RING - HALF PLAN

NOTES
1. Where roadway base is 8" or thicker use 9" ring, all other cases 7" ring is permissible.
2. Manufacturers model of storm ring and cover to be approved by City Engineer.
3. Perforated covers, when required shall be similar to solid covers.

SOLID COVER

Non Skid Pattern Required

RING SECTION

Minimum Weight 7" 232 lbs,
9" 278 lbs.

SOLID COVER SECTION

Minimum Weight 128 lbs.

CITY OF CLEARWATER
ENGINEERING DEPARTMENT

STORM SEWER MANHOLE
RING & COVER
TRAFFIC AREAS

INDEX NO. 201
PAGE NO. 1 OF 1
LATEST REVISION 2/22/2016

11/16" 1-1/4"

5/8" Min. 4 Required

1 3/4" or 2"

36"
23"
21"

Machined Surface

22-3/4"

1/2" 5/8"

Machined Surface

Non Skid Pattern Required

11/16"
Storm Sewer Manhole
Ring & Cover (See City Index No. 201)

Approved barrel joint seals are "O-Rings" Two continuous rings at all joints

Four (4) courses of brick with concrete skim coat.

Concentric cone (Flat cover on shallow manholes 0' to 4' depth)

Steel reinforcement

5" min. wall thickness type II acid resistant cement 4000 p.s.i.

2" joint in pipe entry (Typ.)

2"/ft min. Or to suit pipe

"B" Min.

"C"

Grout fill opening with non-shrink mortar

P.V.C. pipe requires manhole adapter coupling by Flo Control, Inc., or approved water stop coupling.

Grout flow channel

SECTION A-A

<table>
<thead>
<tr>
<th></th>
<th>A</th>
<th>B</th>
<th>C</th>
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<tbody>
<tr>
<td>Shallow 0'-4'</td>
<td>4' Max</td>
<td>3'-6' Max</td>
<td>24&quot; Max</td>
</tr>
<tr>
<td>Standard 4.1'-6'</td>
<td>6' Max</td>
<td>4'</td>
<td>30&quot; Max</td>
</tr>
<tr>
<td>Deep 6.1'-10'</td>
<td>10'</td>
<td>4'</td>
<td>48&quot; Max</td>
</tr>
<tr>
<td>Deep 10.1'-14'</td>
<td>14'</td>
<td>5'</td>
<td>48&quot; Max</td>
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CITY OF CLEARWATER
ENGINEERING DEPARTMENT
STORM DETAILS

INDEX NO. 202
LATEST REVISION 2/22/2016
NOTES:
1. USF 1110 MG cover.
3. Cover weight: 105 lbs.
4. Total weight: 195 lbs.
NOTES:
1 - USF 1182 Ring & ME cover
2 - Material: ASTM-A48 Class 30B gray iron
3 - Cover weight: 135 LBS.
4 - Total weight: 280 LBS.
5 - For use with FDOT types 1,2,3 & 4 curb inlets
   (FDOT index 210)
Notes:
1. Non traffic Bearing
2. Champer all exposed edges 3/4"
3. All concrete to be 3,000 p.s.i., with fiber mesh reinforcing.
NOTES:
1. Storm Sewers and Manholes to be centered in Junction Box unless otherwise specified in Plans.
2. All Concrete to be 3000 P.S.I., with fiber mesh reinforcing.
3. Chamfer all exposed edges 3/4".

SECTION A-A

PLAN VIEW

No. 4 Bars, extra around opening in Top Slab.

8" Brick Walls
Poured 8" Concrete Top Slab
No. 3 Bars, 10" Centers in all walls.

4" 8"
Min. 2'- 8"
8" 4"

No. 4 Bars, 6" Grid
In Top Slab.

Grout Line

Varieties

Poured 8" Conc. Bottom Slab, 3000 P.S.I.
No. 4 Bars, 12" Grid, in Bottom Slab

Varieties

8"
Varieties

Backfill

Ring & Cover (See City Index No. 201)

Sidewalk or Sod
NOTES:

1. Storm sewers and manhole to be centered in junction box unless otherwise specified in plans.
2. All concrete to be 3,000 psi, with fiber mesh reinforcing.
3. All steel bars shall have 1 1/4" minimum cover unless otherwise shown and shall be hooked where indicated. Horizontal steel shall be lapped a minimum of 24 bar diameters at corners. On precast units, floor slabs may be secured to structure walls by no. 4 dowel bars (a minimum of 6 dowels) pushed into the wet concrete after the floor slab is placed.
4. Chamfer all exposed edges 3/4".

PLAN VIEW

SECTION A-A

BRICK STACK (IF REQUIRED)
MODIFIED CURB OR TYPE 1 CURB
PLAN VIEW

VALLEY GUTTER CURB
PLAN VIEW

NOTES:
1. Non traffic bearing.
2. When pipe diameter exceeds 30", inlets shall not be used as junction boxes, limit 3 pipes per inlet.
3. Chamfer all exposed edges ¼".
4. All concrete shall be 3,000 psi, with fiber mesh reinforcing.
5. Center support shall be used on double wing inlets. (See INDEX 209, PAGE 2 of 2, DETAIL B).

