## Appendix B

### STANDARD DETAILS

#### Manholes and Appurtenances

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>010</td>
<td>Standard Manhole</td>
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<tr>
<td>020</td>
<td>Manhole Base</td>
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<tr>
<td>030</td>
<td>Manhole Connections</td>
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<tr>
<td>040</td>
<td>Shallow Flat Top Manhole</td>
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<tr>
<td>050</td>
<td>Flat Top Manhole</td>
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<tr>
<td>060</td>
<td>Mechanical Inside Drop Manhole</td>
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<tr>
<td>080</td>
<td>Open Inside Drop Manhole</td>
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<td>090</td>
<td>Inside Drop Manhole, with Bowl</td>
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<tr>
<td>100</td>
<td>Manhole Step</td>
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<tr>
<td>110</td>
<td>Suburban and Standard Manhole Frame and Cover (Sanitary)</td>
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<tr>
<td>120</td>
<td>Stormwater Manhole Lid</td>
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<tr>
<td>130</td>
<td>Water Tight Manhole Frame and Cover</td>
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<tr>
<td>140</td>
<td>Concrete Manhole Closure Collar</td>
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<tr>
<td>150</td>
<td>Manhole Chimney Seal</td>
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<tr>
<td>160</td>
<td>Large Pre-Cast Concrete Manhole</td>
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<tr>
<td>170</td>
<td>Large Pre-Cast Concrete Manhole – Bases</td>
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<td>180</td>
<td>Large Pre-Cast Concrete Manhole – Types</td>
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<tr>
<td>190</td>
<td>Large Pre-Cast Concrete Manhole Base Slabs</td>
</tr>
<tr>
<td>200</td>
<td>Large Pre-Cast Concrete Manhole – Long. Base Section Reinforcement</td>
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<tr>
<td>210</td>
<td>Large Pre-Cast Concrete Manhole – Base Section Reinforcement 108” &amp; 120”</td>
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<td>220</td>
<td>Large Pre-Cast Concrete Manhole – Top Slabs</td>
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<tr>
<td>230</td>
<td>T- Top Manhole with 48” Riser</td>
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<td>250</td>
<td>Water Quality Manhole (Snout) A</td>
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<tr>
<td>260</td>
<td>Water Quality Manhole (Snout) B</td>
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<tr>
<td>270</td>
<td>Flow Control Structure Detail</td>
</tr>
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#### Storm Structures

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<th>Code</th>
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<tr>
<td>300</td>
<td>Gutter and Curb Inlet Catch Basin (CG – 2)</td>
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<tr>
<td>310</td>
<td>Gutter and Curb Inlet Catch Basin (CG – 2) Reinforcement</td>
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<tr>
<td>320</td>
<td>Catch Basin Frame and Grate (CG – 2)</td>
</tr>
<tr>
<td>330</td>
<td>Inlet Catch Basin (CG – 30)</td>
</tr>
<tr>
<td>340</td>
<td>Inlet Catch Basin (CG – 48)</td>
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<td>Curb Inlet Manhole (CG - 48 M.H.)</td>
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<td>Modified Curb Inlet Manhole (MOD.CG – 48 M.H.)</td>
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<td>370</td>
<td>Top – Curb Inlet Manhole and Modified Curb Inlet Manhole (CG – 48M.H. and MOD. CG – 48 M.H.)</td>
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<td>380</td>
<td>Area Drain Type II</td>
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<td>390</td>
<td>Ditch Inlet</td>
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<tr>
<td>400</td>
<td>Ditch Inlet Frame and Grate</td>
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</tbody>
</table>
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500 Standard Cleanout
510 Cleanout Frame and Cover
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530 Inserta – Tee
550 Concrete Cap
560 Concrete Encasement / Closure Collar
570 Concrete Anchor Wall
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720 Outflow Control Structure
730 Orifice Plate and Guide
740 Chain Link Fence and Gate
750 Concrete Spreader Detail
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770 Rip Rap Specifications
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805 Matting Slope Installation
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820 Outlet Protection - Rip Rap
825 Outlet Protection - Stilling Basin
830 Surface Roughening - Cat Tracking
835 Surface Roughening - Stair Stepping/Grooving Slopes
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850 Diversion Dike/Swale

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860 Oak Mats
865 Tire Wash - Manual Hose Wash
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1007  Force Main Pressure Gauge
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1011  Reduced Pressure Backflow Preventer
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1071  Electrical One-Line Diagram (E01)
1072  Electrical Interior Enclosure-01 (E02)
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1280  24-Hour Rainfall Depths
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NOTES:

2. SEE STD DRAWING 020 FOR Poured IN PLACE CONCRETE MANHOLE BASE.
3. ALL JOINTS AND RUBBER GASKETS SHALL CONFORM TO THE REQUIREMENTS OF ASTM C-443.
4. 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 130.
11. ALL JOINTS AND RUBBER GASKETS SHALL CONFORM TO THE REQUIREMENTS OF ASTM C-443.
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".

MANHOLE BASE

DRAWING NO. 020

REVISED 11-16
NOTES:
ALL PRE-CAST MANHOLE SECTIONS SHALL CONFORM TO THE REQUIREMENTS OF ASTM C-478 AND APPLICABLE PROVISIONS OF STANDARD DRAWING NO. 010.

ENCAPSULATED RUBBER GASKET

PVC PIPE

SANDED BELL FITTING

NON-SHRINKING GROUT

CONSTRUCT CHANNEL AND MIN 12" SHELF IN FIELD 1"/FT SLOPE

PIPE I.D.

6" MIN.

SMOOTH FINISH CHANNEL TO 3/4 VERTICAL HEIGHT OF PIPE

12" MINIMUM OF 3/4"-O" COMPACTED BASE ROCK

KOR-N-SEAL BOOT

PVC SANDED BELL

STAINLESS STEEL BAND

INTERCEPT PIPE

FLEXIBLE CONNECTOR

KOR-N-BAND INTERNAL

MANHOLE CONNECTIONS

DRAWING NO. 030

REvised 12-16
STANDARD MANHOLE FLAT TOP
W/ REINFORCEMENT
OR
RUBBER GASKET FLAT TOP
W/ REINFORCEMENT

STANDARD MANHOLE FRAME
AND COVER (TYPICAL)
SEE STD DRAWING #110

58" DIA.

6" MINIMUM OVERLAP

10" TYP

25"

48"

36" MAXIMUM

12" OF ¾"-O"
COMPACTED BASE
ROCK

#8 TYP MINIMUM CONCRETE

PIPE I.D.

RUBBER GASKET
FLAT TOP
(OPTIONAL)

#6 BAR AROUND OUTSIDE OF OPENING
#6 DIAGONALS BOTH SIDES OF OPENING
#6 6" O.C. BOTH WAYS

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".

SHALLOW FLAT TOP
MANHOLE

DRAWING NO. 040

CleanWater Services

REVISED 12-16
STANDARD MANHOLE FLAT TOP
W/REINFORCEMENT
OR
RUBBER GASKET FLAT TOP
W/REINFORCEMENT

#6 BAR AROUND OUTSIDE OF OPENING
#6 DIAGONALS BOTH SIDES OF OPENING
#6 6" O.C. BOTH WAYS

SMOOTH FINISH CHANNEL TO
3/4 VERTICAL HEIGHT OF
PIPE

12" MINIMUM OF 3/4"-0"
COMPACTED BASE ROCK

NON-SHRINKING GROUT

CONSTRUCT
CHANNEL AND MIN
12" SHELF IN FIELD
1"/FT SLOPE

PIPE

6" MIN.

48"

58" DIA.

36" MINIMUM, 59" MAXIMUM

RUBBER GASKET
FLAT TOP
(OPTIONAL)

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
DEEGER THAN 48" FROM FINISHED GRADE TO
I.E. OUT.

FLAT TOP MANHOLE

DRAWING NO. 050

REvised 12-16
SPECIFICATIONS:
1) CLAMP AND BRACKETS ARE TYPE 304 STAINLESS STEEL, 11 GAUGE (.1196")
2) 3/8" O PINCH BOLT AND NUTS IS TYPE 18-8 STAINLESS STEEL
3) REINER CLAMP/BRACKET AND ANCHOR OR APPROVED EQUIVALENTS.

**ANCHOR DETAIL**
N.T.S.

**CLAMP DETAIL**
N.T.S.

**MECHANICAL INSIDE DROP (OPTIONAL)**

- Standard tee fitting
- Inflow pipe
- Plug end
- Pipe length as required
- Watertight seal
- See detail #030 use modified sand collar per CWS approval
- Minimum of 2 clamps, maximum distance between clamps is 3' or additional clamps will be required
- Construct channel and shelf in field
- Grout to centerline of bend
- 45° deg bend
- Manhole wall

**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 02-17

[CleanWater Services Logo]
OPEN INSIDE DROP WITH BEAVER SLIDE

INSIDE DROP PIPE TO EXTEND A MINIMUM OF 1" BEYOND SHELF.

OPEN INSIDE DROP FOR LARGE DIAMETER PIPE

PRE CAST MANHOLE FOR LARGE DIAMETER PIPE. SEE STD. DRAWING NO. 160.

NON-SHRINKING GROUT WITH WATERTIGHT SEAL SEE STD DRAWING 030

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

PIPE 1/8

48" MAX. FOR STORM AND 24" MAX. FOR SANITARY

48" MAX. FOR STORM AND 12" MAX. FOR SANITARY

PIPE I.D.

NON-SHRINKING GROUT WITH WATERTIGHT SEAL SEE STD DRAWING 030

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

CONSTRUCT CHANNEL AND SLIDE SIMULTANEOUSLY

SMOOTH FINISH CHANNEL TO 3/4 VERTICAL HEIGHT OF PIPE

PIPE PROJECTING BEYOND INTERIOR SURFACE OF MANHOLE WALL IS NOT ALLOWED

OPEN INSIDE DROP MANHOLE
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.

ANCHOR DETAIL
N.T.S.

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 C150-1, 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.

LOCATE STEPS & MANHOLE Lid NEXT TO BOWL FOR MAINTENANCE ACCESS

LEGEND BELOW LADDER SHALL BE AT LEAST 12" IN WIDTH

INSIDE DROP BOWL

CLAMP DETAIL
N.T.S.

MANHOLE STEP
SEE DETAIL #100

48" MINIMUM

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

WATERTIGHT SEAL
SEE DETAIL #330

3'-0" MAXIMUM

45° BEND

CHANNEL BOTTOM

INSIDE DROP MANHOLE W/BOWL

DRAWING NO. 090

REvised 12-16
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 EPOXIED IN HOLES THAT ARE FREE OF MOISTURE AND DEBRIS. (EPOXY TO MEET ASTM C881).
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

CLEANWATER SERVICES

DRAWING NO. 110

REVISED 02-17
1" FLAT FACE LETTERING (RECESSED FLUSH)

1 1/2" PICKHOLE

(16) 3/4" HOLES AS SHOWN

COVER TOP

COVER BACK

SECTION VIEW

SEE DETAIL #110 FOR MANHOLE FRAME SPECIFICATIONS.

STORM WATER MANHOLE LID

DRAWING NO. 120

REVISED 12-06
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

SEE BOLT DOWN DETAIL

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 OMG 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 FUNCTION WITH EITHER THE STANDARD CAM LOCK QUARTER TURN PADLE, OR THE EXTENDED "SURCHARGE" PADLE.
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 PADLE WILL BE ASSEMBLED USING TWO STAINLESS STEEL 14 MM NUTS, 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 90 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 1/4 TURN OF OPERATION.
11. THE BOLT WILL BE OPERATED BY MEANS OF A SPECIALLY MADE OPENING KEY CONSISTING OF A SPECIAL SOCKET 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 DEBRIS 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 COMPRESSIVE STRENGTH OF 3000 PSI @ 28 DAYS.

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

FORM AS APPROVED

CONCRETE MANHOLE CLOSURE COLLAR

DRAWING NO. 140

REVISED 12-06
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 3/8" 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 RING AND CASTING FRAME SHALL BE SET IN NON-SHRINKING GROUT.
6. PRE CAST MANHOLE SECTIONS SHALL CONFORM TO THE REQUIREMENTS OF ASTM C-478, AND APPLICABLE PROVISIONS OF STANDARD MANHOLE DRAWING NO. 010.

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
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 C478.

STANDARD MANHOLE SECTION(S) SEE STD. DRAWING NO. 200 AND NO. 210

MAXIMUM THROUGH PIPE SIZES

<table>
<thead>
<tr>
<th>BARREL DIA.</th>
<th>MAX. PIPE DIA.</th>
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<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>
</tr>
<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>
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</tbody>
</table>

BREAK OUT MANHOLE WALL 2" MINIMUM, 4" MAXIMUM CLEAR OF PIPE WALL GROUT SPACE WITH NON-SHRINK GROUT.

CONCRETE FILL AS REQUIRED.

PRECAST OR CAST-IN-PLACE STANDARD BASE SLAB SEE STD. DRAWING NO'S. 180 AND 190.
NOTES: (MANHOLE BASES & BASE SECTIONS)
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: Expose hoop as required to weld dowels to hoop. Remove only enough concrete to accomplish weld. Patch before casting base to ensure no voids are present.

