

NOTE: NO WOOD SHALL BE USED FOR ADJUSTING CASTING, CEMENT MORTAR ONLY.
 TYPICALLY USED FOR REAR YARD DRAINAGE AREAS AND PARKING LOTS.
 CAST IRON CATCH BASIN FRAME & COVER CASTINGS R-3250A UNLESS OTHERWISE APPROVED BY THE CITY ENGINEER.
 CAST IRON CATCH BASIN FRAME & COVER CASTINGS R-3508C SHALL BE USED WHEN NEEDED IN A DRIVEWAY OR SURMOUNTABLE CURB. CAST IRON CATCH BASIN FRAME & COVER CASTING R-3508B SHALL BE USED WHEN NEEDED IN A COMMERCIAL DRIVEWAY OR VALLEY GUTTER.
 CAST IRON CATCH BASIN FRAME AND COVER CASTING R-2561A OR R-2535-A SHALL BE USED WHEN NEEDED IN A GREEN SPACE OR BACKYARD DRAINAGE AREA.
 PRECAST REINFORCED CONCRETE CONE SECTION AND PRECAST BASE PER ASTM C478.
 FILL OPENING BETWEEN PIPE AND MANHOLE WALL WITH CEMENT MORTAR.
 INSIDE SURFACE SHALL BE FINISHED SMOOTH. WRAP OUTSIDE OF DOGHOUSE WITH GEOTEXTILE FABRIC, TYPE 4, OVERLAP FABRIC 12" ONTO ITSELF.
 ALL MORTAR SHALL CONFORM TO ASTM C270 AND MEET THE REQUIREMENTS OF MNDOT 2506.2B.

CATCH BASIN, TYPE 401
 (WITH SUMP)

3/03/15



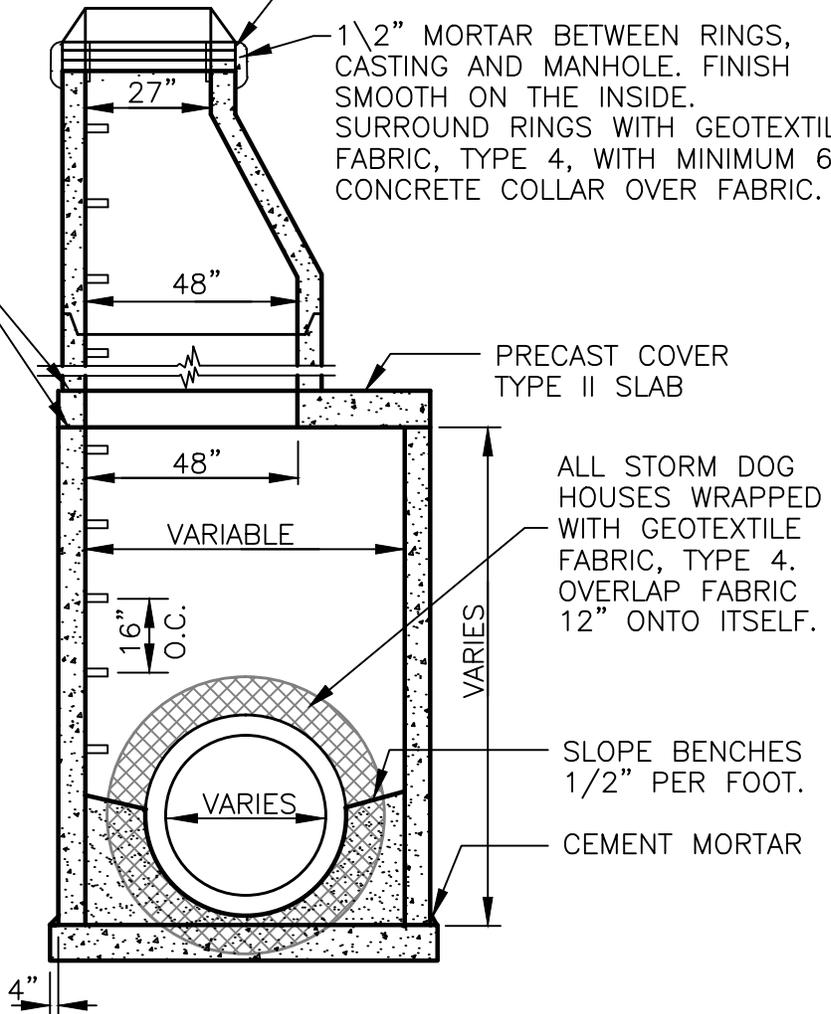
STANDARD DRAWING
 NO.
401J

2 STRIPS BITUMASTIC SEAL
ON SLAB JOINTS

RINGS (2 MIN., 1.0' MAX.
OF RINGS & MORTAR)

1 1/2" MORTAR BETWEEN RINGS,
CASTING AND MANHOLE. FINISH
SMOOTH ON THE INSIDE.
SURROUND RINGS WITH GEOTEXTILE
FABRIC, TYPE 4, WITH MINIMUM 6"
CONCRETE COLLAR OVER FABRIC.

