT PRODUCTS, INC. OR PRE-APPROVED EQUAL.

2. ALL HOODS SHALL BE CONSTRUCTED OF A GLASS REINFORCED RESIN COMPOSITE WITH ISO GEL COAT EXTERIOR FINISH WITH A MINIMUM 0.125" LAMINATE THICKNESS.

3. ALL HOODS SHALL BE EQUIPPED WITH A MINIMUM 10" WATERTIGHT ACCESS PORT, A MOUNTING FLANGE, AND AN ANTI-SIPHON VENT AS DRAWN. (SEE CONFIGURATION DETAIL)

4. THE SIZE AND POSITION OF THE HOOD SHALL BE DETERMINED BY OUTLET PIPE SIZE AS PER MANUFACTURER’S RECOMMENDATION.

5. THE BOTTOM OF THE HOOD SHALL EXTEND DOWNWARD A DISTANCE OF 18" FROM I.E. OUT.

6. THE ANTI-SIPHON VENT SHALL EXTEND ABOVE HOOD BY MINIMUM OF 3" AND A MAXIMUM OF 24" ACCORDING TO STRUCTURE CONFIGURATION.

7. THE SURFACE OF THE STRUCTURE WHERE THE HOOD IS MOUNTED SHALL BE FINISHED SMOOTH AND FREE OF LOOSE MATERIAL.

8. THE HOOD SHALL BE SECURELY ATTACHED TO STRUCTURE WALL WITH STAINLESS STEEL BOLTS AND OIL-RESISTANT GASKET.

9. ANCHOR BOLTS SHALL BE INSTALLED INTO THE CONCRETE OF THE STRUCTURE'S WALL. (NOT WITHIN GROUT)

10. INSTALLATION INSTRUCTIONS SHALL BE FURNISHED WITH MANUFACTURER SUPPLIED INSTALLATION KIT.
    KIT SHALL INCLUDE:
    A. INSTALLATION INSTRUCTIONS
    B. PVC ANTI-SIPHON VENT PIPE AND ADAPTER
    C. OIL-RESISTANT CRUSHED CELL FOAM GASKET WITH PSA BACKING
    D. 3/8" STAINLESS STEEL BOLTS
    E. ANCHOR SHIELDS

WATER QUALITY MANHOLE (SNOUT) B

DRAWING NO. 260

REVISED 10-31-19

BEST MANAGEMENT PRODUCTS, INC.
53 MT. ARCHER RD.
LYME, CT 06371
TOLL FREE: (800) 504-8008 (888) 354-7585
WEB SITE: WWW.BMPPING.COM

WHEN ORDERING, SPECIFY IF THE STRUCTURE IN WHICH THE HOOD WILL BE ATTACHED IS FLAT OR ROUND.