**PRECAST BASE SLAB TYPE 2**

CAST-IN-PLACE BASE

(OR PRECAST BASE TYPE 4)

<table>
<thead>
<tr>
<th>Type</th>
<th>Depth*</th>
<th>60”</th>
<th>72”</th>
<th>84”</th>
<th>96”</th>
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<tr>
<td>1</td>
<td>T_s</td>
<td>8.0”</td>
<td>9.0”</td>
<td>8.0”</td>
<td>9.0”</td>
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<tr>
<td>D Bars</td>
<td>#3 @ 12”</td>
<td>#3 @ 12”</td>
<td>#3 @ 12”</td>
<td>#4 @ 10”</td>
<td>#3 @ 10”</td>
</tr>
<tr>
<td>E Bars</td>
<td>#4 @ 12”</td>
<td>#4 @ 9”</td>
<td>#4 @ 9”</td>
<td>#4 @ 6”</td>
<td>#4 @ 8”</td>
</tr>
<tr>
<td>2</td>
<td>T_s</td>
<td>11.0”</td>
<td>12.0”</td>
<td>11.0”</td>
<td>12.0”</td>
</tr>
<tr>
<td>E Bars</td>
<td>#4 @ 12”</td>
<td>#4 @ 8”</td>
<td>#4 @ 9”</td>
<td>#5 @ 8”</td>
<td>#4” @ 7”</td>
</tr>
<tr>
<td>3</td>
<td>T_s</td>
<td>7.0”</td>
<td>9.0”</td>
<td>7.0”</td>
<td>9.0”</td>
</tr>
<tr>
<td>D Bars</td>
<td>#3 @ 12”</td>
<td>#3 @ 12”</td>
<td>#3 @ 12”</td>
<td>#4 @ 10”</td>
<td>#3 @ 10”</td>
</tr>
<tr>
<td>E Bars</td>
<td>#4 @ 12”</td>
<td>#4 @ 9”</td>
<td>#4 @ 9”</td>
<td>#4 @ 6”</td>
<td>#4 @ 8”</td>
</tr>
<tr>
<td>4</td>
<td>T_s</td>
<td>7.0”</td>
<td>9.0”</td>
<td>7.0”</td>
<td>9.0”</td>
</tr>
<tr>
<td>E Bars</td>
<td>#4 @ 12”</td>
<td>#4 @ 9”</td>
<td>#4 @ 9”</td>
<td>#4 @ 6”</td>
<td>#4 @ 8”</td>
</tr>
</tbody>
</table>

*Invert to Street Grade

Concrete: £ = 4,000 psi
Steel: f_y = 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 12-06
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>
<td>0'-15'</td>
</tr>
<tr>
<td>5</td>
<td>T_s</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>T_s</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

DRAWING NO. 190

REVISED 12-06
### 60”Ø Manhole Section

<table>
<thead>
<tr>
<th>INVERT TO STREET GRADE</th>
<th>( T_w = 5.0” )</th>
<th>( T_w = 6.0” )</th>
<th>( T_w = 6.75” )</th>
</tr>
</thead>
<tbody>
<tr>
<td>TYPE 1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0 Ft to 15 Ft</td>
<td>0.16</td>
<td>0.15</td>
<td>0.24</td>
</tr>
<tr>
<td>15 Ft to 30 Ft</td>
<td>0.32</td>
<td>0.18</td>
<td>0.53</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>( T_w = 6.0” )</th>
<th>( T_w = 7.0” )</th>
<th>( T_w = 7.75” )</th>
</tr>
</thead>
<tbody>
<tr>
<td>TYPE 1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0 Ft to 15 Ft</td>
<td>0.19</td>
<td>0.19</td>
<td>0.26</td>
</tr>
<tr>
<td>15 Ft to 30 Ft</td>
<td>0.33</td>
<td>0.28</td>
<td>0.58</td>
</tr>
</tbody>
</table>

"C" Bars—2 NO. 5 HOOPS 2” CLR. OF TOP OF MH BARREL \& 2 NO. 3 HOOPS 2” CLR. OVER PIPE BLOCKOUTS \*
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>( T_w = 7.0” )</th>
<th>( T_w = 8.0” )</th>
<th>( T_w = 8.75” )</th>
</tr>
</thead>
<tbody>
<tr>
<td>TYPE 1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0 Ft to 15 Ft</td>
<td>0.20</td>
<td>0.13</td>
<td>0.26</td>
</tr>
<tr>
<td>15 Ft to 30 Ft</td>
<td>0.33</td>
<td>0.23</td>
<td>0.59</td>
</tr>
</tbody>
</table>

"C" Bars—2 NO. 5 HOOPS 2” CLR. OF TOP OF MH BARREL \& 2 NO. 3 HOOPS 2” CLR. OVER PIPE BLOCKOUTS \*
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>( T_w = 8.0” )</th>
<th>( T_w = 9.0” )</th>
<th>( T_w = 9.75” )</th>
</tr>
</thead>
<tbody>
<tr>
<td>TYPE 1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0 Ft to 15 Ft</td>
<td>0.25</td>
<td>0.18</td>
<td>0.33</td>
</tr>
<tr>
<td>15 Ft to 30 Ft</td>
<td>0.41</td>
<td>0.26</td>
<td>0.77</td>
</tr>
</tbody>
</table>

"C" Bars—2 NO. 5 HOOPS 2” CLR. OF TOP OF MH BARREL \& 2 NO. 3 HOOPS 2” CLR. OVER PIPE BLOCKOUTS \*
REQ’D. FOR LESS THAN 2'-0" CLR. BETWEEN BLOCKOUT AND TOP OF SECTION.

---

**LARGE PRECAST CONCRETE MANHOLE—LONG BASE SECTION REINF.**

**DRAWING NO. 200**

**REVISION 12-06**

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*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.*
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 bands "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.

<table>
<thead>
<tr>
<th>MH Dia. (in)</th>
<th>Thickness (in)</th>
<th>Band Width</th>
<th>Depth to Invert (in)</th>
<th>Inside Pipe Dia. (in)</th>
<th>Additional reinforcement Required</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Tw min.</td>
<td>h=b min.</td>
<td>max.</td>
<td></td>
<td>Hoop Reinf. (h)</td>
</tr>
<tr>
<td></td>
<td>(in)</td>
<td>(in)</td>
<td>(ft)</td>
<td>(in)</td>
<td>Outside Face (in²/ft²)</td>
</tr>
<tr>
<td>108</td>
<td>9</td>
<td>1.00</td>
<td>15</td>
<td>54 – 60</td>
<td>.381</td>
</tr>
<tr>
<td>108</td>
<td>9</td>
<td>1.25</td>
<td>15</td>
<td>66 – 84</td>
<td>.381</td>
</tr>
<tr>
<td>108</td>
<td>10</td>
<td>1.75</td>
<td>15</td>
<td>54 – 60</td>
<td>.381</td>
</tr>
<tr>
<td>108</td>
<td>11</td>
<td>1.00</td>
<td>30</td>
<td>54 – 60</td>
<td>.790</td>
</tr>
<tr>
<td>108</td>
<td>12</td>
<td>1.25</td>
<td>30</td>
<td>66 – 84</td>
<td>.790</td>
</tr>
<tr>
<td>108</td>
<td>16</td>
<td>1.75</td>
<td>30</td>
<td>54 – 60</td>
<td>.790</td>
</tr>
<tr>
<td>120</td>
<td>10</td>
<td>1.00</td>
<td>15</td>
<td>54 – 72</td>
<td>.423</td>
</tr>
<tr>
<td>120</td>
<td>10</td>
<td>1.50</td>
<td>15</td>
<td>78 – 96</td>
<td>.423</td>
</tr>
<tr>
<td>120</td>
<td>11</td>
<td>2.00</td>
<td>15</td>
<td>54 – 72</td>
<td>.423</td>
</tr>
<tr>
<td>120</td>
<td>11</td>
<td>1.00</td>
<td>30</td>
<td>54 – 72</td>
<td>.880</td>
</tr>
<tr>
<td>120</td>
<td>14</td>
<td>1.50</td>
<td>30</td>
<td>78 – 96</td>
<td>.880</td>
</tr>
<tr>
<td>120</td>
<td>17</td>
<td>2.00</td>
<td>30</td>
<td>78 – 96</td>
<td>.880</td>
</tr>
</tbody>
</table>
# TOP SLAB "A"

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>6’ to 12’</td>
<td>4’-0” to 7’-0”</td>
<td>7’-1” to 22’-0”</td>
</tr>
<tr>
<td>Size</td>
<td>&quot;A&quot; Bars &quot;B&quot; Bars</td>
<td>&quot;A&quot; Bars &quot;B&quot; Bars</td>
</tr>
<tr>
<td>60”</td>
<td>8” No.5 @ 7½” No.5 @ 7½”</td>
<td>12” No.5 @ 9” No.5 @ 9”</td>
</tr>
<tr>
<td>72”</td>
<td>10” No.5 @ 7” No.5 @ 7”</td>
<td>12” No.5 @ 9” No.5 @ 9”</td>
</tr>
<tr>
<td>84”</td>
<td>11” No.5 @ 7” No.5 @ 7”</td>
<td>12” No.5 @ 6” No.5 @ 6”</td>
</tr>
<tr>
<td>96”</td>
<td>12” No.5 @ 6” No.5 @ 6”</td>
<td>12” No.5 @ 6” No.5 @ 6”</td>
</tr>
<tr>
<td>108”</td>
<td>N/A N/A N/A</td>
<td>12” No.6 @ 8” No.6 @ 8”</td>
</tr>
<tr>
<td>120”</td>
<td>N/A N/A N/A</td>
<td>12” No.6 @ 7” No.6 @ 7”</td>
</tr>
</tbody>
</table>

---

LARGE PRECAST CONCRETE MANHOLE TOP SLABS

DRAWING NO. 220

CleanWater Services

REVISED 12-06
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

"B" Reinf. ea. face in 15" wide band

"A" Reinf. all around

Class V pipe

CROSS SECTION

<table>
<thead>
<tr>
<th>D1 (IN.)</th>
<th>ADDITIONAL REINF. SQUARE INCHES (TOTAL)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>&quot;A&quot;</td>
</tr>
<tr>
<td>60 - 72</td>
<td>.177</td>
</tr>
<tr>
<td>78 - 96</td>
<td>.224</td>
</tr>
<tr>
<td>102 - 120</td>
<td>.265</td>
</tr>
</tbody>
</table>

T-TOP MANHOLE WITH 48" RISER

DRAWING NO. 230

REVISED 12-06
ALL SNOITS AND TRAPS FOR CATCH BASINS AND WATER QUALITY STRUCTURES SHALL BE 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.

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 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 INSTRUCTION AND USING MANUFACTURER'S INSTALLATION KIT.

SUMP VOLUME AVAILABLE PER DEPTH OF SUMP

36" MINIMUM  60" MAXIMUM
60" M.H. = 58.9 CF  98.1 CF
72" M.H. = 84.8 CF  141.3 CF
84" M.H. = 115.4 CF  192.4 CF

PROVIDE SPECIAL DETAIL FOR VOLUME REQUIREMENTS EXCEEDING 192.4 CF

SUMP VOLUME REQUIREMENTS
20 CF/.0 CF OF INFLOW
58.9 CF MINIMUM REQUIRED
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 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 AS SUPPLIED BY MANUFACTURER. (SEE INSTALLATION DETAIL)

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

Best Management Products, Inc.
53 Mt. Archer Rd.
Lyme, CT 06371
Toll Free: (800) 504-8008 (888) 354-7585
Web Site: www.bmpinc.com

INSTALLATION NOTE:
POSITION HOOD SUCH THAT BOTTOM FLANGE IS 18" BELOW THE PIPE INVERT.

WATER QUALITY MANHOLE (SNOUT) B

DRAWING NO. 260
REVISED 12-16
**Flow Control Structure Detail**

**Flow Control Structure Table**

<table>
<thead>
<tr>
<th>Diameter Of Manhole (In.)</th>
<th>60&quot; MIN</th>
</tr>
</thead>
<tbody>
<tr>
<td>F.L. (In)</td>
<td></td>
</tr>
<tr>
<td>F.L. (Out)</td>
<td></td>
</tr>
<tr>
<td>Outlet Pipe Diameter (In.)</td>
<td></td>
</tr>
<tr>
<td>Number Of Orifice</td>
<td></td>
</tr>
<tr>
<td>Orifice A Elevation</td>
<td></td>
</tr>
<tr>
<td>Diameter Of Orifice A (In.)</td>
<td></td>
</tr>
<tr>
<td>Orifice B Elevation</td>
<td></td>
</tr>
<tr>
<td>Diameter Of Orifice B (In.)</td>
<td></td>
</tr>
<tr>
<td>Orifice C Elevation</td>
<td></td>
</tr>
<tr>
<td>Diameter Of Orifice C (In.)</td>
<td></td>
</tr>
<tr>
<td>Overflow Elevation</td>
<td></td>
</tr>
<tr>
<td>Rim Elevation</td>
<td></td>
</tr>
</tbody>
</table>
PLAN VIEW – STANDARD CURB AND GUTTER

SECTION A–A

SECTION B–B

NOTES:

1. CATCH BASIN SHALL BE CONSTRUCTED IN ACCORDANCE WITH ASTM C–478.
2. INSTALL STRUCTURE ON MINIMUM OF 8” OF ¾”–0” COMPACTED BASE MATERIAL.
3. REINFORCEMENT FOR PRE CAST CATCH BASIN SHALL BE REBAR MEETING ASTM A–615 GRADE 60 OR WELDED WIRE MEETING ASTM A–497.
4. ALL Poured IN–PLACE CONCRETE SHALL HAVE A 28 DAY STRENGTH OF 3000 P.S.I. AND A SLUMP OF 2” TO 4”.
5. CHANNEL REQUIRED IN FLOW THROUGH APPLICATIONS, AS APPROVED. ALL OTHER APPLICATIONS REQUIRE AN 18” SUMP BELOW LOWEST PIPE INLET.
6. FULL CURB EXPOSURE REQUIRED CANNOT BE LOCATED IN SIDEWALK RAMPS OR RAMP WINGS.

GUTTER & CURB INLET
CATCH BASIN (CG–2)

DRAWING NO. 300
REVISED 09–16
PLAN

SEE STD DRAWING NO. 320 FOR FRAME AND COVER.

SECTION A-A

GUTTER & CURB INLET CATCH BASIN (CG-2) REINFORCEMENT

DRAWING NO. 310

REvised 12-06
NOTE:
FRAME AND GRATE TO BE NEW STRUCTURAL ASTM A-36 FLAT BAR STEEL OR APPROVED EQUAL.
NOTES:

1. ALL Poured IN PLACE CONCRETE SHALL HAVE A 28 DAY STRENGTH OF 3000 P.S.I. AND A SLUMP OF 2" TO 4".
2. INSTALL STRUCTURE ON MINIMUM OF 8" OF 3/4" TO 0" COMPACTED BASE MATERIAL.
3. NON-SUMP INLET CATCH BASING SHALL BE CHANNELED (E.G. FLOW THROUGH GBS).

INLET CATCH BASIN (CG-30)

Drawing No. 330
Revised 12-16

CleanWater Services
NOTES:

1. ALL FABRICATED METAL PARTS SHALL BE NEW STRUCTURAL, ASTM A-36 STEEL, AND BE HOT-DIPPED GALVANIZED AFTER FABRICATION.

2. ALL Poured IN PLACE CONCRETE SHALL HAVE A 28 DAY STRENGTH OF 3000 P.S.I. AND A SLUMP OF 2" TO 4".

3. INSTALL STRUCTURE ON MINIMUM OF 6" OF ¾" TO 0" COMPACTED BASE MATERIAL.

4. NON-SUMP INLET CATCH BASINS SHALL BE CHANNELED (E.G. FLOW THROUGH CBS).

INLET CATCH BASIN (CG-48)

DRAWING NO. 340

REVISED 12-16
SECTION B-B

Maximum 27" from top of first step to top of lid.

Slope to match sidewalk

SECTION A-A

Pipe sizes variable

18" Sump

12" minimum of 3/4" to 0" compacted base material

Plan View

See Std. Drawing No. 370 for top section details

Upper section to be 48" drain inlet. See Std. Drawing No. 370.

5" weep hole located at base of aggregate

6" for poured in place 5" with reinforcement for pre cast

Notes:
1. Pre cast catch basin shall be constructed in accordance with ASTM C-478.
2. Non-sump inlet manhole shall be channeled.
3. All poured in place concrete shall have a 28 day strength of 3000 psi and a slump of 2" to 4"

6" bench sloped to center to facilitate cleaning.

Curb Inlet Manhole (CG-48 M.H.)