MH DIA.	BASE SLAB THICKNESS
48"	6"
54"-102"	8"
108"	10"
120"	12"



NOTES: NO WOOD SHALL BE USED FOR ADJUSTING CASTING; CEMENT MORTAR ONLY.

INSTALL A 12" OR 16" BARREL SECTION UNDER THE CONE WHENEVER POSSIBLE.

CAST IRON MANHOLE FRAME & COVER AS PER SPECIFICATIONS (1642 B).

STEPS SHALL BE CAST IRON, ALUMINUM, OR STEEL REINFORCED PLASTIC, LOCATION AS SHOWN.

PRECAST REINFORCED CONCRETE MANHOLE SECTIONS PER ASTM C478

FILL OPENING BETWEEN PIPE AND MANHOLE WALL WITH CEMENT MORTAR.

INSIDE SURFACE SHALL BE FINISHED SMOOTH. WRAP OUTSIDE OF DOGHOUSE WITH GEOTEXTILE FABRIC, TYPE 4, OVERLAP FABRIC 12" ONTO ITSELF.

ALL MORTAR SHALL CONFORM TO ASTM C270 AND MEET THE REQUIREMENTS OF MNDOT 2506.2B.

OVERSIZED STORM SEWER MANHOLE (PIPES 30" & LARGER)

3/03/15



STANDARD DRAWING
NO.

408C

1/2" MORTAR BETWEEN RINGS, CASTING, AND MANHOLE. FINISH SMOOTH ON THE INSIDE. SURROUND RINGS WITH GEOTEXTILE FABRIC, TYPE 4, WITH MINIMUM 6" CONCRETE COLLAR OVER FABRIC.

RINGS (2 MIN., 1.0' MAX. OF RINGS & MORTAR)

PRECAST COVER TYPE II SLAB

2 STRIPS BITUMASTIC SEAL ON SLAB JOINTS

VARIABLE

VARIABLE (48" MIN.)

16"

27"

1/2"/FT.

ALL STORM DOG HOUSES WRAPPED WITH GEOTEXTILE FABRIC, TYPE 4. OVERLAP FABRIC 12" ONTO ITSELF.

MH DIA.	BASE SLAB THICKNESS
48"	6"
54"-102"	8"
108"	10"
120"	12"

NOTE: NO WOOD SHALL BE USED FOR ADJUSTING CASTING; CEMENT MORTAR ONLY.

CAST IRON MANHOLE FRAME & COVER AS PER SPECIFICATIONS (1642 B).

STEPS SHALL BE CAST IRON, ALUMINUM OR STEEL REINFORCED PLASTIC, LOCATION AS SHOWN.

PRECAST REINFORCED CONCRETE MANHOLE SECTIONS PER ASTM C478.

FILL OPENING BETWEEN PIPE AND MANHOLE WALL WITH CEMENT MORTAR. INSIDE SURFACE SHALL BE FINISHED SMOOTH. WRAP OUTSIDE OF DOGHOUSE WITH GEOTEXTILE FABRIC, TYPE 4, OVERLAP FABRIC 12" ONTO ITSELF.

ALL MORTAR SHALL CONFORM TO ASTM C270 AND MEET THE REQUIREMENTS OF MNDOT 2506.2B.

SHALLOW STORM SEWER MANHOLE

3/03/15



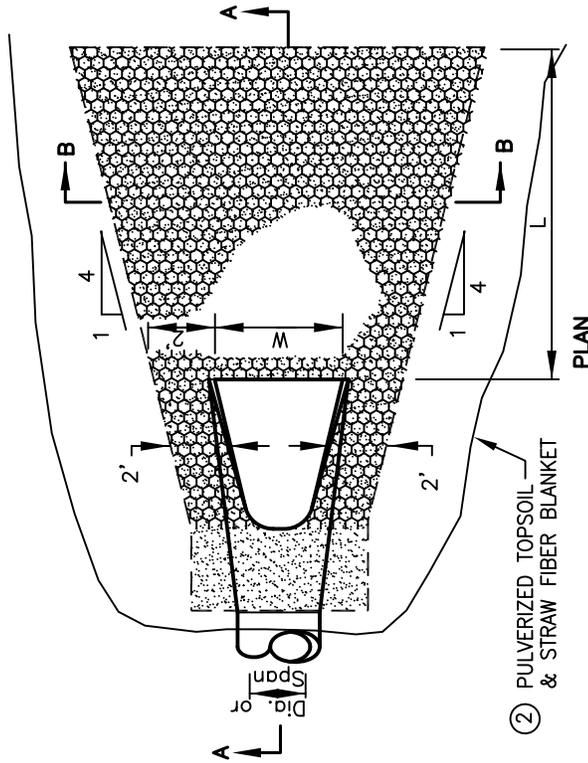
STANDARD DRAWING
NO.
409C

5/22/06

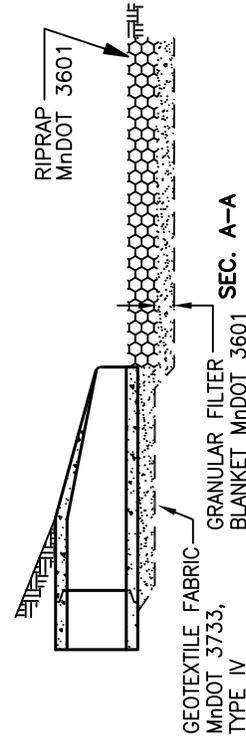
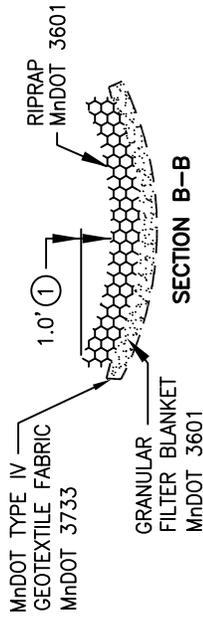
RIPRAP AT RCP OUTLETS