DETAIL "A"

Wire To Rebar
Retaining Nut With Washer
4" x 4" x 3/8" Galvanized Steel Angle Iron
8" Long x 1/2" # Galvanized Steel Carriage Bolt, 2" O.C. (Typ.)
Notes:
1. No joints inside of box
2. Engineer to provide calculations demonstrating that the conflict structure has sufficient hydraulic capacity to not restrict flow more than a typical structure

Annular Space Plug/Seal Option: Flowable Fill Or Neoprene Flexible Seal

1"-0" Minimum Clearance Between Obstruction And Flow Line Of Outlet Pipe

Casing spacer Or Cradle (cradle Option Shown)

See Plan For Structure Type

Grout

SECTION LONGITUDINAL
N.T.S.

SECTION A-A
N.T.S.
NOTES:
1. Non traffic bearing.
2. When pipe diameter exceeds 30", inlets shall not be used as junction boxes, limit three pipes per inlet.
3. Chamfer all exposed edges 3/8".
4. All concrete 3,000 psi, with fiber mesh reinforcing.
5. Center support shall be used on double wing inlets. (See Detail A).
Storm Sewer Inlet
Ring and Cover (see City Index No. 203)

#3 Bars All Around

Depth E

Shallow 0'-4'
Standard 4.1'-6'
Deep 6.1'-14'

F
8"
8"
12"

Notations:
1. Non traffic bearing.
2. Chamfer all exposed edges 3/4".
3. All concrete 3,000 psi, with fiber mesh reinforcing.
NOTES
1. Fasten skimmer with 4 stainless steel bolts with lead anchors.
2. Seal all edges of skimmer at contact points with structure with waterproof caulking or approved equal.
Design High Water Level

Top of Bank
6' Freeboard

Water Quantity

Pond Bottom
Minimum of 6" between pond bottom and SHWT

Seasonal High Water Table (SHWT)

Conc. Pad 4" Min.

Concrete Pad Under Skimmer

Skimmer

Weir

2-1/4"

Steel Grate

2" Cl.

Eye Bolts Per FDOT Index 201

4'-4"

6" U.D.

2-1/4"

Outfall Pipe 15" Minimum

5-3/4"

4'-4"

5-3/4"

3'-0"

2" Cl.

G

6" U.D.

8"

#4 Bars @ 12" Ctrs.

Install 6" (Min.) Gravel Bedding

Outfall Pipe 45" Minimum

CROSS-SECTION
N.T.S.

PLAN VIEW
N.T.S.

Skimmer

12"

6" U.D.

24"

5'-10"

Concrete Pad Under Skimmer

2-1/4"

2-1/4"

21 Spaces @ 2-5/16"  
22 Bars @ 3/16"  

3'-4"

4'-4"

4'-4"

4'-4"

4'-4"

4'-4"

2-1/4"

2-1/4"

8"

8"

NOTES

1. Fasten skimmer with 4 stainless steel bolts with lead anchors
2. Seal all edges of skimmer at 2 contact points with structure with waterproof caulking or approved equal
3. Top of underdrain shall be installed a minimum of 30" below existing grade.

STORM SEWER OUTFALL CONTROL Structure

FDOT TYPE E INLET (MODIFIED)
WITH UNDERDRAIN (DRY POND)

STORM DETAILS

CITY OF CLEARWATER
ENGINEERING DEPARTMENT

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6/18/15 EDITED DRAWING
S.R. APP

DATE
REVISION DESCRIPTION

2/22/2016 LATEST REVISION
**PLAN VIEW**

- **N.T.S.**

**Design High Water Level**
- Top of Bank
- 6" Freeboard
- Water Quantity
- Water Quality
- Slot Or V-Notch

**Normal Water Level**
- Basin Side Slope 4:1 (Typ.)
- Pond Bottom

**CONCRETE PAD UNDER SKIMMER**

**WEIR**

**Skimmer**

**2-1/4"**

**3'-0"**

**4'-4"**

**5'-10"**

**12"**

**21 Spaces @ 2-5/16"**

**22 Bars @ 3/16"**

**Drain**

**Outfall Pipe**
- 15" Minimum
- 4'-4-1/16"

**Bands**

**TYPE E**

**N.T.S.**

**Straight Bars 2" x 3/16"**

**Reticline Bars 1-1/4" x 3/16"**

**Bands 1-1/2" x 1/4"**

**Approx. Weight 215 Lbs.**

**NOTES**

1. Fasten skimmer with 4 stainless steel bolts with lead anchors
2. Seal all edges of skimmer at contact points with structure with waterproof caulking or approved equal
NOTES:
1. Install min 8" underdrain pipe or 6" pipe (per FDOT requirements) if approved by the City Engineer.
2. No ADS pipe shall be used for underdrain on City projects.
3. Invert of the underdrain pipe shall be a minimum of 6" above the established Seasonal High Water Table (SHWT).
Overlap filter material 18" across top of aggregate.