Drawing No. 350

CleanWater Services

Revised 01-13
SLOPE TOP TO MATCH SIDEWALK SLOPE

MAXIMUM OF 27" FROM TOP OF FIRST STEP TO TOP OF LID.

MANHOLE STEPS SEE STD. DRAWINGS NO. 100

PAINED ROAD SURFACE

DEPRESS CUTTER BAR 2-1/2" BELOW NORMAL AT FACE

UPPER SECTION TO BE 48" DRAIN INLET. SEE STD. DRAWING NO. 370.

3" WEEP HOLE LOCATED AT BASE OF AGGREGATE

4" MIN.

SLOPE 2" MINIMUM

POURED CONCRETE BASE 3000 P.S.I. AT 28 DAYS (COMMERCIAL MIX)

ALL PRE CAST MANHOLE SECTIONS SHALL CONFORM TO THE REQUIREMENTS OF ASTM C-476, AND APPLICABLE PROVISIONS OF STANDARD MANHOLE DRAWING NO. 010.

ALL JOINTS TO BE RAM-NICK JOINT MATERIALS OR EQUIVALENT-ALT. GROUT

6" BENCH SLOPED TO CENTER TO FACILITATE CLEANING.

6" MIN. 3/4"-0 AT 90% COMP.

5" MINIMUM

6" MIN. 3/4"-0 AT 90% COMP.

12" 3/4"-0 BASE MATERIAL 90% COMPACTION

1. NON-SUMP INLET MANHOLE SHALL BE CHANNELLED.
2. SEE STD. DRAWING NO. 370 FOR TOP SECTION DETAILS

APPROVED FOR USE BY WASHINGTON COUNTY ONLY.

MODIFIED CURB INLET MANHOLE (MOD.CG-48MH)

DRAWING NO. 360

REVISED 01-13

CleanWater Services
TOP-CURB INLET MANHOLE AND MODIFIED CURB INLET MANHOLE
(CG-48 M.H. AND MOD. CG-48 M.H.)

PLAN VIEW

SECTION A-A

SECTION B-B

SECTION C-C

SECTION D-D

NOTE:
MATERIAL SHALL BE NEW STRUCTURAL ASTM A-36 STEEL
SEE STD. DRAWING NO. 320 FOR FRAME AND GRATE

PLAN VIEW

SECTION A–A

SECTION B–B

NOTES:

1. ALL PRE CAST SECTIONS SHALL CONFORM TO REQUIREMENTS OF ASTM C-478.
2. INSTALL STRUCTURE ON MIN. OF 8" OF 3/4"–0" COMPACTED BASE MATERIAL.
3. PRE CAST REINFORCEMENT SHALL BE REBAR MEETING ASTM A615 GRADE OR WELDED WIRE MEETING ASTM A497.
4. ALL Poured INPLACE CONCRETE SHALL HAVE A 28 DAY STRENGTH OF 3000 P.S.I. AND A SLUMP OF 2" TO 4".
5. AREA DRAINS IN REAR OR SIDE YARDS SHALL NOT BE SUMPED AND SHALL BE PROPERLY CHANNELIZED. DITCH INLETS SHALL BE EQUIPPED WITH AN 18" SUMP.
6. PRE–CAST STRUCTURE'S CONFORMING TO O.D.O.T. TYPE G–2 CATCH BASIN INLET ARE AN ACCEPTABLE ALTERNATE. (ALL GRATE MATERIALS AND DIMENSIONS SHALL MEET C.W.S. STANDARDS AS SHOWN ON DETAIL #320)

AREA DRAIN
TYPE II

DRAWING NO. 380

CleanWater Services

REVISED 01–13
SEE STD. DRAWING NO. 400 FOR FRAME AND GRATE

PLAN

SECTION A-A

SECTION B-B

NOTES:

1. ALL PRE CAST SECTIONS SHALL CONFORM TO REQUIREMENTS OF ASTM C-478.
2. INSTALL STRUCTURE ON MINIMUM OF 8" OF 3/4" – 0" COMPACTED BASE MATERIAL.
3. PRE CAST REINFORCEMENT SHALL BE REBAR MEETING ASTM A615 GRADE 60 OR WELDED WIRE MEETING ASTM A497.
4. ALL POURED IN PLACE CONCRETE SHALL HAVE A 28 DAY STRENGTH OF 3000 PSI AND SLUMP OF 2" TO 4".
5. PRE-CAST STRUCTURE'S CONFORMING TO O.O.O.T. TYPE G-2 CATCH BASIN DESIGN/WITH DITCH INLET TOP ARE AN ACCEPTABLE ALTERNATE. ALL GRATE MATERIALS SHALL MEET C.W.S. STANDARDS AS SHOWN ON DETAIL #400.

DITCH INLET
NOTES:
FRAME AND GRATE SHALL BE NEW STRUCTURAL ASTM A-36 FLAT BAR STEEL OR APPROVED EQUAL.
STANDARD CLEANOUT

NOTE:
1. CONCRETE ENCASE ENTIRE WYE SECTION AND 45° BEND IF CONCRETE PIPE.
2. STAND PIPE TO BE SAME SIZE AS MAINLINE UP TO AND INCLUDING 8" PIPE. MAINLINE GREATER THAN 8" SHALL HAVE A 8" STANDPIPE.

CONCRETE COLLAR
STANDARD MANHOLE
GRADE RING
(NON–TRAFFIC APPLICATIONS)

WATERTIGHT PIPE PLUG
WITH STOPS OR
WATERTIGHT THREADED
CAP AS APPROVED BY
LOCAL JURISDICTION.

FINISH GRADE
(ASPHALT, CONCRETE, OR OTHER)

CONCRETE ENCASED
BOTTOM OF WYE
FOR PLASTIC PIPE

3/4"–0

3/4"–0

1" MIN.
OVERLAP

2" MIN.
CLEARANCE

STANDARD CAST IRON
FRAME AND COVER
DRAWING NO. 510

CONCRETE ENCASED
BETWEEN CLEANOUT PIPE
AND GROUT COLLAR.

PROVIDE 1/2" GAP (MAX.)
BETWEEN CLEANOUT PIPE
AND GROUT COLLAR.

PROVIDE 3/4"–0 FOR
A MINIMUM OF 6" AROUND CLEANOUT

6" MIN.
CLEANOUT FRAME AND COVER

NOTES:
1. ¼" ALLEN HEAD BOLTS
   1" LONG RECESSED.
2. ALL PERMANENT CLEANOUTS
   TO HAVE BOLT DOWN COVERS.
3. MATERIAL SHALL BE GRAY
   CAST-IRON, ASTM A-48,
   CLASS 30.

DETAIL
1. ALL STORM AND SANITARY SERVICE LATERALS SHALL BE MARKED ON THE TOP FACE OF CURB AS FOLLOWS:
   • STORM DRAIN LATERALS "D"  
   • SANITARY SEWER LATERALS "S"  
2. LETTERS SHALL HAVE ¼" MAX. WIDTH AND A MAX HEIGHT OF 4"  
3. LETTER SHALL BE CENTERED ON TOP FACE OF CURB.  

**CURB STAMP DETAIL**

**NOTES:**

1. FOR NEW CONSTRUCTION ALL SIDE SEWER AND SIDE STORM PIPELINE CONNECTIONS TO 8" AND 10" MAINS SHALL BE WITH FACTORY FABRICATED "TEE" FITTINGS UNLESS OTHERWISE APPROVED.  
2. PIPE MATERIAL SHALL BE ONE OF THE FOLLOWING:  
   A. PVC ASTM-D3034, ASTM-D900  
   B. DUCTILE IRON CLASS 50  
   (STORM ONLY)  
   C. A=2000 PVC ASTM 949  
   D. PVC RIB MEETING ASTM D 1784  
   E. CPP MEETING AASHTO M252  

LABEL MAGNETIC TAPE WITH BLACK LETTERING STATING THE FOLLOWING:  
FOR SANITARY: "CAUTION SEWER BURIED BELOW."  
FOR STORM: "CAUTION STORM DRAIN BURIED BELOW."  
PLACE 18" ABOVE TOP OF PIPE AND AGAINST 2X4.  

**SIDE SEWER / SIDE STORM PIPELINE**

DRAWING NO. 520  
REVISED 12-16
1. PVC HUB SHALL CONFORM TO ASTM 3034, SDR 35 DRIVE INTO CENTER OF RUBBER SLEEVE AFTER SLEEVE IS PLACED IN HOLE.

2. STAINLESS STEEL BAND SECURES UPPER HALF OF RUBBER SLEEVE TO THE PVC HUB. STAINLESS STEEL BAND SHALL BE 300 SERIES, \( \frac{3}{16} \)" BAND WIDTH, CADMIUM PLATED CARBON STEEL, AND ATTACHED WITH HEX HEAD SLOTTED SCREW.

3. COMPLETE RUBBER SLEEVE INCLUDES A MOLDED SEGMENT THAT HOLDS IT IN PLACE.

NOTES:
1. ALL INSERTA-TEE HOLES SHALL BE MACHINE DRILLED AND CORED.
2. INSERTA-TEES ARE NOT ALLOWED IN NEWLY CONSTRUCTED SEWER MAINS WITH AN INSIDE DIAMETER (I.D.) OF 10 INCHES OR SMALLER.
3. SEWER MAIN SHALL BE TWO SIZES (NOMINAL I.D.) LARGER THAN THE INSERTA-TEE.
CONCRETE CAP

NOTE:
CONCRETE SHALL HAVE A 28 DAY STRENGTH OF 3000 PSI AND 2" TO 4" SLUMP.
NOTE:
1. CONCRETE SHALL HAVE A 28 DAY STRENGTH OF 3000 PSI AND, 2" TO 4" SLUMP.
2. PRIOR TO INSTALLING THE CONCRETE ENSURE THE JOINT IS SEAL IN A MANNER AS NOT TO ALLOW CONCRETE TO ENTER INTO THE INTERIOR OF PIPE.
<table>
<thead>
<tr>
<th>SLOPE</th>
<th>MIN. ANCHOR SPACING CENTER TO CENTER</th>
</tr>
</thead>
<tbody>
<tr>
<td>20% - 34%</td>
<td>35'</td>
</tr>
<tr>
<td>35% - 50%</td>
<td>25'</td>
</tr>
<tr>
<td>51% +</td>
<td>15' OR CONC. ENCASEMENT</td>
</tr>
</tbody>
</table>

**NOTE:**
1. CONCRETE ANCHORS TO BE INSTALLED IMMEDIATELY DOWNHILL OF PIPE/ELL.
2. CONCRETE SHALL HAVE A 28 DAY STRENGTH OF 3000 PSI, AND 2" TO 4" SLUMP.
3. ODOT "METAL PIPE SLOPE ANCHORS" ARE AN ACCEPTABLE ALTERNATIVE, SEE DETAIL #580.

CONCRETE ANCHOR WALL

DRAWING NO. 570

REVISED 01-13
1. ALL PIPE STAKES AND HARDWARE TO BE GALVANIZED AFTER FABRICATION.

2. EITHER ALTERNATE "A" OR ALTERNATE "B" ANCHOR ASSEMBLY MAY BE USED AT CONTRACTOR'S OPTION FOR ANNULARLY CORRUGATED PIPE. ALTERNATE "A" TO BE USED WITH HELICALLY CORRUGATED PIPE.

3. EITHER TYPE 1 OR TYPE 2 PIPE STAKES MAY BE USED WITH EITHER ANCHOR ASSEMBLY ALTERNATE AT THE CONTRACTOR'S OPTION.

4. PLACE SLOPE ANCHOR ASSEMBLIES ON 6 M MAX. CENTERS. ON SLOPES 20 % OR GREATER.

5. PLATE MATERIAL TO BE ASTM A36M 6.3 MM GALVANIZE AFTER FABRICATION.

O.D.O.T. PIPE SLOPE ANCHOR

DRAWING NO. 580 REVISED: 12-16

CleanWater Services
TRENCH BACKFILL DETAILS

NOTE:
1. ALL COMPACTION REQUIREMENTS PER AASHTO T-99 AND ODOT/PAWA SPEC 00405.
2. THE TRENCH WIDTH AT THE SURFACE OF THE GROUND SHALL BE KEPT TO A MINIMUM NECESSARY TO INSTALL THE PIPE IN A SAFE MANNER.
3. THE MINIMUM TRENCH WIDTH IN THE PIPE ZONE SHALL PROVIDE A CLEAR WORKING SPACE OF SIX INCHES OUTSIDE THE MAXIMUM OUTSIDE DIAMETER OF THE PIPE BEING INSTALLED.
4. IN ALL CASES, TRENCHES SHALL BE OF SUFFICIENT WIDTH TO ALLOW FOR SHORING, PROPER JOINING OF PIPE, AND BACKFILLING OF MATERIAL ALONG THE SIDES OF THE PIPE.
TACK ALL EXPOSED MATERIAL PATCH AC TO GREATER OF 3" THICKNESS OR EXISTING.

EXISTING BASE ROCK

SAWCUT

12" MIN.

W + 24" MIN.

12" MIN.

EXISTING AC

3/4" = 0 CRUSHED ROCK

PIPE ZONE

BEDDING

NOTE:
1. TEE CUT TO BE DONE AFTER EXCAVATION AND BACKFILL OF TRENCH.
2. SEE STD. DRAWING NO. 590 FOR BEDDING, PIPE ZONE, AND TRENCH BACKFILL.
SEAL THE AREA BETWEEN THE END OF THE CASING AND PIPE BY FORCING GROUT INTO THE SPACE AROUND THE PIPE AT THE DIMENSIONS SHOWN.

SMOOTH STEEL PIPE CASING

FILL ANNULAR SPACE WITH SPECIFIED MATERIAL, LEAN GROUT, PEA GRAVEL, OR SAND AS APPROVED.

BEGIN AT THE FAR END AND FILL BACK TOWARD THE INSERTION HOLE.

AIR VENT AND FILLING POINTS SHALL BE REMOVED PRIOR TO GROUT PLUGS BEING INSTALLED.

PIE SEAL DETAIL

FILL BORE PIT WITH COMPACTED 3/4"-6 BACKFILL MATERIAL

NOTES:

1. PROVIDE PIPE NIPPLE AT TOP OF CASING, AT EACH END OF CASING OR AS SPECIFIED, FOR FILLING AND VERIFYING FILLING OPERATION. (MIN DIAMETER SIZE 4"

2. GROUT SHALL BE PUMPED TO FILL Voids AROUND THE CASING DURING THE INSTALLATION. ENGINEER DESIGN REQUIRED.

CASING PIPE:
6"-12" DIA. - 1/4" MIN. THICKNESS.
15"-24" DIA. - 5/16" MIN. THICKNESS.
OR AS SPECIFIED

SEWER PIPE AS SPECIFIED

Casing Section

STRAP PRESSURE TREATED WOOD OR PREFABRICATED SKIDS WITH BANDS, THREE PER PIPE MIN. SPACED TO SUPPORT PIPE TO ENSURE NO DEFORMATION. PREFABRICATED SKIDS SHALL BE INSTALLED PER MANUFACTURERS SPECIFICATIONS OR APPROVED EQUAL.
LIMITS OF CREEK CROSSING (VARIETY)

12' MIN. (TYP)

BOTH ENDS OF FABRIC SHALL BE KEYED IN A MINIMUM OF 6"

EXISTING CREEK BANK

Erosion control and revegetation mat material (woven bristle coir or an approved alt.) installation shall be per approved manufacturer's instructions

ALL DISTURBED CREEK BANK AREAS SHALL BE RESTORED, AS APPROVED, COMPACTED & REVEGETATED USING NATIVE PLANT LIST, AS REQUIRED.