STANDARD DRAWING
NO.
411A



②



① FOR PIPES 48" & LARGER, USE 2.0'.

② THE CONTRACTOR SHALL PLACE RIPRAP, PULVERIZED TOPSOIL, SEED, AND STRAW FIBER BLANKET IMMEDIATELY AFTER PIPE IS INSTALLED, EXTEND AREA TO MATCH UNDISTURBED SOIL.

③ SILT FENCE SHALL BE PLACED AROUND EACH APRON AS DIRECTED BY THE ENGINEER (+40LF).

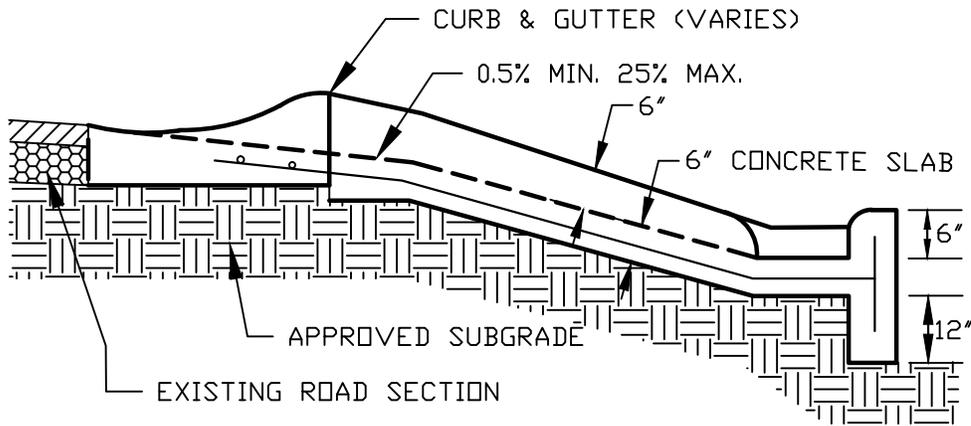
TABLE OF QUANTITIES
RIPRAP AT RCP OUTLETS

Dia. Round Pipe (In.)	L (Ft.)	CLASS II d 50=6"		CLASS III d 50=9"		CLASS IV d 50=12"	
		24" Depth Riprap (Cu. Yd.)	6" Depth Granular Filter (Cu. Yd.)	36" Depth Riprap (Cu. Yd.)	9" Depth Granular Filter (Cu. Yd.)	48" Depth Riprap (Cu. Yd.)	12" Depth Granular Filter (Cu. Yd.)
12	12	8.8	2.6	13.2	3.9	17.6	5.2
15	12	9.4	2.7	14.1	4.1	18.8	5.5
18	15	13.0	3.6	19.5	5.5	26.0	7.3
21	15	14.0	3.8	21.0	5.7	27.9	7.7
24	18	18.5	4.9	27.8	7.4	37.1	9.8
27	18	19.6	5.1	29.4	7.7	39.2	10.3
30	21	24.8	6.4	37.1	9.6	49.5	12.8
36	24	31.8	8.3	47.6	12.5	63.5	16.6
42	27	38.0	9.9	57.0	14.9	76.0	19.8
48	30	45.3	11.7	68.0	17.5	90.7	23.3

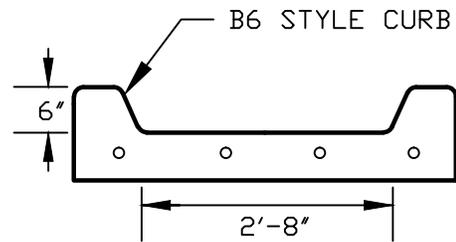
TABLE OF QUANTITIES
RIPRAP AT RCP-A OUTLETS or BOXES OF EQUIVALENT SPAN WIDTH

Span Pipe Arch (In.)	L (Ft.)	Class II d 50=6"		Class III d 50=9"		Class IV d 50=12"	
		18" Depth Riprap (Cu. Yd.)	4.5" Depth GRANULAR Filter (Cu. Yd.)	30" Depth Riprap (Cu. Yd.)	7.5" Depth GRANULAR Filter (Cu. Yd.)	36" Depth Riprap (Cu. Yd.)	9" Depth GRANULAR Filter (Cu. Yd.)
22	15	9.7	2.7	16.2	4.5	19.5	5.4
28	18	13.8	3.7	22.9	6.1	27.5	7.3
36	21	18.4	5.0	30.7	8.3	36.8	9.9
43	24	23.7	6.2	39.5	10.4	47.4	12.4
51	27	28.4	7.4	47.3	12.3	56.8	14.8
58	30	33.5	8.7	55.8	14.5	66.9	17.4