Perimeter of aggregate to be fully wrapped with Non-Degradable Fiberous Filter Type Material as Directed by Engineer, Mirafi 140 N or approved equal.

Filter aggregate for underdrains shall be as specified in the FDOT Standard Specifications, Section 901 — Coarse Aggregate, and shall be either #6 or #57. If #57 is used, it must be washed and screened to remove fines. The aggregate may be stone, slag or crushed gravel.

Solid pipe (w/o perforations) is to be used under drives and roadways, with compacted backfill.

Unless otherwise noted, underdrain pipe shall be 8" diameter PVC with perforations down — See Technical Specifications for details.
NOTES:
Saw Cut Drive if Nearest Const. Joint Over 7" from Back of Curb.

* Filter aggregate for underdrains shall be as specified in the FDOT Standard Specifications, Section 901 – Coarse Aggregate, and shall be either #6 or #57. If #57 is used, it must be washed and screened to remove fines. The aggregate may be stone, slag, or crushed gravel.
Notes:
1. Place Cleanout Every 200' From Inlet
2. All Cleanouts are 8" Only.
3. Cleanout Faces Upstream.

ASTM D3034—SDR 35 8" PVC Underdrain (Refer to Plans for Diameter)

N.T.S.

PLAN VIEW

18"

Brass Cleanout Plug

18" Square Concrete Pad, 8" Thick

Two—8"—1/16 (22½") Street Els

8" X 8" PVC Wye (Gasketed)

SECTION VIEW

Low End

Flow

Upstream

CITY OF CLEARWATER
ENGINEERING DEPARTMENT
STORM DETAILS

STANDARD UNDERDRAIN CLEANOUT
(STORM)

INDEX NO. 218
PAGE NO. 3
LATEST REVISION 2/22/2016
Notes:
2. All Cleanouts are 6" Only.

18" Square Concrete Pad, 8" Thick
Two–8"–1/16 (22 1/2) Street Els
ASTM D3034–SDR 35 8" PVC Underdrain (Refer to Plans for Diameter)

18"  8"  8” X 8” PVC Wye (Gasketed)

Brass Cleanout Plug
8" Cemented Cap

Flow
Joint w/o Bell
(Showing filter fabric)

Joint w/ Bell
(Showing filter fabric)

Tongue and Groove type joint with Double Gasket
(Prior to pull-up)

Bell and Spigot type joint with "O Ring" Gasket
(Prior to pull-up)

NOTES:
1. Joint wrap shall conform to one of the following: Filter Fabric—Mirafi 140—N as manufactured by Mirafi Inc., or approved equal. Minimum width(s) as shown above. Elastic band as manufactured by Cadillac External Pipe Joint, Inc., or approved equal. Width(s) as per ASTM C 877.
2. Joint wrap shall be held in place as follows: Filter Fabric—minimum 2 straps as shown or as required by the manufacturer.
3. Gasket type shall conform to pipe manufacturer specifications.
NOTES:
1. Finished floor elevation shall be a minimum of 1' above crown of road.
2. If a fence is placed on the property line, then the side swale shall be entirely on the Owner's property.

Lot Grading Type 'A'
Lot Drainage to Street
N.T.S.
NOTES:
1. Finished floor elevation shall be a minimum of 1' above crown of road.
2. If a fence is placed on the property line, then the side swale shall be entirely on the Owner's property.

Lot Grading Type 'B'
Lot Drainage Both to Street and to Rear Lot Line
N.T.S.
NOTES:
1. Finished floor elevation shall be a minimum of 1" above crown of road.
2. If a fence is placed on the property line, then the side swale shall be entirely on the Owner’s property.
CROSS SECTION
LAKE/POND

NOTES
1. Littoral shelf and upland areas to be vegetated per city requirements.
2. Outfall structure shall incorporate sub drain with inverts no lower than normal water elevation. Overflow shall be set at high water elevation.
3. There shall be 6" of freeboard between the top of the outfall control structure and the top of the bank elevation.

CITY OF CLEARWATER
ENGINEERING DEPARTMENT
WET DETENTION/RETENTION POND
Min. of 6” between bottom of system and SHWT

RTV recovery by soil infiltration (Recommended unsaturated infiltration only)
Seasonal High Water Table (SHWT)
Confining Layer
NOTES:
1. Compressive strength of Reinforcement System shall exceed H2O loading requirements.
2. Soil infill will be based on local conditions and be determined by the Engineer.
3. Base material thickness and type shall be provided by the Manufacturer.
4. Geotextile fabric is required to prevent migration of fines into the subgrade.
5. For design purposes, the void space in the reinforced grass parking system will receive 50 percent credit for required treatment volume.