MINIMUM OF 6" OVERLAP. EC MATTING MUST EXTEND NO LESS THAN 6" ABOVE ORDINARILY HIGH WATER LEVEL.

MEAN HIGH WATER LEVEL

1' MIN.

ROCK RIPRAP AS SHOWN ON THE ENGINEERED PLANS

DIMENSION VARIES

MINIMUM ODOT CLASS 100 RIP RAP REQUIRED. SEE STANDARD DRAWING #770

BENTONITE TRENCH DAM LOCATED 20 FEET HORIZONTALLY BEYOND MEAN HIGH WATER LEVEL (TYP) EXACT LOCATION TO BE DETERMINE BY DESIGN ENGINEER.

36" MINIMUM COVER (TYP) ABOVE PIPE ZONE SHALL BE COMPACTED NATIVE MATERIAL WITHIN LIMITS OF CREEK CROSSING, AS APPROVED

NEW PIPE LINE

PIPE ZONE AS SPECIFIED SEE STD DRAWING # 590

36" MINIMUM

PIPE BEDDING AS SPECIFIED

NOTES:
DIP, C-900, OR RCP REQUIRED BETWEEN 12" AND 36" OF DEPTH BELOW RIP RAP, AS APPROVED BY DISTRICT OR CITY.

CREEK CROSSING RESTORATION

CleanWater Services

DRAWING NO. 620

REVISED 12-16
**WATER QUALITY SWALE**

**DRAIN MIN #700**

**REVISION 12-06**

**CLEAN WATER SERVICES**

---

**Table:**

<table>
<thead>
<tr>
<th>EC MATTING</th>
<th>FREEBOARD AREA</th>
<th>TREATMENT AREA</th>
<th>FREEBOARD AREA</th>
<th>BUFFER/MITIGATION AREA</th>
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<tr>
<td><strong>ECONOJUTE</strong></td>
<td><strong>LOW GROW MIX</strong></td>
<td><strong>COCONUT FIBER OR GEOJUTE PLUS</strong></td>
<td><strong>LOW GROW MIX</strong></td>
<td><strong>ECONOJUTE</strong></td>
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<tr>
<td><strong>SEED MIX</strong></td>
<td><strong>SEE NOTE #5</strong></td>
<td><strong>NONE</strong></td>
<td><strong>SEE NOTE #5</strong></td>
<td><strong>AS APPROVED BY</strong></td>
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<tr>
<td><strong>MAX. SLOPE</strong></td>
<td><strong>2.5:1</strong></td>
<td><strong>4:1</strong></td>
<td><strong>FLAT BOTTOM</strong></td>
<td><strong>DISTRICT OR CITY</strong></td>
</tr>
</tbody>
</table>

| **2.5:1** | **4:1** | **FLAT BOTTOM** | **2.5:1** | **NA** |

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**NOTES:**

1. REFER TO APPENDIX A, CWS DESIGN & CONSTRUCTION STANDARDS, FOR LANDSCAPING REQUIREMENTS INCLUDING TREE PLACEMENT, TOPSOIL AND PLANTING SPECIFICATIONS.
2. PROVIDE IRRIGATION AS APPROVED BY CWS.
3. JUTE MATING– GEOJUTE PLUS IN TREATMENT AREA, ECONOJUTE FOR ALL OTHER AREAS, OR SIMILAR FABRICS. COCONUT FIBER IS ALSO ACCEPTABLE.
4. 12-INCHES OF TOPSOIL SHALL BE PLACED THROUGHOUT THE WATER QUALITY TRACT.
5. FREEBOARD AREA SEED MIX, DWARF TALL FESCUE 40%, DWARF PERENNIAL RYE 30%, CREEPING RED FESCUE 25%, COLONIAL BENT GRASS 5%. APPLY AT A RATE OF 120#/ACRE.

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**Diagram:**

- Vinyl clad chain link fencing
- See STD. DETAIL NO. 740
- River rock 2" - 3/4" 2.5'-3' deep
- Approved EC matting
- Freeboard area
- Treatment area 6' minimum width
- Freeboard area
- Buffer/mitigation area
CONSTRUCTION

1. Water Quality Swale shall be over-excavated and filled to final grade with 12-inch amended topsoil. Topsoil amendments shall be garden compost, not conventional fertilizer amendments.

2. A biodegradable Erosion Control Matting shall be placed over the topsoil throughout the swale cross section, fabric shall be held in place in accordance with the manufacturer's installation requirements. Anchor spacing shall be based on 3 fps flow over the fabric.
   a. Treatment area - high-density jute matting (Geojute Plus or other approved equal)
   b. All other areas - low-density jute matting (Econojute or other approved equal)

3. 2.5-3 inches of 2"-3" river run rock shall be placed over the matting evenly throughout the length and width of the swale.

4. Plant materials shall be placed in accordance with the plan and plant table as shown on approved plans.

5. The water quality swale treatment area plantings can be deemed "substantially complete" once active green growth has occurred to an average growth of 3" and plant density is an average of approx. 6 plants (minimum 1-inch plugs or equivalent) per square foot.

6. The facility shall be deemed acceptable to begin the maintenance period when plant growth and density matches the engineer's design as shown on the approved plans and all other requirements have been met. The engineer must certify the facility to be functional, in accordance with the approved plan design to begin the two-year maintenance period.

MAINTENANCE

1. The permittee is responsible for the maintenance of this facility for a minimum of two years following construction and acceptance of this facility per Chapter 2.

2. Irrigation is to be provided per separate irrigation plan as approved.
   Note: Irrigation needs are to be met using a temporary irrigation system with a timer during the dry season. Systems should be winterized during the wet season to assure longevity and guard against damage from freezing temperatures. Water source shall be as shown on the approved plans.

3. Engineer or Owners Representative is to visit and evaluate the site a minimum of twice annually (Spring and Fall). The landscaping shall be evaluated and replanted as necessary to ensure a minimum of 80% survival rate of the required vegetation and 90% aerial coverage. Non-native, invasive plant species shall be removed when occupying more than 20% of the site.

4. The facility shall be re-excavated and planted if siltation greater than 3 inches in depth occurs within the two-year maintenance period.
OUTFLOW CONTROL STRUCTURE

DRAWING NO. 720

REVISED 11-06

NOTES:
1. CONNECTING PIPE AND TEE SHALL BE 4", 6", OR 8" AWWA C-900 OR ASTM 3034 PVC, AND ONE SIZE LARGER THAN THE ORIFICE OPENING.
2. MAXIMUM ORIFICE OPENING SHALL BE 6" DIAMETER.
3. STRUCTURES SHALL CONFORM TO STANDARD DRAWING NO. 390 DITCH INLET.
4. FRAME AND GRATE SHALL CONFORM TO STANDARD DRAWING NO. 400, DITCH INLET FRAME AND GRATE.
5. PLATE AND GUIDE SHALL BE SECURED FLUSH AGAINST WALL OF STRUCTURE AS APPROVED.
6. MAINTENANCE ACCESS REQUIRED TO WITHIN 10' OF CENTER OF BOTH STRUCTURES.
7. FOR APPROVAL OF ALTERNATE STRUCTURES SEE SECTION 1.17.
SLOT SHALL BE 1"X5" CENTERED

ORIFICE SIZE
ORIFICE ELEVATION
ALN INVERT OF ORIFICE TO INVENT OF PIPE.

3 1/2" MIN.

2" MIN.

2" MIN.

2" MIN.

10" MINIMUM

6" (TYP.)

3"

12" MIN.

3" 1/2"

PLATE THICKNESS +/-1/4"

TOP OF GUIDE +/-3" BELOW GRATE

\( \frac{3}{8} \)" STAINLESS STEEL CHAIN OR CABLE ATTACHED TO ORIFICE PLATE AND STRUCTURE AS APPROVED. CHAIN OR CABLE SHALL BE SMALL ENOUGH TO ALLOW ORIFICE PLATE TO BE REMOVED FROM GUIDE. ORIFICE PLATE AND GUIDE TO BE MANUFACTURED FROM 1/2" HDPE OR 3/4" STAINLESS STEEL.

\( \frac{3}{8} \)" DIA. WEEP HOLES

\( \frac{3}{8} \)" SELF-TAPPING CONCRETE ANCHORS, PHILLIPS 5-12 OR APPROVED EQUAL. \( \frac{3}{8} \)" X 1-3/8" STAINLESS STEEL BOLT.

NOTE:
FOR MULTIPLE ORIFICE APPLICATION A 3" MIN. SPACER IS REQUIRED AS SHOWN. SPACER TO MATCH PLATE GUIDE DIMENSIONS, WIDTH, MATERIAL WITH A WATER TIGHT SEAL.
CONCRETE SPREADER DETAIL

TOP VIEW

SWALE FLOW LINE

4" Poured Concrete

CHANNEL WIDTH PER APPROVED PLAN

12"

FRONT VIEW

4" TOP SOIL

SIDE VIEW

12" WIDE TRENCH

4"
STEEL PIPE SPECIFICATIONS
ASTM A-53 STEEL, SCHEDULE 40,
BLACK, HOT DIPPED, ZINC-COATED, WELDED, SEAMLESS
4-INCH STEEL PIPE O.D. = 4.500" I.D. = 4.026" THICKNESS = 0.237
3 1/2-INCH STEEL PIPE O.D. = 4.000" I.D. = 3.549" THICKNESS = 0.226"

3 1/2" STEEL PIPE BOLLARD CAPPED AT TOP PRIME AND PAINT SAFETY YELLOW.
4" ROUND X 2" LONG STEEL COLLAR, WELDED TO BOLLARD.
WELD 2° ANGLE IRON TO CASING AND COLLAR DRILL 1/2" HOLES FOR PADLOCK
FINISH GRADE
4" STEEL PIPE CASING
POUR CONCREATE 6" THICK AROUND PIPE CASING.
GRAVEL BASE, 12" MINIMUM

REMOVABLE BOLLARD

DRAWING NO. 760
REVISED 12-06
RIPRAP:
• ROCK FOR RIPRAP SHALL BE ANGULAR IN SHAPE.
• THICKNESS OF A SINGLE ROCK SHALL NOT BE LESS THAN ONE-THIRD ITS LENGTH.
• ROUNDED ROCK WILL NOT BE ACCEPTED UNLESS APPROVED BY THE DISTRICT.

RIPRAP INSTALLATION:
• EXCAVATE BELOW FINISH GRADE TO DEPTH & DIMENSIONS SHOWN ON APPROVED PLANS.
• INSTALL WOVEN GEOTEXTILE FABRIC.
• PLACE RIP RAP TO FINISH GRADE.

GRADE RIPRAP SHALL BE THE CLASS AND SIZE OF ROCK ACCORDING TO THE FOLLOWING:

<table>
<thead>
<tr>
<th>CLASS</th>
<th>CLASS</th>
<th>CLASS</th>
<th>CLASS</th>
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<tr>
<td>50</td>
<td>100</td>
<td>200</td>
<td>700</td>
<td>2000</td>
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</table>

<table>
<thead>
<tr>
<th>WEIGHT OF ROCK (LBS)</th>
<th>PERCENT (BY WEIGHT)</th>
</tr>
</thead>
<tbody>
<tr>
<td>50-30</td>
<td>20</td>
</tr>
<tr>
<td>30-15</td>
<td>30</td>
</tr>
<tr>
<td>15-2</td>
<td>40</td>
</tr>
<tr>
<td>2-0</td>
<td>10</td>
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</table>
1" ABOVE FINISHED GRADE

3" WATERING BERM

REMOVE TWINE FROM AROUND BASE OF THE TREE, PUSH BURLAP AND ROPE FLAT AGAINST GROUND (TREATED OR SYNTHETIC BURLAP MUST BE REMOVED)

MULCH NO CLOSER THAN 1" FROM TRUNK
3"-4" COMPOSTED MULCH

ROOTBALL

LOosen AND MIX ORIGINAL SOIL WITH SHOVEL

SUBGRADE

3 x DIA OF ROOTBALL

NOTE: IF TREE IS CONTAINER GROWN STOCK, BREAK ROOT BALL APART BEFORE PLACING IN PLANTING HOLE. IF PLANT IS ROOT BOUND MAKE A VERTICAL CUT THROUGH THE LOWER 1/4 OF THE SOIL MASS. PULL OUT AND STRAIGHTEN LARGE, CIRCLING ROOTS.
12"X18" SIGNS SHALL BE PLACED IN A MANNER AS TO CLEARLY IDENTIFY THE SENSITIVE AREA AND VEGETATED CORRIDOR AS WELL AS AT ALL POINTS OF ENTRY SUCH AS THE BEGINNING OF PATHS, TRAIL HEADS AND ANY PLACE THAT THE PUBLIC MAY WANT OR BE ABLE TO ENTER AREA.

4"X4" SIGNS SHALL BE USED FOR AREAS WHERE A LARGE NUMBER OF SIGNS ARE NEEDED SUCH AS THE BACK OR SIDE YARDS ON EACH LOT ADJACENT TO THE SENSITIVE AREA OR VEGETATED CORRIDOR IN NEW SUBDIVISIONS OF PARTITIONS.
NOTES:

1. CHECK SLOTS TO BE CONSTRUCTED PER MANUFACTURERS SPECIFICATIONS.
2. STAKING OR STAPLING LAYOUT PER MANUFACTURERS SPECIFICATIONS.

MATTING CHANNEL INSTALLATION

DRAWING NO. 800

REvised 12-16

CleanWater Services
MATS/BLANKETS SHOULD BE INSTALLED VERTICALLY DOWNSLOPE.

TAMP SOIL OVER MAT/BLANKET

MIN. 4” OVERLAP

ISOMETRIC VIEW

TYPICAL SLOPE
SOIL STABILIZATION

NOT TO SCALE

NOTES:
1. SLOPE SURFACE SHALL BE FREE OF ROCKS, CLODS, STICKS AND GRASS. MATS/BLANKETS SHALL HAVE GOOD SOIL CONTACT.
2. APPLY PERMANENT SEEDING BEFORE PLACING BLANKETS.
3. LAY BLANKETS LOOSELY AND STAKE OR STAPLE TO MAINTAIN DIRECT CONTACT WITH THE SOIL. DO NOT STRETCH.
4. STAKING OR STAPLING LAYOUT PER MANUFACTURERS SPECIFICATIONS.