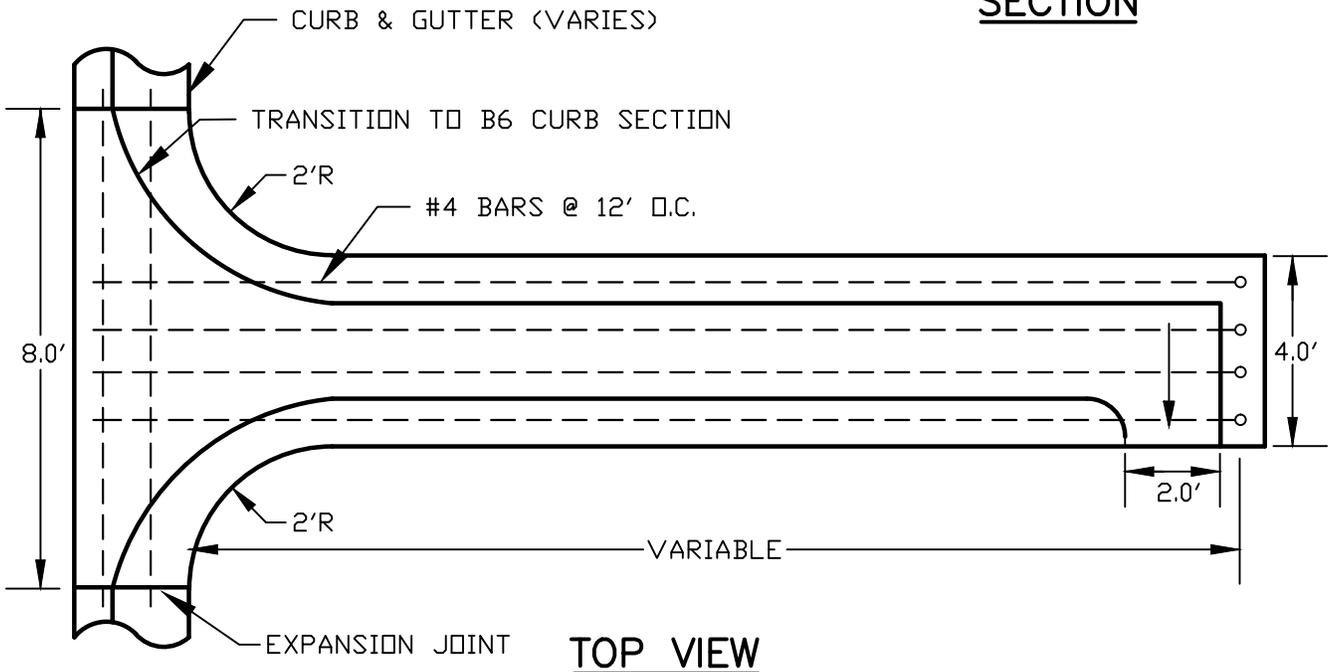
Note: Requirements for riprap size and thickness and filter blanket will be designated in the plans.



SECTION



SECTION



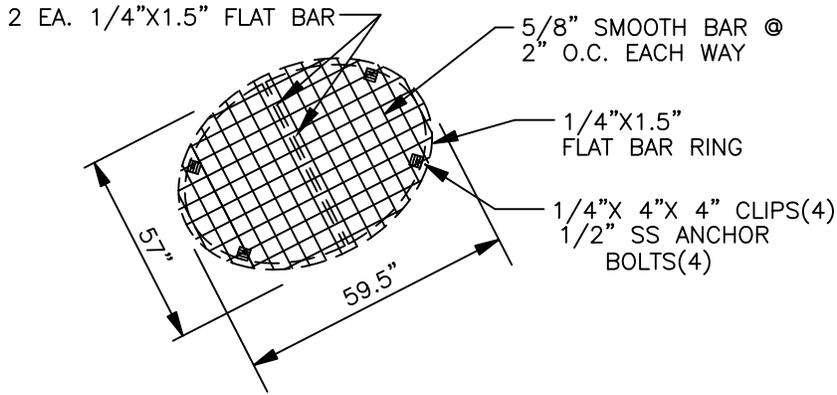
TOP VIEW

CONCRETE SPILLWAY

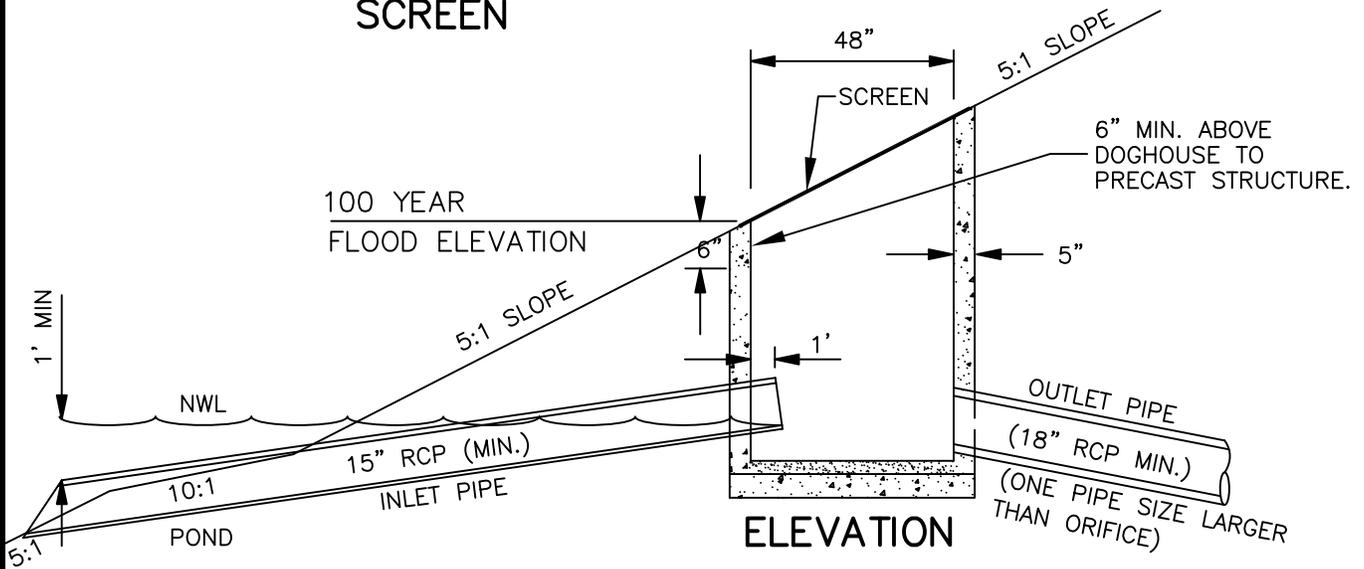
1/25/13



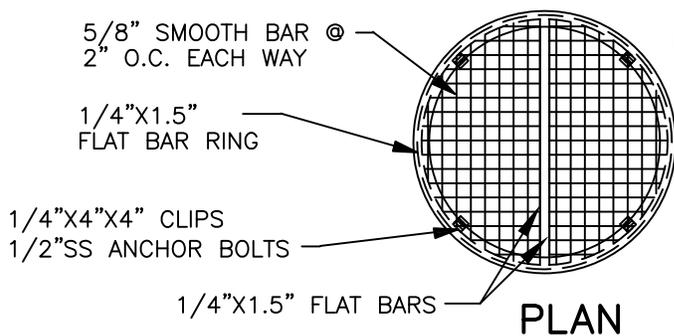
STANDARD DRAWING
NO.
412A



SCREEN



ELEVATION



PLAN

1" TO OUTSIDE OF MH FROM FLAT BAR (TYP.)

RESTORE ALL DISTURBED AREAS ON SLOPE WITH SILT FENCE, PULVERIZED TOPSOIL AND STRAW FIBER BLANKET AS SHOWN ON PLANS OR AS DIRECTED BY THE ENGINEER.

POND	100 YR	NWL	INLET ϕ	INLET EL.	OUTLET ϕ	OUTLET EL.	OUTLET %

STRUCTURE TABLE

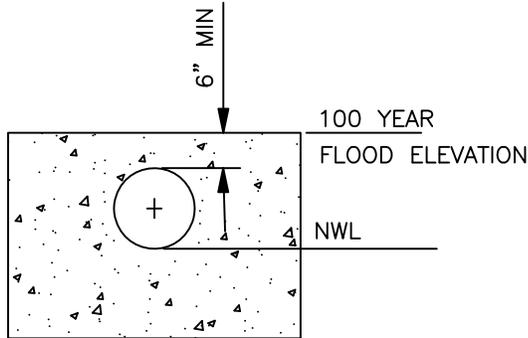
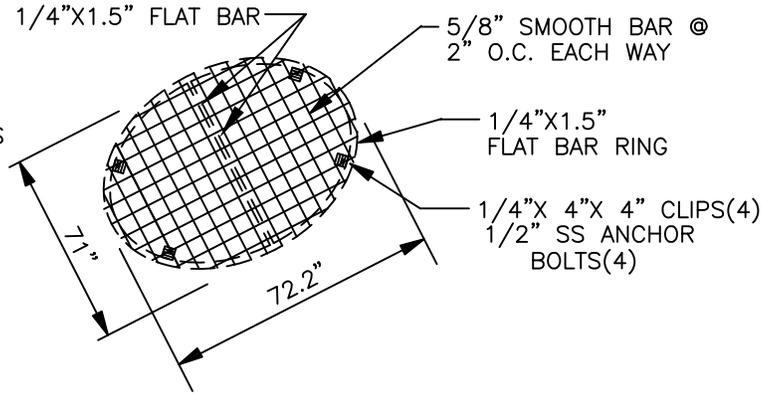
POND SKIMMER STRUCTURE