MATTING SLOPE INSTALLATION

DRAWING NO. 805

CleanWater Services

REVISED 12-16
NOTES:
1. MINIMUM 12” OVERLAP OF ALL SEAMS REQUIRED.
2. BARRIER REQUIRED @ TOE OF STOCK PILE.
3. COVERING MAINTAINED TIGHTLY IN PLACE BY USING SANDBAGS OR APPROVED EQUAL ON ROPES WITH A MAXIMUM 10’ GRID SPACING IN ALL DIRECTIONS.
4. PLASTIC TO EXTEND MINIMUM 1’ BEYOND TOE OF SLOPE.
FOR FURTHER INFORMATION ON DESIGN CRITERIA SEE CHAPTER 4 OF CLEAN WATER SERVICES EROSION PREVENTION AND SEDIMENT CONTROL PLANNING AND DESIGN MANUAL.

INTERCEPTOR DIKE

CMP OR HDPE APPROPRIATELY SIZED FOR EXPECTED FLOW

SCOUR HOLE

SEEDMENT FENCE ONLY REQUIRED WHEN DISCHARGING SEDIMENT LADEN WATER.

TEMPORARY SLOPE DRAIN

FLOW

EXISTING GRADE

6D

3D

1'

6”MIN.

1’MIN.

1’ MIN.

FLARED END OR TEE.

ANCHOR AT 5’ CENTERS.

NON-WOVEN GEOTEXTILE

SCOUR HOLE DETAIL

FRONT VIEW

SCOUR HOLE DETAIL

TOP VIEW

PIPE SLOPE DRAIN
NOTES:
1. BIO BAGS ONLY REQUIRED WHEN DISCHARGING SEDIMENT LADEN WATER.
2. STAKING OF BAGS REQUIRED WITH EITHER METHOD USING (2) 1"x 2" WOOD STAKES OR APPROVED EQUAL PER BAG.
OUTLET PROTECTION
STILLING BASIN

NOTES:
1. CONTRACTOR TO
   COMPLY WITH
   CONDITIONS AND
   REQUIREMENT OF
   DSL AND CORPS
   PERMITS.

FOR FURTHER INFORMATION
ON DESIGN CRITERIA SEE
CHAPTER 4 OF CLEAN WATER
SERVICES EROSION PREVENTION
AND SEDIMENT CONTROL
PLANNING AND DESIGN MANUAL.

DRAWING NO. 825
REvised 12-16
FOR FURTHER INFORMATION ON DESIGN CRITERIA SEE CHAPTER 4 OF CLEAN WATER SERVICES EROSION PREVENTION AND SEDIMENT CONTROL PLANNING AND DESIGN MANUAL.

STAIR STEPPING CUT SLOPES

Debris from slope above is caught by steps.

Water, soil, and fertilizer are held by steps. Plants can become established on the steps.

GROOVING SLOPES

Grooving is cutting furrows along the contour of a slope. Irregularities in the soil surface reduce runoff velocity, promote infiltration, and retain lime, fertilizer, and seed.

Surface Roughening Stair Stepping/Grooving Slopes

Drawing No. 835

Revised 12-16
FOR FURTHER INFORMATION ON DESIGN CRITERIA SEE CHAPTER 4 OF CLEAN WATER SERVICES EROSION PREVENTION AND SEDIMENT CONTROL PLANNING AND DESIGN MANUAL.

ROCK CHECK DAM

L = THE DISTANCE SUCH THAT POINTS A AND B ARE OF EQUAL ELEVATION

1' SLOPE OPTIONAL

SPACING BETWEEN CHECK DAMS

CHECK DAM ROCK

DRAWING NO. 840

REVISED 12-16
FOR FURTHER INFORMATION ON DESIGN CRITERIA SEE CHAPTER 4 OF CLEAN WATER SERVICES EROSION PREVENTION AND SEDIMENT CONTROL PLANNING AND DESIGN MANUAL.

PLAN VIEW

NOTES:
1. STAKING OF BAGS REQUIRED USING (2) 1"X2" WOOD STAKES OR APPROVED EQUAL PER BAG.
2. SURFACE MUST BE SMOOTH BEFORE APPLICATION.
3. CHECK DAMS CAN BE CONSTRUCTED USING STRAW WATTLE OR OTHER MATERIALS AS APPROVED BY THE DISTRICT OR CITY.

CHECK DAM BIO-FILTER BAG

DRAWING NO. 845

CleanWater Services

REVISED 12-16
FOR FURTHER INFORMATION ON DESIGN CRITERIA SEE CHAPTER 4 OF CLEAN WATER SERVICES EROSION PREVENTION AND SEDIMENT CONTROL PLANNING AND DESIGN MANUAL.

GRASS OR ROCK OR APPROVE EQUAL

ROW OR OTHER EXPOSED SLOPE

LEVEL BOTTOM

2 FEET MINIMUM; THE BOTTOM WIDTH SHALL BE LEVEL

DEPTH 1 FOOT MINIMUM

SIDE SLOPE 2H:1V OR FLATTER

GRADE MAXIMUM 5 PERCENT, WITH POSITIVE DRAINAGE TO A SUITABLE OUTLET (SUCH AS SEDIMENTATION POND)

DIVERSION SWALE

DIKE MATERIAL COMPACTED TO 95% PROCTOR

8' MIN.

DIKE MATERIAL COMPACTED TO 95% PROCTOR

SLOPE SPACING

<5% 300 FEET
5-10% 200 FEET
10-40% 100 FEET

NOTES:

1. IMMEDIATELY UPON CONSTRUCTION, ESTABLISHED VEGETATION OR EROSION CONTROL BLANKETS ARE REQUIRED.

DIVERSION DIKE / SWALE

DRAWING NO. 850 REVISED 12-16
FOR FURTHER INFORMATION ON DESIGN CRITERIA SEE CHAPTER 4 OF CLEAN WATER SERVICES EROSION PREVENTION AND SEDIMENT CONTROL PLANNING AND DESIGN MANUAL.

NOTES:
1. THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION THAT WILL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC RIGHT-OF-WAY. THIS MAY REQUIRE TOP DRESSING, REPAIR AND/OR CLEAN OUT OF ANY MEASURES USED TO TRAP SEDIMENT.
2. WHEN NECESSARY, WHEELS SHALL BE CLEANED PRIOR TO ENTRANCE ONTO PUBLIC RIGHT-OF-WAY.
3. WHEN WASHING IS REQUIRED, IT SHALL BE DONE ON AN AREA STABILIZED WITH CRUSHED STONE THAT DRAINS INTO AN APPROVED SEDIMENT TRAP OR SEDIMENT BASIN.
4. WHERE RUNOFF CONTAINING SEDIMENT LADEN WATER IS LEAVING THE SITE VIA THE CONSTRUCTION ENTRANCE, OTHER MEASURES SHALL BE IMPLEMENTED TO DIVERT RUNOFF THROUGH AN APPROVED FILTERING SYSTEM.
5. DIMENSIONS
   - SINGLE FAMILY: 20' LONG BY 20' WIDE 8" DEEP OF 3/4" MINUS CLEAN ROCK.
   - COMMERCIAL: 50' LONG BY 20' WIDE 3-6" CLEAN ROCK, GOVERNING AUTHORITY MAY REQUIRE GEOTEXTILE FABRIC TO PREVENT SUB-SOIL PUMPING.

CONSTRUCTION ENTRANCE
FOR FURTHER INFORMATION ON DESIGN CRITERIA SEE CHAPTER 4 OF CLEAN WATER SERVICES EROSION PREVENTION AND SEDIMENT CONTROL PLANNING AND DESIGN MANUAL.

2"x6"x16' OAK BOARDS

LIFTING CABLES

2"x6"x16' OAK BOARDS

2"x6"x8' OAK BOARDS

8'

16'

5'

OAK MATS

NOTES:

1. CONSTRUCTED OF 2"x6" OAK.

OAK MATS

DRAWING NO. 860

REVISED 12-16
CRUSHED AGGREGATE GREATER THAN 3 IN. BUT SMALLER THAN 6 IN.

SECTION A–A
NOT TO SCALE

CRUSHED AGGREGATE GREATER THAN 3 IN. BUT SMALLER THAN 6 IN.

SECTION B–B
NOT TO SCALE

PAVED ROADWAY
MATCH EXISTING GRADE

WASH RACK

DITCH TO CARRY RUNOFF TO A SEDIMENT TRAPPING DEVICE

TYPICAL TIRE WASH
NOT TO SCALE

WATER SUPPLY & HOSE

NOTES:
1. MANY DESIGNS CAN BE FIELD FABRICATED OR PRE-FABRICATED UNITS MAY BE USED

FOR FURTHER INFORMATION ON DESIGN CRITERIA SEE CHAPTER 4 OF CLEAN WATER SERVICES EROSION PREVENTION AND SEDIMENT CONTROL PLANNING AND DESIGN MANUAL.

TIRE WASH
(MANUAL HOSE WASH)

DRAWING NO. 865
REvised 12-16
NOTES:

1. CONTRACTOR TO REMOVE ACCUMULATED SEDIMENT AS NEEDED TO PREVENT TRACKING FROM TIRE WASH; SEDIMENT LADEN WATER MAY BE PIPED TO AN APPROVED SEDIMENT TRAP.

2. USE GEOTEXTILE FABRIC WITH AGGREGATE FOR A TEMPORARY TIRE WASH.

FOR FURTHER INFORMATION ON DESIGN CRITERIA SEE CHAPTER 4 OF CLEAN WATER SERVICES EROSION PREVENTION AND SEDIMENT CONTROL PLANNING AND DESIGN MANUAL.
ANGLE FILTER FABRIC FENCE TO ASSURE SOIL IS TRAPPED

INTERLOCKED 2"x 2" POSTS AND ATTACH

PLAN VIEW
NOT TO SCALE

NOTES:
1. BURY BOTTOM OF FILTER FABRIC 6" VERTICALLY BELOW FINISHED GRADE.
2. 2"x 2" FIR, PINE OR STEEL FENCE POSTS.
3. POSTS TO BE INSTALLED ON UPHILL SIDE OF SLOPE.
4. COMPACT BOTH SIDES OF FILTER FABRIC TRENCH.
5. PANELS MUST BE PLACED ACCORDING TO SPACING ON DETAIL NO.940

FILTER FABRIC MATERIAL 36" WIDE ROLLS

PROFILE
NOT TO SCALE

3' MINIMUM FROM TOE SLOPE
USE STITCHED LOOPS OVER 2"x 2" POSTS
2'-6" 4'-0"

FILTER FABRIC MATERIAL 36" WIDE ROLLS

2'-6"
4'-0"
6" MAXIMUM SPACING

1'-6"

FRONT VIEW
NOT TO SCALE

FOR FURTHER INFORMATION ON DESIGN CRITERIA SEE CHAPTER 4 OF CLEAN WATER SERVICES EROSION PREVENTION AND SEDIMENT CONTROL PLANNING AND DESIGN MANUAL.
FOR FURTHER INFORMATION
ON DESIGN CRITERIA SEE
CHAPTER 4 OF CLEAN WATER
SERVICES EROSION PREVENTION
AND SEDIMENT CONTROL
PLANNING AND DESIGN MANUAL.

PLACE WATTLE ALONG SLOPE CONTOURS.

PROFILE
NOT TO SCALE

STAGGER JOINTS

STAKING SPACING 4" O.C.

MINIMUM 1' OVERLAPPING ON UPHILL SIDE

FLOW

FLOW

STAKING STAKE

WHEAT STRAW, RYE
GRASS STRAW,
COCONUT OR
EXCELSIOR WATTLE

SECTION
NOT TO SCALE

NOTES:
1. STAKING SPECIFICATIONS:
   a. 1"X2" WOODEN STAKES
   b. ADDITIONAL STAKES MAY BE INSTALLED ON
      DOWNHILL SIDE OF WATTLE, ON STEEP SLOPE OR
      HIGHLY EROSIIVE SOILS.

2. SPACING IN ACCORDANCE WITH DETAIL 940.

3. REMOVE ALL ROCKS, CLÖSS, VEGETATION OR
   OTHER OBSTRUCTIONS SO THAT THE INSTALLED
   WATTLES WILL HAVE DIRECT CONTACT WITH THE
   SOIL.

4. INSTALL THE WATTLES IN A 2" DEEP TRENCH,
   INSURING THAT NO CAPS EXIST BETWEEN THE
   SOIL AND THE BOTTOM OF THE WATTLE. THE
   ENDS OF ADJACENT WATTLES SHALL BE
   OVERLAPPED 1 FT. MINIMUM TO PREVENT
   SEDIMENT PASSING THROUGH THE FIELD JOINT.

WATTLES

DRAWING NO. 880  REVISED 12-16

CleanWater Services
FOR FURTHER INFORMATION ON DESIGN CRITERIA SEE CHAPTER 4 OF CLEAN WATER SERVICES EROSION PREVENTION AND SEDIMENT CONTROL PLANNING AND DESIGN MANUAL.

PROPERTY LINE

PROPERTY LINE

FLOW

PROPERTY LINE

FLOW

PROPERTY LINE

FLOW

MINIMUM 1" OVERLAP ADJACENT WATTLE

MINIMUM 1" OVERLAP ADJACENT WATTLE

SIDEWALK

SEE STANDARD DRAWING # 880 FOR INSTALLATION OF WATTLE

PLAN VIEW

NTS

NOTES:

1. SEE STANDARD DRAWING # 880 FOR INSTALLATION OF WATTLE.

2. ALTERNATE MATERIALS MAY BE USED AS APPROVED BY DISTRICT OR CITY.

3. PERIMETER MEASURES INSTALLED AS NEEDED.

WATTLES
SINGLE FAMILY APPLICATION

DRAWING NO. 885

REVISED 12-16
NOTES:

1. Direct the outlet side of the rock/compost filter berms onto a stabilized area, such as vegetation and/or rock.

2. Embed rock filter berm a min. of 4" into the existing ground/embankment.

3. Use rock filter berm on 3:1 or flatter side slopes. Within the safety clear zone, use 6:1 or flatter on side slopes.

4. Place compost filter berm's along or on the ground contour with the ends turned up slope.

5. Prior to installing a compost filter berm in a vegetated area, ensure that the vegetation is cut to a height of no greater than 3" prior to installation.

6. Compost has not been chemically treated and is weed-free, plastic-free, decomposed, non-woody plant material; animal waste is not allowed.
Curb Construction Entrance

Direction of slope maximum 5%

Sidewalk Subgrade

Install sediment control measures at the corner and extend 6’ min along property line

Plan View

Existing ground

4’ min. width

4” min. depth

Plug all weep holes

Sidewalk Subgrades
2” layer of approved subbase material must be installed.

Profile

Notes:

1. Sidewalk subgrade can be used for all construction activities

For further information on design criteria see Chapter 4 of Clean Water Services Erosion Prevention and Sediment Control Planning and Design Manual.