3/24/08



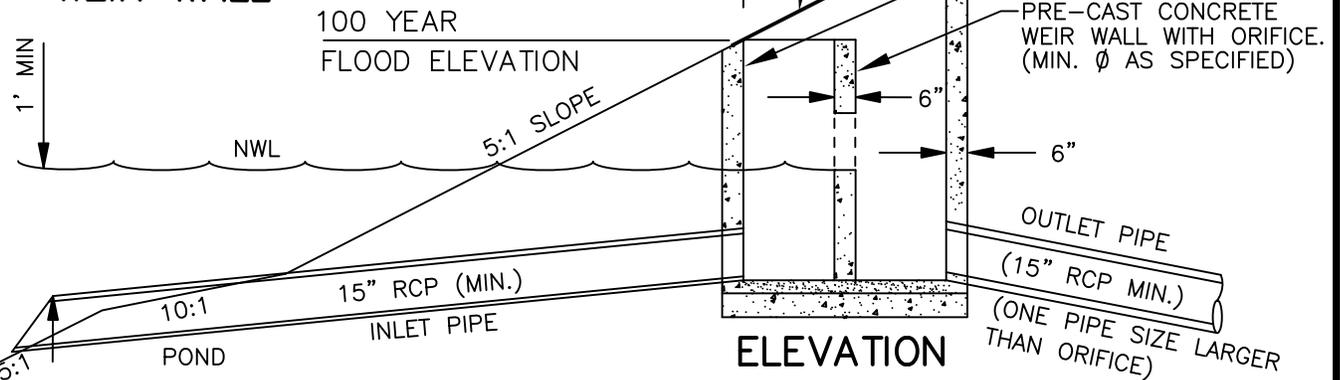
STANDARD DRAWING NO. **417E**

WEIR WALL TO BE CONNECTED TO STRUCTURE BY PRE-CAST KEYED SLOT OR BY 3" X 3" ANGLE IRON ALONG EACH SIDE OF THE VERTICAL LENGTH OF THE WALL. CONNECTION SHALL USE 4-3/4" x 3/4" SS WEDGE ANCHOR BOLTS SPACED 6" O.C. JOINTS SHALL BE GROUTED AND SEALED TO BE WATER PROOF.

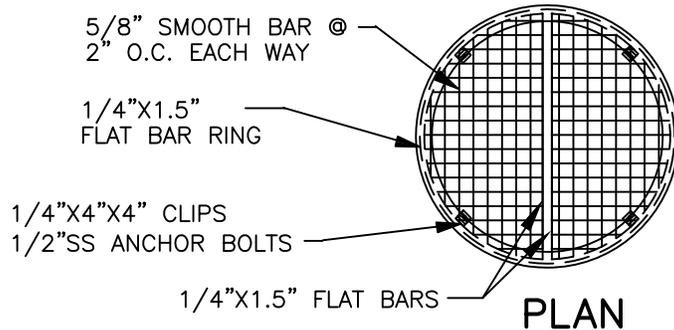


WEIR WALL

SCREEN



ELEVATION



PLAN

RESTORE ALL DISTURBED AREAS ON SLOPE WITH SILT FENCE, PULVERIZED TOPSOIL AND STRAW FIBER BLANKET AS SHOWN ON PLANS OR AS DIRECTED BY THE ENGINEER.

POND	100 YR	NWL	ORIFICE ϕ	INLET ϕ	INLET EL.	OUTLET ϕ	OUTLET EL.	OUTLET %

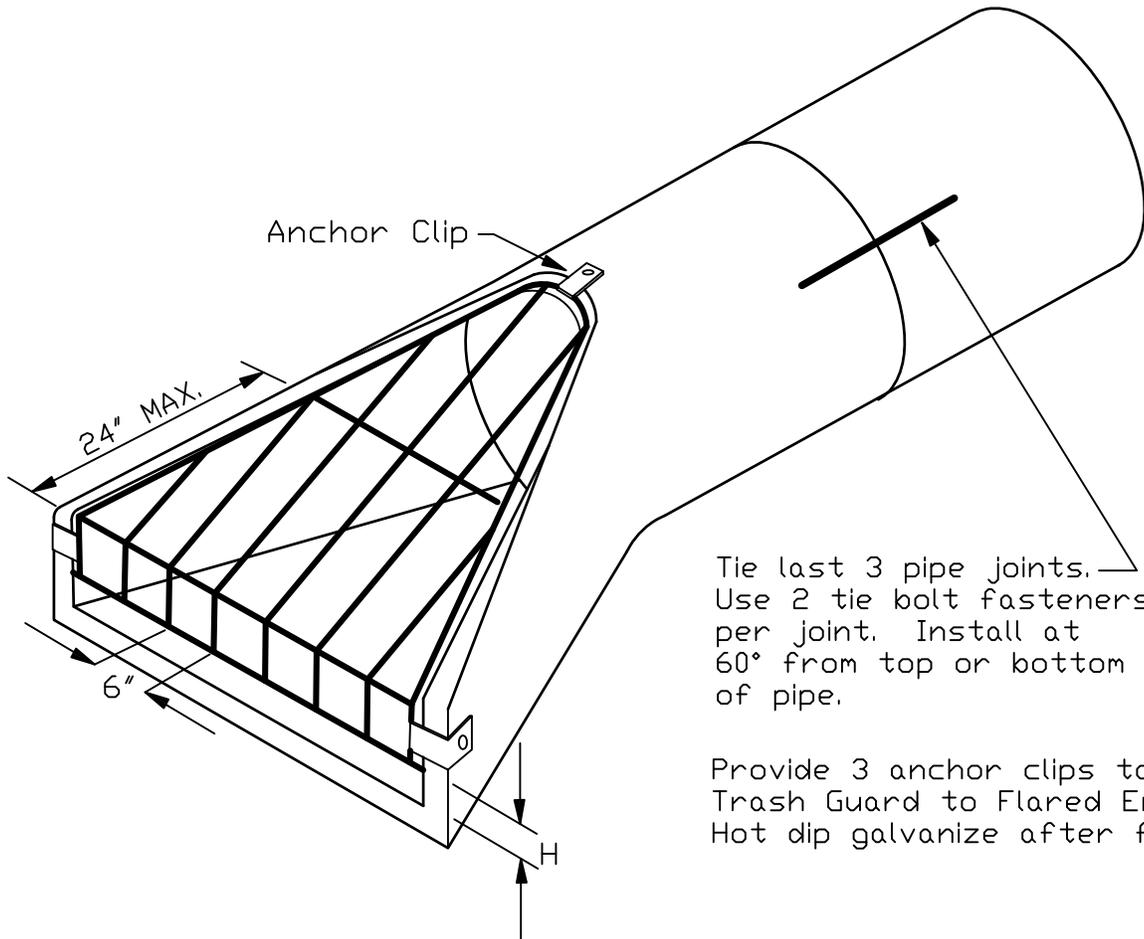
STRUCTURE TABLE
POND SKIMMER STRUCTURE WITH WEIR WALL