Sidewalk Subgrade

Drawing No. 895

Revised 12-16
NOTES:

1. WASHOUT FACILITIES SHALL BE MAINTAINED TO PROVIDE ADEQUATE HOLDING CAPACITY WITH A MINIMUM FREEBOARD OF 12 INCHES.

2. WASHOUT FACILITIES MUST BE CLEANED, OR NEW FACILITIES MUST BE CONSTRUCTED AND READY FOR USE ONCE THE WASHOUT IS 75% FULL.

3. IF THE WASHOUT IS NEARING CAPACITY, VACUUM AND DISPOSE OF THE WASTE MATERIAL IN AN APPROVED MANNER.

4. TEMPORARY CONCRETE WASHOUT FACILITIES SHALL BE LOCATED A MINIMUM OF 50 FT FROM SENSITIVE AREAS INCLUDING OPEN DRAINAGE FACILITIES AND WATERSOURCES.

5. CONCRETE WASHOUT FACILITIES SHALL BE CONSTRUCTED AND MAINTAINED IN SUFFICIENT QUANTITY AND SIZE TO CONTAIN ALL LIQUID AND CONCRETE WASTE GENERATED BY WASHOUT OPERATIONS.

6. INSTALL CONCRETE WASHOUT SIGN WITHIN 30 FEET OF TEMPORARY CONCRETE WASHOUT FACILITY.

7. TEMPORARY CONCRETE WASHOUTS MAY BE A PREFABRICATED CONTAINER THAT IS PORTABLE AND REUSABLE.

CONCRETE WASHOUT

DRAWING NO. 900

REVISED 12-16

CleanWater Services
INSTALLATION NOTES:

1. Only allowed use of application is on CG-30 and CG-48 inlets unless approved by CWS.

2. Install wattle along inlet with wattle extending a min of 36" beyond inlet openings in each direction.

3. Wattle must be installed tightly against curb. May require additional measures to ensure wattle remains tight against curb, such as using zip-ties to secure wattle to inlet's trash bars or using sandbags to weight down wattle.

MAINTENANCE NOTES:

1. Any visible sign of sediment accumulation to be cleaned up at the end of each workday.

2. Replace wattle as necessary to prevent sediment from entering the storm system.
FOR FURTHER INFORMATION ON DESIGN CRITERIA SEE CHAPTER 4 OF CLEAN WATER SERVICES EROSION PREVENTION AND SEDIMENT CONTROL PLANNING AND DESIGN MANUAL.
NOTES:
1. ADDITIONAL MEASURES MUST BE CONSIDERED DEPENDING ON SOIL TYPES.

2. BIO-FILTER BAGS SHOULD BE STAKED WHERE APPLICABLE USING (2) 1"x2" WOODEN STAKES OR APPROVED EQUAL PER BAG.

3. WHEN USING 30" BIO-BAGS TO PROTECT A CATCH BASIN YOU MUST HAVE 4 BAGS AND THEY SHALL BE OVERLAPPED BY 6".

FOR FURTHER INFORMATION ON DESIGN CRITERIA SEE CHAPTER 4 OF CLEAN WATER SERVICES EROSION PREVENTION AND SEDIMENT CONTROL PLANNING AND DESIGN MANUAL.
NOTE:

1. RECESSED CURB INLET CATCH BASINS MUST BE BLOCKED WHEN USING FILTER FABRIC INLET SACKS. SIZE OF FILTER FABRIC INLET SACKS TO BE DETERMINED BY MANUFACTURER.

FOR FURTHER INFORMATION ON DESIGN CRITERIA SEE CHAPTER 4 OF CLEAN WATER SERVICES EROSION PREVENTION AND SEDIMENT CONTROL PLANNING AND DESIGN MANUAL.
FOR FURTHER INFORMATION ON DESIGN CRITERIA SEE CHAPTER 4 OF CLEAN WATER SERVICES EROSION PREVENTION AND SEDIMENT CONTROL PLANNING AND DESIGN MANUAL.

MAY BE USED SHORT TERM W / UTILITY WORK AND W / PHASING OF DEVELOPMENT TIGHT TO CURB

FLOW

CATCH BASIN

5"

FRONT

GROMMETS USED FOR ATTACHMENT TO GRATE 12" TYP.

26"

38"

48"

TOP

INSTALLATION NOTES:
1. INSTALL SOLID FABRIC SIDE DOWN MESH SIDE UP.
2. ATTACH TO CATCH BASIN GRATE AT A MINIMUM OF 3 LOCATIONS TIGHT TO CURB WITH 1/4" ZIP TIES.

MAINTENANCE NOTES:
1. ANY VISBILE SIGN OF SEDIMENT ACCUMULATION TO BE CLEANED UP AT THE END OF EACH WORKDAY.
2. REPLACE U-SHAPED FILTER BAG AS NECESSARY TO PREVENT WOOD CHIPS FROM ENTERING THE STORM SYSTEM.

INLET PROTECTION TYPE 6

DRAWING NO. 925 REVISED 12-16
FOR FURTHER INFORMATION ON DESIGN CRITERIA SEE CHAPTER 4 OF CLEAN WATER SERVICES EROSION PREVENTION AND SEDIMENT CONTROL PLANNING AND DESIGN MANUAL.

CROSS SECTION
NOT TO SCALE

NOTE: MAY BE CONSTRUCTED BY EXCAVATION OR BY BUILDING A BERM.

OVERFLOW SPILLWAY
10' MIN. LENGTH

2' SETTLING DEPTH & 1' DEPTH OF 2-4' ROCK (TOP)
1' DEPTH OF 3/4" - 1 1/2" WASHED GRAVEL (BOTTOM)

SEDIMENT TRAP OUTLET
NOT TO SCALE

NOTES:
1. A FILTER FABRIC FENCE OR SIMILAR FILTER MUST BE CONSTRUCTED TO FILTER RUNOFF FROM THE SEDIMENT TRAP PRIOR TO DISCHARGE FROM THE CONSTRUCTION SITE.

CleanWater Services
DRAWING NO. 930 REVISION 12-16
NOTES:

1. 50' MINIMUM OF HIGHLY VEGETATED AREA AND OR SEDIMENT FENCE IS REQUIRED PRIOR TO DISCHARGING TO STREAM OR WETLAND.

FOR FURTHER INFORMATION ON DESIGN CRITERIA SEE CHAPTER 4 OF CLEAN WATER SERVICES EROSION PREVENTION AND SEDIMENT CONTROL PLANNING AND DESIGN MANUAL.
### Spacing for Check Dams

<table>
<thead>
<tr>
<th>Ditch Grade</th>
<th>6 Inch</th>
<th>12 Inch</th>
<th>18 Inch</th>
</tr>
</thead>
<tbody>
<tr>
<td>6%</td>
<td>NOT ALLOWED</td>
<td>16 FT O.C.</td>
<td>26 FT O.C.</td>
</tr>
<tr>
<td>5%</td>
<td>NOT ALLOWED</td>
<td>20 FT</td>
<td>30 FT</td>
</tr>
<tr>
<td>4%</td>
<td>NOT ALLOWED</td>
<td>26 FT</td>
<td>40 FT</td>
</tr>
<tr>
<td>3%</td>
<td>15 FT</td>
<td>33 FT</td>
<td>50 FT</td>
</tr>
<tr>
<td>2%</td>
<td>25 FT</td>
<td>50 FT</td>
<td>80 FT</td>
</tr>
</tbody>
</table>

### Barrier Spacing for General Application

Install parallel along contours as follows:

<table>
<thead>
<tr>
<th>% Slope</th>
<th>Slope</th>
<th>Maximum Spacing on Slope</th>
</tr>
</thead>
<tbody>
<tr>
<td>10% or flatter</td>
<td>10:1 or flatter</td>
<td>300 FT</td>
</tr>
<tr>
<td>&gt;10% or &lt;15%</td>
<td>&gt;10:1 or &lt;7.5:1</td>
<td>150 FT</td>
</tr>
<tr>
<td>&gt;15% or &lt;20%</td>
<td>&gt;7.5:1 or &lt;5:1</td>
<td>100 FT</td>
</tr>
<tr>
<td>&gt;20% or &lt;30%</td>
<td>&gt;5:1 or &lt;3.5:1</td>
<td>50 FT</td>
</tr>
<tr>
<td>&gt;30% or &lt;50%</td>
<td>&gt;3.5:1 or &lt;2:1</td>
<td>25 FT</td>
</tr>
</tbody>
</table>

Notes:
1. For more information regarding these tables see Chapter 4 Tables 4-3 and 4-7 of Clean Water Services Erosion Prevention and Sediment Control Design Manual.

Spacing Tables

Drawing No. 940 Revised 12-16
NOTES:

1. WHEN RAINFALL AND RUNOFF OCCURS, A KNOWLEDGEABLE AND EXPERIENCED PERSON IN THE PRINCIPLES, PRACTICES, INSTALLATION, AND MAINTENANCE OF EROSION AND SEDIMENT CONTROLS WHO WORKS FOR THE PERMITTEE MUST PROVIDE DAILY INSPECTIONS OF THE EROSION AND SEDIMENT CONTROLS AND DISCHARGE OUTFALLS.

2. CONSTRUCTION ACTIVITIES MUST AVOID OR MINIMIZE EXCAVATION AND CREATION OF BARE GROUND FROM OCTOBER 1 THROUGH MAY 31ST EACH YEAR.

3. DURING WET WEATHER PERIOD, TEMPORARY STABILIZATION OF THE SITE MUST OCCUR AT THE END OF EACH WORK DAY.

4. SEDIMENT CONTROLS MUST BE INSTALLED AND MAINTAINED ON ALL DOWN GRADIENT SIDES OF THE CONSTRUCTION SITE AT ALL TIMES DURING CONSTRUCTION. THEY MUST REMAIN IN PLACE UNTIL PERMANENT VEGETATION OR OTHER PERMANENT COVERING OF EXPOSED SOIL IS ESTABLISHED.

5. ALL ACTIVE INLETS MUST HAVE SEDIMENT CONTROLS INSTALLED AND MAINTAINED AT ALL TIMES DURING CONSTRUCTION. UNLESS OTHERWISE APPROVED, A SURFACE MOUNTED AND ATTACHABLE, U-SHAPED FILTER BAG IS REQUIRED FOR ALL CURB INLET CATCH BASINS.


7. SEDIMENT MUST NOT BE INTENTIONALLY WASHED INTO STORM SEWERS, DRAINAGE WAYS, OR WATER BODIES.

8. SEDIMENT MUST BE REMOVED FROM BEHIND ALL SEDIMENT CONTROL MEASURES WHEN IT HAS REACHED A HEIGHT OF 1/3-RD THE BARRIER HEIGHT AND PRIOR TO THE CONTROL MEASURES REMOVAL.

9. CLEANING OF ALL STRUCTURES WITH SUMPS MUST OCCUR WHEN THE SEDIMENT RETENTION CAPACITY HAS BEEN REDUCED BY 50% AND AT COMPLETION OF PROJECT.

10. ANY USE OF TOXIC OR OTHER HAZARDOUS MATERIALS MUST INCLUDE PROPER STORAGE, APPLICATION, AND DISPOSAL.

11. THE PERMITTEE MUST PROPERLY MANAGE HAZARDOUS WASTES, USED OILS, CONTAMINATED SOILS, CONCRETE WASTE, SANITARY WASTE, LIQUID WASTE, OR OTHER TOXIC SUBSTANCES DISCOVERED OR GENERATED DURING CONSTRUCTION.

12. THE APPLICATION RATE OF FERTILIZERS USED TO REESTABLISH VEGETATION MUST FOLLOW MANUFACTURER'S RECOMMENDATIONS. NUTRIENT RELEASES FROM FERTILIZERS TO SURFACE WATERS MUST BE MINIMIZED. TIME RELEASE FERTILIZERS SHOULD BE USED AND CARE SHOULD BE MADE IN APPLICATION OF FERTILIZERS WITHIN ANY WATER WAY RIPARIAN ZONE.

13. OWNER OR DESIGNATED PERSON SHALL BE RESPONSIBLE FOR PROPER INSTALLATION AND MAINTENANCE OF ALL EROSION AND SEDIMENT CONTROL MEASURES, IN ACCORDANCE WITH CURRENT CLEAN WATER SERVICES STANDARDS AND STATE, AND FEDERAL REGULATIONS.


15. PRIOR TO ANY LAND DISTURBING ACTIVITIES, THE BMPS THAT MUST BE INSTALLED ARE GRAVEL CONSTRUCTION ENTRANCE, PERIMETER SEDIMENT CONTROL, AND INLET PROTECTION. THESE BMPS MUST BE MAINTAINED FOR THE DURATION OF THE PROJECT.

16. IF VEGETATIVE SEED MIXES ARE SPECIFIED, SEEDING MUST TAKE PLACE NO LATER THAN SEPTEMBER 1ST; THE TYPE AND PERCENTAGES OF SEED IN THE MIX ARE AS IDENTIFIED ON THE PLANS OR AS SPECIFIED BY THE DESIGN ENGINEER.

17. WATERTIGHT TRUCKS MUST BE USED TO TRANSPORT SATURATED SOILS FROM THE CONSTRUCTION SITE. AN APPROVED EQUIVALENT IS TO DRAIN THE SOIL ON SITE AT A DESIGNATED LOCATION USING APPROPRIATE BMPS; SOIL MUST BE DRAINED SUFFICIENTLY FOR MINIMAL SPILLAGE.

18. ALL PUMPING OF SEDIMENT LADEN WATER MUST BE DISCHARGED OVER AN UNDISTURBED, PREFERABLY VEGETATED AREA, AND THROUGH A SEDIMENT CONTROL BMP (I.E. FILTER BAG).

19. THE ESC PLAN MUST BE KEPT ONSITE. ALL MEASURES SHOWN ON THE PLAN MUST BE INSTALLED PROPERLY TO ENSURE THAT SEDIMENT LADEN WATER DOES NOT ENTER A SURFACE WATER SYSTEM, ROADWAY, OR OTHER PROPERTIES.

20. THE ESC MEASURES SHOWN ON THIS PLAN ARE THE MINIMUM REQUIREMENTS FOR ANTICIPATED SITE CONDITIONS. DURING THE CONSTRUCTION PERIOD, THESE MEASURES SHALL BE UPGRADED AS NEEDED TO MAINTAIN COMPLIANCE WITH ALL REGULATIONS.

21. WRITTEN ESC LOGS ARE SUGGESTED TO BE MAINTAINED ONSITE AND AVAILABLE TO DISTRICT INSPECTORS UPON REQUEST.

22. IN AREAS SUBJECT TO WIND EROSION, APPROPRIATE BMPS MUST BE USED WHICH MAY INCLUDE THE APPLICATION OF FINE WATER SPRAYING, PLASTIC SHEETING, MULCHING, OR OTHER APPROVED MEASURES.