5/22/06



STANDARD DRAWING NO.
418E

See City Plate No. 411A for Riprap placement.



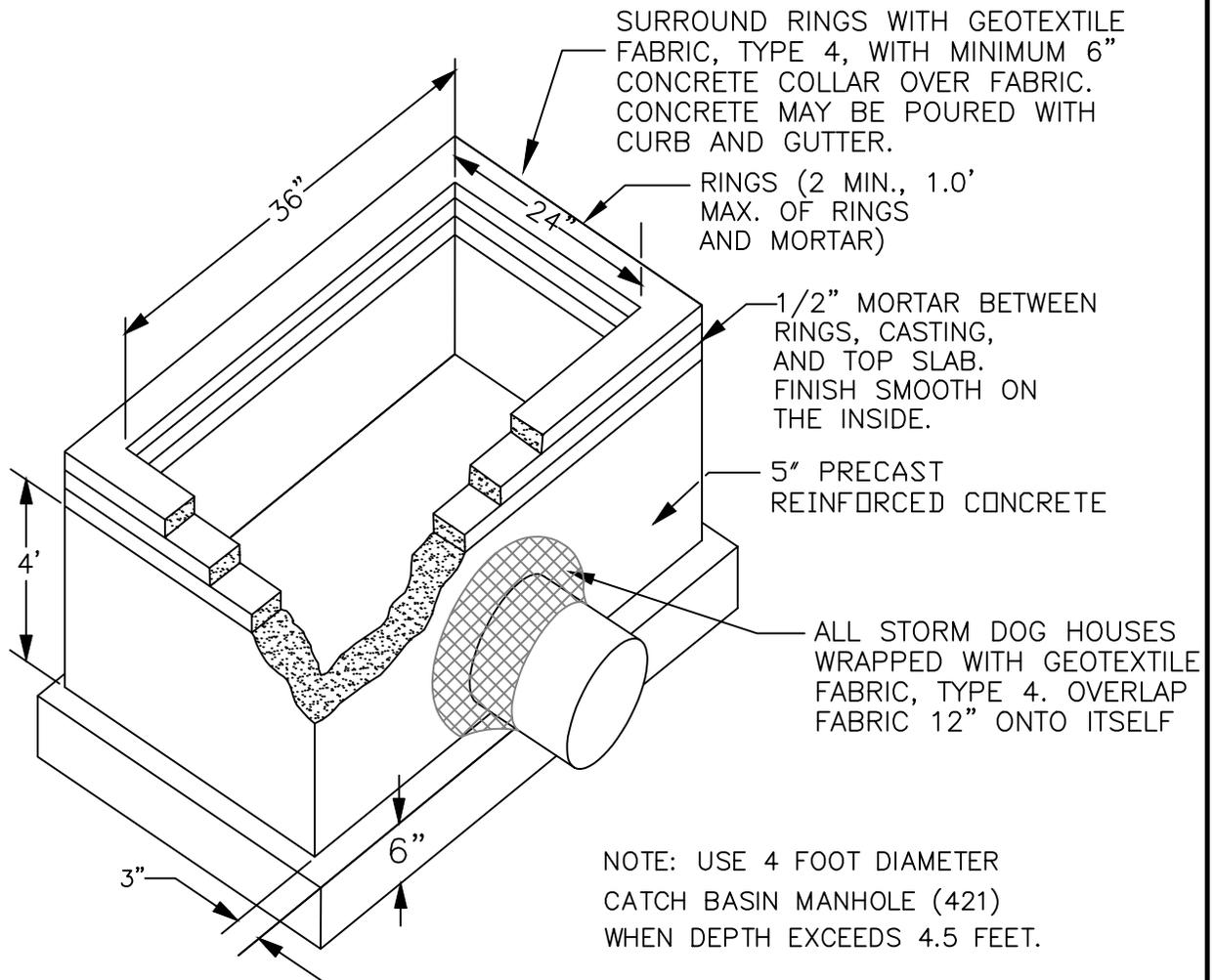
ISOMETRIC

FLARED END SECTION

3/4/10



STANDARD DRAWING
NO.
419A



NOTES: NO WOOD SHALL BE USED FOR ADJUSTING CASTING; CEMENT MORTAR ONLY.

IN NEW DEVELOPMENTS CAST IRON FRAME AND GRATE CASTINGS TYPE R-3501-TB SHALL BE USED. CAST IRON FRAME AND GRATE CASTINGS TYPE R-3067-V (ON A GRADE) OR R-3067-VB (LOW POINTS) SHALL BE USED IN RECONSTRUCTION AREAS OR AS CALLED OUT IN PLANS.

PRECAST REINFORCED CONCRETE BASE SLAB PER ASTM C478.

FILL OPENING BETWEEN PIPE AND MANHOLE WALL WITH CEMENT MORTAR.

INSIDE SURFACE SHALL BE FINISHED SMOOTH. WRAP OUTSIDE OF DOGHOUSE WITH GEOTEXTILE FABRIC, TYPE 4, OVERLAP FABRIC 12" ONTO ITSELF.

ALL MORTAR SHALL CONFORM TO ASTM C270 AND MEET THE REQUIREMENTS OF MNDOT 2506.2B.

DOGHOUSE SHALL BE GROUTED ON BOTH THE OUTSIDE AND INSIDE.

MAXIMUM DIAMETER RCP STORM SEWER PIPE IS 15" ON THE SHORT SIDE AND 18" ON THE LONG SIDE OF CATCH BASIN.

GROUT SUMP TO PIPE INVERT UNLESS A SUMP IS CALLED OUT IN PLANS.

CATCH BASIN, TYPE 420

2/22/16



STANDARD DRAWING
NO.
420F

1/2" MORTAR BETWEEN RINGS, CASTING, AND TOP SLAB. FINISH SMOOTH ON THE INSIDE.

SURROUND RINGS WITH GEOTEXTILE FABRIC, TYPE 4, WITH MINIMUM 6" CONCRETE COLLAR OVER FABRIC. CONCRETE MAY BE POURED WITH CURB AND GUTTER.