23. ALL EXPOSED SOILS MUST BE COVERED DURING WET WEATHER PERIOD.

STANDARD EROSION CONTROL NOTES FOR SITES LESS THAN 1 ACRE

CleanWater Services

DRAWING NO. 945

REVISED 12-16
NOTES:
1. THE SEDIMENT BAG SHALL BE MANUFACTURED USING A POLYPROPYLENE 8 OZ. NON-WOVEN GEOTEXTILE SEWN INTO A BAG WITH A DOUBLE NEEDLE, USING A HIGH STRENGTH THREAD.
2. EACH STANDARD SEDIMENT BAG MUST HAVE A FILL SPOUT LARGE ENOUGH TO ACCOMMODATE A 4" DISCHARGE HOSE. STRAPS ARE ATTACHED TO SECURE THE HOSE AND PREVENT PUMPED WATER FROM ESCAPING WITHOUT BEING FILTERED.
3. THE SEDIMENT BAG SHALL MEET OR EXCEED OVERALL BAG REMOVAL EFFICIENCY RATE OF 97.55%.
4. WATER BEING DISCHARGED FROM THE SEDIMENT BAG MUST BE FREE OF ALL SEDIMENT PRIOR TO LEAVING THE SITE OR ENTERING INTO THE STORM SYSTEM.
5. INSTALLING A SEDIMENT BAG ON A SLOPE REQUIRES THE Incoming WATER TO FLOW DOWNHILL THROUGH SEDIMENT BAG WITHOUT CREATING MORE EROSION. THE NECK OF THE SEDIMENT BAG WILL BE STRAPPED TIGHTLY TO THE DISCHARGE HOSE SO AS IT DOES NOT PULL FREE WHEN FILLED.
6. SEDIMENT BAG IS FULL WHEN IT NO LONGER CAN EFFICIENTLY FILTER SEDIMENT OR ALLOW WATER TO PASS AT A RATE LESS THAN 50% OF MANUFACTURE'S DESIGNED FLOW RATE.
7. DURING USE, THE SEDIMENT BAG MUST BE MONITORED.
8. DISPOSE OF USED SEDIMENT BAG OFF SITE OR AS APPROVED BY CWS.
9. WHEN APPROPRIATE, INSTALL DOWNSTREAM SEDIMENT CONTROL MEASURES PER CWS STANDARDS.
### Wastewater Pump Station and Force Main
#### Design Data Summary Table

#### BASIN CHARACTERISTICS

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Location</td>
<td>Address and Cross street</td>
</tr>
<tr>
<td>Basin Area</td>
<td>XXX Acres</td>
</tr>
<tr>
<td>Equivalent Dwelling Units (EDU) Per Acre</td>
<td>X.X</td>
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<tr>
<td>Persons Per EDU</td>
<td>X.X</td>
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<tr>
<td>Population Equivalent</td>
<td>XXXX</td>
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<tr>
<td>Average per Capita Flow</td>
<td>XX GPD</td>
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<tr>
<td>Infiltration and Inflow, Peak Wet</td>
<td>XXX,XXX GPD</td>
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<tr>
<td>Weather Flow (PWWF)</td>
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<tr>
<td>Average Daily Flow (ADF)</td>
<td>XXX,XXX GPD</td>
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<tr>
<td>Peak Hourly Flow</td>
<td>XXX GPM</td>
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</table>

#### PUMP STATION

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Value</th>
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<tbody>
<tr>
<td>Type</td>
<td>Duplex submersible, non-clog, variable speed pumps</td>
</tr>
<tr>
<td>Capacity (per pump)</td>
<td>XXX gpm @ XX feet TDH (static head = XX ft)</td>
</tr>
<tr>
<td>Horsepower, HP</td>
<td>XX HP Each with Variable Frequency Drives</td>
</tr>
<tr>
<td>Motor Data</td>
<td>Xxx volt xphase xx cycle</td>
</tr>
<tr>
<td>Firm Capacity of Pump Station</td>
<td>X.XX MGD (XXX GPM)</td>
</tr>
<tr>
<td>Maximum Pump Starts Per Hour</td>
<td>X</td>
</tr>
<tr>
<td>Wet Well Volume</td>
<td>XXXXX gallons (pumps off to lead pump on)</td>
</tr>
<tr>
<td>Level Control Type</td>
<td>Bubbler with duplex Compressors and backup floats</td>
</tr>
<tr>
<td>Overflow Point</td>
<td>Manhole Number and Elevation</td>
</tr>
<tr>
<td>Overflow location</td>
<td>Description</td>
</tr>
<tr>
<td>Average Time to Overflow</td>
<td>Time and Description xx hours at yy gpm Design</td>
</tr>
<tr>
<td></td>
<td>Average Influent Flow</td>
</tr>
<tr>
<td>Telemetry</td>
<td>Auto-Dialer</td>
</tr>
<tr>
<td>Transfer Switch</td>
<td>Automatic</td>
</tr>
<tr>
<td>Standby Power Type</td>
<td>XXX kW stationary diesel-powered standby generator.</td>
</tr>
<tr>
<td>Fuel Tank Capacity</td>
<td>xx Hrs (XXX Gallons)</td>
</tr>
<tr>
<td>EPA Reliability Class</td>
<td>1</td>
</tr>
<tr>
<td>Flow Meter</td>
<td>X” Magnetic (Description)</td>
</tr>
<tr>
<td>Control</td>
<td>Constant Speed or VFD</td>
</tr>
</tbody>
</table>

**DATA TABLE SHEET 1 OF 2**

WASTEWATER PUMP STATION & FORCE MAIN DESIGN DATA TABLE

DRAWING NO. 1001       REVISED 01-07
## FORCE MAIN

<table>
<thead>
<tr>
<th>Type and Length</th>
<th>XXXX feet (Type?)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Forcemain Velocity</td>
<td>X.X feet per second</td>
</tr>
<tr>
<td>Profile</td>
<td>Description</td>
</tr>
<tr>
<td>Air Release Valve</td>
<td>Quantity? Description?</td>
</tr>
<tr>
<td>Discharge Location</td>
<td>Manhole Number and Elevation</td>
</tr>
<tr>
<td>Average Detention Time</td>
<td>XX hours</td>
</tr>
<tr>
<td>Sulfide Control System</td>
<td>Description?</td>
</tr>
</tbody>
</table>

## OPERATING LEVELS

<table>
<thead>
<tr>
<th>Ground Elevation xxx.xx?</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Overflow Alarm Elevation xxx.xx</td>
<td>Float Control System? (backup)</td>
</tr>
<tr>
<td>Lag Pump On/High Water Alarm Elevation xxx.xx</td>
<td>Float Control Backup</td>
</tr>
<tr>
<td>Lag Pump On/High Water Alarm Elevation xxx.xx</td>
<td>Ultrasonic (provide distance from wet well floor in feet) same as level indicator digital display.</td>
</tr>
<tr>
<td>Lead Pump On Elevation xxx.xx</td>
<td>Ultrasonic (provide distance from wet well floor in feet) same as level indicator digital display.</td>
</tr>
<tr>
<td>All Pumps Off Elevation xxx.xx</td>
<td>Ultrasonic (provide distance from wet well floor in feet) same as level indicator digital display.</td>
</tr>
<tr>
<td>Wetwell Floor Elevation xxx.xx</td>
<td>Ultrasonic (0.00 Feet)</td>
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</tbody>
</table>

## LANDSCAPING

<table>
<thead>
<tr>
<th>Landscaping Area</th>
<th>Square feet and Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Irrigation System</td>
<td>Type</td>
</tr>
<tr>
<td>Control Valves</td>
<td>Number and Type</td>
</tr>
<tr>
<td>Backflow Device</td>
<td>Size and Type</td>
</tr>
</tbody>
</table>

DATA TABLE SHEET 2 OF 2

WASTEWATER PUMP STATION & FORCE MAIN DESIGN DATA TABLE

DRAWING NO. 1002  REVISION 01-07
NOTES:
1. ALL FITTINGS, FASTENERS, & AND FABRIC TIES SHALL BE HOT DIP GALV.
2. CONC. SHALL BE MIN 2500 PSI & 28 DAYS.
3. PROVIDE BRACE RAIL BETWEEN END POSTS AND LINE POSTS, LENGTHS AS
   REQUIRED.
4. PROVIDE GATE STOP AND DROP RECEIVERS SET IN CONCRETE, EACH
   GATE.
5. PROVIDE EXTENSION ARMS ON LINE, END AND CORNER POSTS & GATE
   POSTS AS REQUIRED.
6. PROVIDE SIGHT OBSCURING SLATS WITH ALL WASTEWATER PUMP
   STATIONS.
7. CENTER BRACE RAIL NOT REQUIRED WITH FENCE HEIGHT OF 5' OR LESS.
8. ALL POSTS AND RAILS TO MATCH FENCE COLOR.

<table>
<thead>
<tr>
<th>MEMBER</th>
<th>NOMINAL DIA [IN]</th>
<th>MATERIAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>BRACE RAIL</td>
<td>1.660</td>
<td>GALV TUBULAR STL</td>
</tr>
<tr>
<td>GATE FRAME</td>
<td>2.00</td>
<td>GALV TUBULAR STL</td>
</tr>
<tr>
<td>LINE POSTS</td>
<td>2.375</td>
<td>GALV TUBULAR STL</td>
</tr>
<tr>
<td>END &amp; CORNER POSTS</td>
<td>2.875</td>
<td>GALV TUBULAR STL</td>
</tr>
<tr>
<td>CHAIN LINK FABRIC</td>
<td></td>
<td>G. L. W/ GREEN OR BLACK PVC COATING</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>GATE POST</th>
<th>NOMINAL DIA [IN]</th>
<th>MATERIAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>12' OR 15'</td>
<td>4</td>
<td>GALV TUBULAR STL</td>
</tr>
</tbody>
</table>
NOTES:

1. INSTALL GAUGE AS SHOWN ON 1/2" DUCTILE IRON PIPE SADDLE WITH STAINLESS STEEL STRAP.

2. ALL PIPE AND FITTINGS SHALL BE SCHEDULE 80 STAINLESS STEEL WITH THREADED ENDS.

3. INSTALL PRESSURE GAUGE AND DIAPHRAGM SEAL PER MANUFACTURERS’ REQUIREMENTS.

4. ACCEPTABLE ALTERNATIVE IS FLANGED ANNULAR SEAL, RED VALVE SERIES 45 OR APPROVED EQUAL WITH GLYCERIN FILL.
MOLDED FIBERGLASS ENCLOSURE, INSTALL ACCORDING TO MANUFACTURER INSTRUCTIONS, SECURE TO PAD WITH STAINLESS STEEL ANCHOR BOLTS.

HEAT TAPE JUNCTION BOX & THERMOSTAT

REDUCED PRESSURE BACKFLOW PREVENTER

PIPE SLEEVE, TYPICAL

6" THICK CONCRETE PAD, WIRE MESH (6" SQUARE) REINFORCED

3'-0" MINIMUM BURY

TO YARD HYDRANT

ELECTRICAL CONDUIT

1" DIAMETER WATER SERVICE

4" MINIMUM (TYPICAL)

2"

6" OF 3/4" MINUS CRUSHED ROCK, COMPACTED TO 95% MAXIMUM DRY DENSITY (STD PROCTOR)

NOTE:
1. WRAP EXPOSED WATER PIPE WITH HEAT TAPE AND PVC COATED PIPE INSULATION.
SAMPLE DRAWING
FULL SIZE DRAWING WILL BE PROVIDED IN AUTOCAD FORMAT BY
TREATMENT PLANT SERVICES AND SHALL BE USED BY DESIGN ENGINEER
IN PREPARING PUMP STATION CONSTRUCTION DRAWINGS.

Clean Water Services

PUMP STATION STANDARD DRAWINGS

FEBRUARY 2007
SAMPLE DRAWING
FULL SIZE DRAWING WILL BE PROVIDED IN AUTOCAD FORMAT BY TREATMENT PLANT SERVICES AND SHALL BE USED BY DESIGN ENGINEER IN PREPARING PUMP STATION CONSTRUCTION DRAWINGS.
SAMPLE DRAWING

FULL SIZE DRAWING WILL BE PROVIDED IN AUTOCAD FORMAT BY TREATMENT PLANT SERVICES AND SHALL BE USED BY DESIGN ENGINEER IN PREPARING PUMP STATION CONSTRUCTION DRAWINGS.

KEYED NOTES & NAMEPLATE DESIGNATIONS:

- EXISTING CONDITIONS
- UNLITED HOOD WITH LETTER
- EXIST NOTES A & B
- SEE DETAIL
- INSTALL STAINLESS STEEL CONDUIT IN SUPPORT
- 24" HOOK HOOD
- SEE NOTE C
- 4" X 4" GALVANIZED PIPE
- 3/8" STEEL PIPE
- 20000X PUMP STATION
- 2000X PUMP STATION
- ALARM 4 LEVEL BRACKET LIGHT (SEE NOTE A)
- STAINLESS STEEL CONDUIT IN SUPPORT

GENERAL NOTES:
A. MULTIPLE EXTERIOR EXHAUST EXHAUST DESIGNATED ON DRAWING. SHALL BE PROVIDED AS SHOWN AND SHALL BE DUCT TYPE.
B. EXTERIOR EXHAUST DUCTS BETWEEN PUMPS & PUMP ENCLOSURE SHALL PROVIDE AS SHOWN AND SHALL BE DUCT TYPE.
C. PUMP ENCLOSURE DESIGNATED OVER METER ENCLOSURE ON OUTSIDE FRONT OF ENCLOSURE & METER ENCLOSURE.
D. PUMP ENCLOSURE DESIGNATED OVER METER ENCLOSURE ON OUTSIDE FRONT OF ENCLOSURE & METER ENCLOSURE.
E. PVC DETAILS AND CONNECTIONS TO PAD SHOULD BE DESIGNED TO RESIST BENDING AND WIND LOADING.
F. PVC DETAILS AND CONNECTIONS TO PAD SHOULD BE DESIGNED TO RESIST BENDING AND WIND LOADING.
G. PVC DETAILS AND CONNECTIONS TO PAD SHOULD BE DESIGNED TO RESIST BENDING AND WIND LOADING.
H. PVC DETAILS AND CONNECTIONS TO PAD SHOULD BE DESIGNED TO RESIST BENDING AND WIND LOADING.
I. PVC DETAILS AND CONNECTIONS TO PAD SHOULD BE DESIGNED TO RESIST BENDING AND WIND LOADING.
J. PVC DETAILS AND CONNECTIONS TO PAD SHOULD BE DESIGNED TO RESIST BENDING AND WIND LOADING.
SAMPLE DRAWING
FULL SIZE DRAWING WILL BE PROVIDED IN AUTOCAD FORMAT BY TREATMENT PLANT SERVICES AND SHALL BE USED BY DESIGN ENGINEER IN PREPARING PUMP STATION CONSTRUCTION DRAWINGS.