RINGS (2 MIN., 1.0' MAX. OF RINGS AND MORTAR)

PRECAST TYPE II COVER SLAB

2 STRIPS BITUMASTIC SEAL ON SLAB JOINTS

CEMENT MORTAR

0'-9" MIN.

24"
(2'x3')

16"
O.C.

*

SUMP

ALL STORM DOG HOUSED WRAPPED WITH GEOTEXTILE FABRIC, TYPE 4. OVERLAP FABRIC 12" ONTO ITSELF

4"
VAR.
(4' MIN.)
VARIABLE

PRECAST BASE	
MH DIA.	SLAB THICKNESS
48"	6"
54"-102"	8"
108"	10"
120"	12"

NOTES: NO WOOD SHALL BE USED FOR ADJUSTING CASTING; CEMENT MORTAR ONLY.

IN NEW DEVELOPMENTS CAST IRON FRAME AND GRATE CASTINGS TYPE R-3501-TB SHALL BE USED. CAST IRON FRAME AND GRATE CASTINGS TYPE R-3067-V (ON A GRADE) OR R-3067-VB (LOW POINTS) SHALL BE USED IN RECONSTRUCTION AREAS OR AS CALLED OUT IN PLANS.

MANHOLE STEPS SHALL BE CAST IRON, ALUMINUM, OR STEEL REINFORCED PLASTIC PER ASTM C478. LOCATION SHALL BE EASILY ACCESSIBLE.

PRECAST REINFORCED CONCRETE BASE SLAB & COVER SLAB PER ASTM C478.

PRECAST REINFORCED CONCRETE MANHOLE SECTIONS PER ASTM C478, FURNISHED WITH O-RING GASKETS & LUBRICANT.

FILL OPENING BETWEEN PIPE AND MANHOLE WALL WITH CEMENT MORTAR.

INSIDE SURFACE SHALL BE FINISHED SMOOTH. WRAP OUTSIDE OF DOGHOUSE WITH GEOTEXTILE FABRIC, TYPE 4, OVERLAP FABRIC 12" ONTO ITSELF.

ALL MORTAR SHALL CONFORM TO ASTM C270 AND MEET THE REQUIREMENTS OF MNDOT 2506.2B.

* REFER TO PLANS FOR SUMP DEPTH, IF ANY.

CATCH BASIN/MANHOLE WITH SUMP, TYPE 421

2/22/16



STANDARD DRAWING
NO.

421F