KEYED NOTES & NAMEPLATE DESIGNATIONS:

<table>
<thead>
<tr>
<th>NO.</th>
<th>DEVICE</th>
<th>NAMEPLATE</th>
</tr>
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<tbody>
<tr>
<td>1</td>
<td>WEATHER PROOF ENCLOSURE</td>
<td>PUMP STATION XXX</td>
</tr>
<tr>
<td>2</td>
<td>LOAD CENTER</td>
<td>LOAD CENTER</td>
</tr>
<tr>
<td>3</td>
<td>PANEL HEATER W/ INTERREL. TEMPERATURE</td>
<td>CIRCUIT L A T</td>
</tr>
<tr>
<td>4</td>
<td>NOT USED</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>D R Y TYPE W ATHER BREAKER</td>
<td>D R Y TYPE WATHER BREAKER</td>
</tr>
<tr>
<td>6</td>
<td>D R Y TYPE WATHER</td>
<td>D R Y TYPE WATHER</td>
</tr>
<tr>
<td>7</td>
<td>G L A S S CABINET</td>
<td>GLASS CABINET</td>
</tr>
<tr>
<td>8</td>
<td>Q U I C K RECEPTACLE</td>
<td>QUICK RECEPTACLE</td>
</tr>
<tr>
<td>9</td>
<td>E X H I B I TED ELECTRIC SHEETS</td>
<td>EXHIBITED ELECTRIC SHEETS</td>
</tr>
<tr>
<td>10</td>
<td>NOT USED</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>AUTOMATIC TRANSFER SWITCH</td>
<td>AUTOMATIC TRANSFER SWITCH</td>
</tr>
<tr>
<td>12</td>
<td>NOT USED</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>PLACEMENT ADJUSTMENT INDICATED BY DOOR DRAWING</td>
<td>PLACEMENT ADJUSTMENT INDICATED BY DOOR DRAWING</td>
</tr>
<tr>
<td>14</td>
<td>CIRCUIT BOARD &amp; ENCLOSURE FAB. #1</td>
<td>CIRCUIT BOARD &amp; ENCLOSURE FAB. #1</td>
</tr>
<tr>
<td>15</td>
<td>NOT USED</td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>NOT USED</td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>TUBE ACCESS HINGE REEL AND DUCTOR</td>
<td>TUBE ACCESS HINGE REEL AND DUCTOR</td>
</tr>
<tr>
<td>18</td>
<td>PANEL BREAKER TRANSF.</td>
<td>PANEL BREAKER TRANSF.</td>
</tr>
<tr>
<td>19</td>
<td>HINGED 1/2 D R Y BREAKER (STAINLESS STEEL)</td>
<td>HINGED 1/2 D R Y BREAKER (STAINLESS STEEL)</td>
</tr>
<tr>
<td>20</td>
<td>BUSHING BOLT DRILL STAGE STANDARD</td>
<td>BUSHING BOLT DRILL STAGE STANDARD</td>
</tr>
<tr>
<td>21</td>
<td>BUSHING BOLT DRILL STAGE W/P S STANDARD</td>
<td>BUSHING BOLT DRILL STAGE W/P S STANDARD</td>
</tr>
</tbody>
</table>

GENERAL NOTES:

A. NOT USED.
B. INTERIOR ENCLOSURE ROUTING BETWEEN PANELS (MERH) ENCLOSURES SHALL BE STILLCOOPILED AND SHALL BE SHUT BY A BARRIER.
C. PROVIDE 6"X8" TIE-INS TO PANEL ENCLOSURES TO ALLOW MACHINERY TO BE CONNECTED TO PANEL ENCLOSURES.
D. ENCLOSURE MATERIAL AND CONNECTION TO PANELS SHOULD BE COORDINATED TO DESIGNED. ENCLOSURE MATERIAL AND CONNECTION SHOULD BE COORDINATED WITH PANEL ENCLOSURE.
E. ENCLOSURE ENCLOSURE INSTALLATION SHALL BE PERMITS TO HOME RUN ELECTRICAL INSTALLATION, AS PER CONSTRUCTION SCHEDULE.
F. ENCLOSURE ENCLOSURE INSTALLATION SHALL BE PERMITS TO HOME RUN ENCLOSURE INSTALLATION, AS PER CONSTRUCTION SCHEDULE.
G. ENCLOSURE ENCLOSURE INSTALLATION SHALL BE PERMITS TO HOME RUN ENCLOSURE INSTALLATION, AS PER CONSTRUCTION SCHEDULE.
H. EXPOSED PARTS NOT ACCEPTABLE.
I. ENCLOSURE ENCLOSURE INSTALLATION SHALL BE PERMITS TO HOME RUN ENCLOSURE INSTALLATION, AS PER CONSTRUCTION SCHEDULE.
SAMPLE DRAWING

FULL SIZE DRAWING WILL BE PROVIDED IN AUTOCAD FORMAT BY TREATMENT PLANT SERVICES AND SHALL BE USED BY DESIGN ENGINEER IN PREPARING PUMP STATION CONSTRUCTION DRAWINGS.

ELECTRICAL CONTROL PANEL DETAIL

CleanWater Services

DRAWING NO. 1074  REVISIO 2-07
SAMPLE DRAWING
FULL SIZE DRAWING WILL BE PROVIDED IN AUTOCAD FORMAT BY
TREATMENT PLANT SERVICES AND SHALL BE USED BY DESIGN ENGINEER
IN PREPARING PUMP STATION CONSTRUCTION DRAWINGS.

INTRINSICALLY SAFE EXAMPLE

CAUTION:
REMOVING PARTS FROM THE ENCLOSURE MAY IMPAIR INTRINSICALLY SAFE FUNCTION.
FOR CONNECTION ONLY TO FUSE BLOCK.
INSTALL SEPARATE SUPPLIES ALONG WITH LOW VOLTAGE NON-CONDUCTING TEMPO.
NON-HAZARDOUS AREA

NOTES:
1. DANGER TO BE CONNECTED TO A GROUND SPARE
2. CAUTION - PUMP-OUT INFERENCE BETWEEN INTRINSICALLY SAFE WIND AND OTHER WIND.
3. WHEN MULTIPLE BARRIER MODULES ARE USED, THE INTERCONNECTION WINDS SHOULD BE TESTED SEPARATELY AND BE SEPARATE FROM EACH OTHER.
4. INSTALL SEPARATE SUPPLIES FOR INTRINSIC SAFETY PER SPECIFICATIONS.

INTRINSICALLY SAFE ENCLOSURE

1. DANGER TO BE CONNECTED TO A GROUND SPARE
2. CAUTION - PUMP-OUT INFERENCE BETWEEN INTRINSICALLY SAFE WIND AND OTHER WIND.
3. WHEN MULTIPLE BARRIER MODULES ARE USED, THE INTERCONNECTION WINDS SHOULD BE TESTED SEPARATELY AND BE SEPARATE FROM EACH OTHER.
4. INSTALL SEPARATE SUPPLIES FOR INTRINSIC SAFETY PER SPECIFICATIONS.
SAMPLE DRAWING
FULL SIZE DRAWING WILL BE PROVIDED IN AUTOCAD FORMAT BY
TREATMENT PLANT SERVICES AND SHALL BE USED BY DESIGN ENGINEER
IN PREPARING PUMP STATION CONSTRUCTION DRAWINGS.
PARTITION ATTACHMENT

CONCRETE BENCH

MANHOLE WALL

INFLOW

WINDOW OPENING

OUTFLOW

2" CONDUIT SCHEDULE
40 PVC CASING

MANHOLE PLAN VIEW

1/2" SELF TAPPING CONC.
ANCHORS. PHILLIPS S-12
OR APPROVED EQUIV.
1/2" X 1-1/2" STAINLESS
STEEL BOLT

SANITARY SEWER PERMANENT
FLOW MONITOR DETAILS
(MANHOLE CONDUIT INSTALLATION)

DRAWING NO. 1100

Rev 12-06

NOTES:
ALL MANHOLE SECTIONS SHALL CONFORM
TO THE REQUIREMENT OF ASTM C478
AND APPLICABLE PROVISIONS OF STANDARD
MANHOLE DRAWING NO. 010, AND NO. 030

CLAMP DETAIL
(SECTION A-A)

MIN. 2" BELOW
GRADE LEVEL

CROUT-SEAL
AROUND EXTERIOR
OF 2" CONDUIT

ANCHOR TO WALL
WITH STAINLESS
STEEL RISER CLAMP
OR 2" MINIMUM
STAINLESS STEEL
BAND AND STAINLESS
STEEL ANCHORS,
MINIMUM 2 PLACES.

SECTION

N.T.S.
CLEAN WATER SERVICES OF WASHINGTON COUNTY

AIR TEST

PROJECT: ____________________________ DATE: ______________________

CONTRACTOR: ________________________ PROJECT #: ______________________

TESTING COMPANY: ____________________ INSPECTOR: _____________________

<table>
<thead>
<tr>
<th>DATE</th>
<th>LINE</th>
<th>DOWN STREAM MH #</th>
<th>UP STREAM MH #</th>
<th>DIA. (IN)</th>
<th>LENGTH (FT)</th>
<th>TIME (MIN: SEC)</th>
<th>START TEST</th>
<th>STOP TEST</th>
<th>PASS/FAIL</th>
</tr>
</thead>
<tbody>
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</tbody>
</table>

NOTES: ALL AIR TEST WILL BE PERFORMED IN ACCORDANCE WITH ASTM C924 AND CURRENT CONSTRUCTION STANDARDS RESOLUTION AND ORDER.

INSPECTORS SIGNATURE: ______________________________

AIR TEST FORM

DRAWING NO. 1200 REVISED 02-03
FIG. #1:
NOMOGRAPH FOR THE SOLUTION OF $K = \frac{.011 \text{dL}}{C} = .0003882 \text{dL}$, $t_q = K + C$
CLEAN WATER SERVICES OF WASHINGTON COUNTY

MANHOLE VACUUM TEST

PROJECT: ___________________________ DATE: __________________

CONTRACTOR: ______________________ PROJECT #: _____________

TESTING COMPANY: __________________ INSPECTOR: ______________

<table>
<thead>
<tr>
<th>DATE</th>
<th>MH. #</th>
<th>SIZE</th>
<th>DEPTH</th>
<th>REQUIRED TIME</th>
<th>TIME</th>
<th>NOTES / COMMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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<td></td>
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</tr>
</tbody>
</table>

NOTES: ALL MANHOLE VACUUM TESTS WILL BE CONDUCTED IN ACCORDANCE WITH ASTM AND CURRENT CONSTRUCTION STANDARDS RESOLUTION AND ORDER.

INSPECTORS SIGNATURE: ___________________________

MANHOLE VACUUM TEST

DRAWING NO. 1210 REVISED 02-03

CleanWater Services
CLEAN WATER SERVICES OF WASHINGTON COUNTY

MANHOLE HYDROSTATIC TEST

PROJECT: ________________________  DATE: ________________________
CONTRACTOR: ____________________  PROJECT #: ____________________
TESTING COMPANY: _______________  INSPECTOR: ___________________

<table>
<thead>
<tr>
<th>DATE</th>
<th>M.H. #</th>
<th>DEPTH</th>
<th>ALLOWABLE LOSS / HR.</th>
<th>ACTUAL LOSS / HR.</th>
<th>TIME</th>
<th>PASS/FAIL</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>START</td>
<td>END</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>DATE</th>
<th>M.H. #</th>
<th>DEPTH</th>
<th>ALLOWABLE LOSS / HR.</th>
<th>ACTUAL LOSS / HR.</th>
<th>TIME</th>
<th>PASS/FAIL</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>START</td>
<td>END</td>
</tr>
</tbody>
</table>

COMMENTS:

NOTE:

ALL MANHOLE HYDROSTATIC TEST WILL BE CONDUCTED IN ACCORDANCE WITH ASTM AND CURRENT CONSTRUCTION STANDARDS RESOLUTION ORDER, ALLOWABLE LEAKAGE SHALL NOT EXCEED 0.2 GALLONS PER HOUR PER FOOT OF HEAD MEASURED FROM INVERT TO TOP OF FRAME.

INSPECTORS SIGNATURE: ____________________________________________

MANHOLE HYDROSTATIC TEST

DRAWING NO. 1215  REVISED 02-03
EXAMPLE

D = 42 INCHES (3.5 FEET)
Q = 120 cfs

\[ \frac{H_f}{D} \]

\[ H_w \]

FEET

(1) 2.5
(2) 2.1
(3) 2.2

*1 IN FEET

ENTRANCE TYPE

SQUARE EDGE WITH HEADWALL

PLAN (1)

GROOVE END WITH HEADWALL

PLAN (2)

GROOVE END PROJECTING

PLAN (3)

TO USE SCALE (2) OR (3) PROJECT HORIZONTALLY TO SCALE (1), THEN USE STRAIGHT INCLINED LINE THROUGH D AND Q SCALES, OR REVERSE AS ILLUSTRATED.
HEAD FOR CULVERTS
(PIPE W / "N" = 0.012), FLOWING
FULL WITH OUTLET CONTROL

CleanWater Services

DRAWING NO. 1265  REVISED 02-03
HEAD FOR CULVERTS
(PIPE W / "N" = 0.024), FLOWING FULL WITH OUTLET CONTROL
# Rational Method Rainfall Intensities

Rainfall intensity is for East Washington County and is shown as inches per hour.

<table>
<thead>
<tr>
<th>Time of Concentration (Minutes)</th>
<th>Storm Event: Year and Probability</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2 50%</td>
</tr>
<tr>
<td>0</td>
<td>1.90</td>
</tr>
<tr>
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## 24-HOUR RAINFALL DEPTHS

<table>
<thead>
<tr>
<th>Recurrence Interval (Years)</th>
<th>Total Precipitation Depth (Inches)</th>
</tr>
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<tr>
<td>2</td>
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<tr>
<td>5</td>
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<tr>
<td>10</td>
<td>3.45</td>
</tr>
<tr>
<td>25</td>
<td>3.90</td>
</tr>
<tr>
<td>50</td>
<td>4.20</td>
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<tr>
<td>100</td>
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## DESIGN STORM DISTRIBUTION CHART

The following table contains the NRCS Type IA Precipitation Distribution. The table is from the “SubBasin Hydrologic Modeling Criteria” by Kramer, Chin, & Mayo Inc., 1991.

<table>
<thead>
<tr>
<th>HOUR</th>
<th>PERCENT RAINFALL</th>
<th>RAINFALL DEPTH (INCHES)</th>
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<tbody>
<tr>
<td></td>
<td>INCREMENTAL</td>
<td>2 YEAR 5 YEAR 10 YEAR 25 YEAR 50 YEAR 100 YEAR</td>
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<tr>
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<td>CUMULATIVE</td>
<td>2.50 3.10 3.45 3.90 4.20 4.50</td>
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<tr>
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<tr>
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<td>3.20</td>
<td>0.08 0.10 0.11 0.12 0.13 0.14</td>
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<tr>
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