

NOTES:

1. HALF ROUND PLATE TO BE WELDED TO TOP FOR POLLUTION RETARDANT BASIN.
2. THE HALF ROUND PIPE SHALL BE ONE SIZE LARGER THAN DISCHARGE PIPE.
3. FOR STRUCTURE'S CONSTRUCTION DIMENSIONS AND SPEC'S., SEE PRECAST CATCH BASIN DETAIL.

POLLUTION RETARDANT CATCH BASIN

REVISIONS			
No.	Date	Description	By

Date: 6/9/09

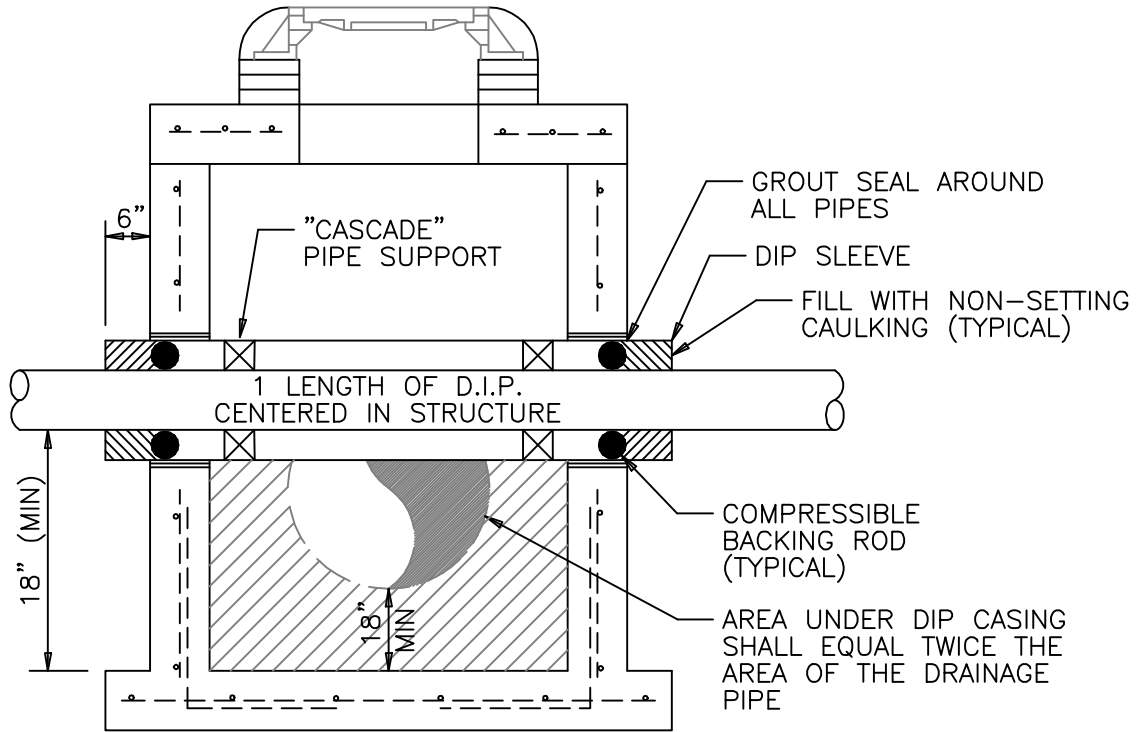
POLLUTION RETARDANT
 CATCH BASIN

Seal:

STANDARD DETAILS

FIGURE DR-1

CITY OF TAMARAC, BROWARD COUNTY, FLORIDA



CONFLICT MANHOLE

REVISIONS		
No.	Date	Remarks

Date: 4/20/09

Seal:

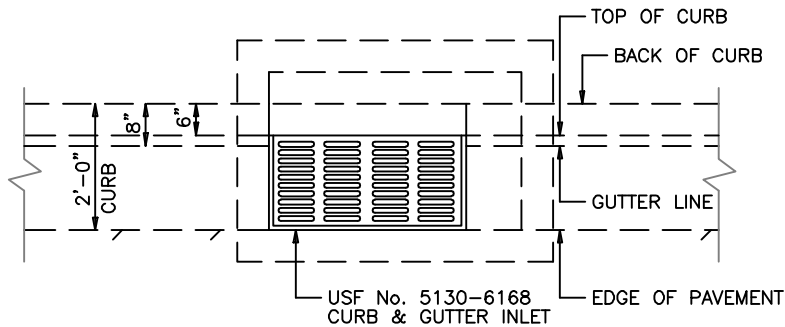
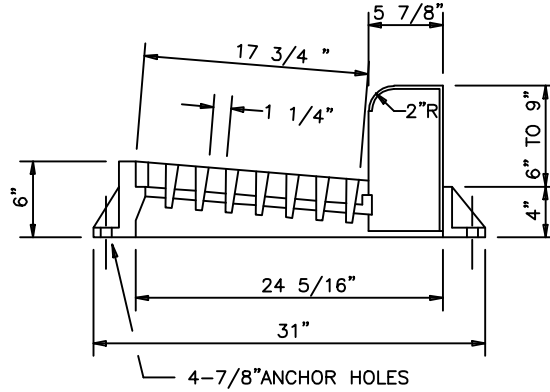
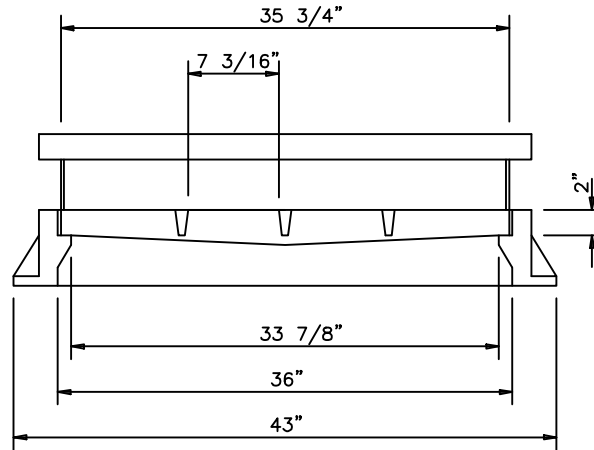
CONFLICT MANHOLE

Seal:

STANDARD DETAILS

FIGURE DR-2

CITY OF TAMARAC, BROWARD COUNTY, FLORIDA



CURB & GUTTER INLET

(USF 5130-6168)

REVISIONS		
No.	Date	Remarks

Date: 4/20/09

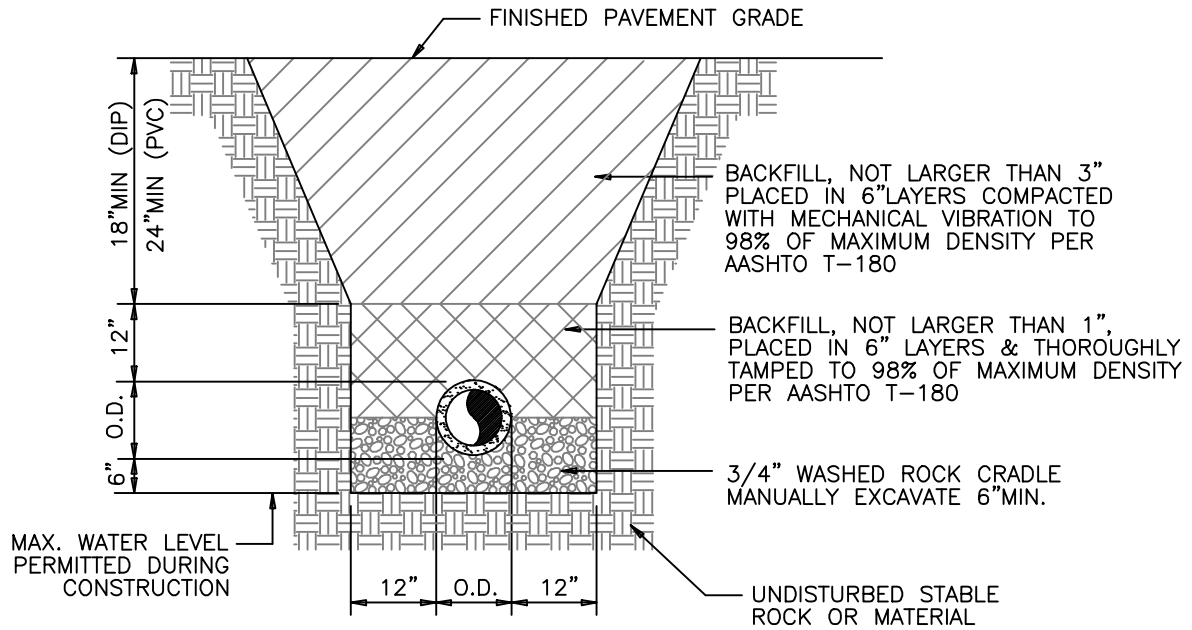
CURB AND GUTTER
 INLET

Seal:

STANDARD DETAILS

FIGURE DR-3

CITY OF TAMARAC, BROWARD COUNTY, FLORIDA



TYPICAL TRENCH DETAIL

REVISIONS			
No.	Date	Description	By

Date: 4/20/09

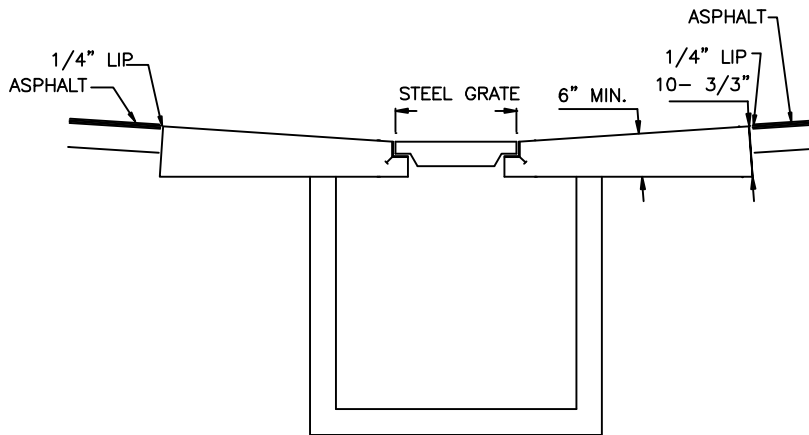
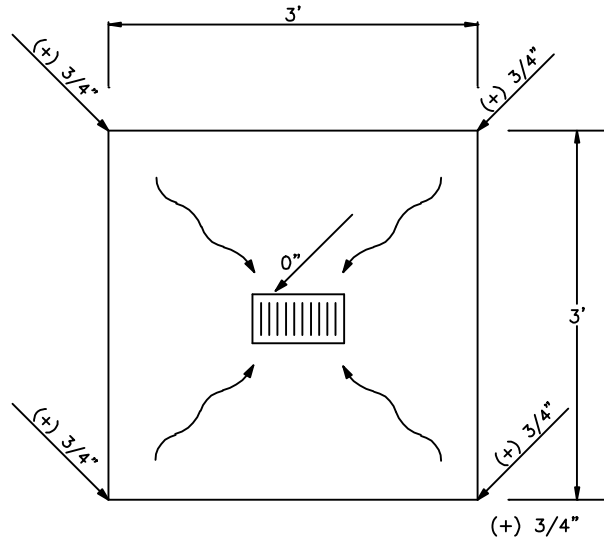
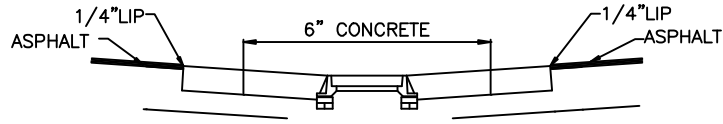
TYPICAL TRENCH

Seal:

STANDARD DETAILS

FIGURE DR-4

CITY OF TAMARAC, BROWARD COUNTY, FLORIDA



GENERAL APRON NOTES:

1. CONCRETE SHALL BE 3000 PSI STRENGTH @ 28 DAYS.

TYPICAL APRON DETAIL

REVISIONS		
No.	Date	Description

Date: 4/20/09

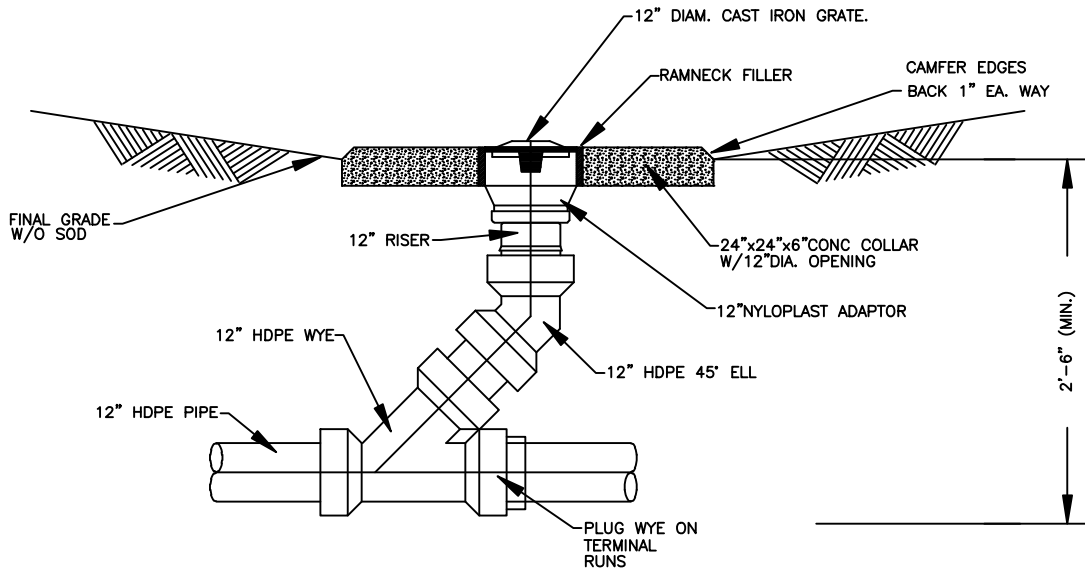
Seal:

CONCRETE
 APRON

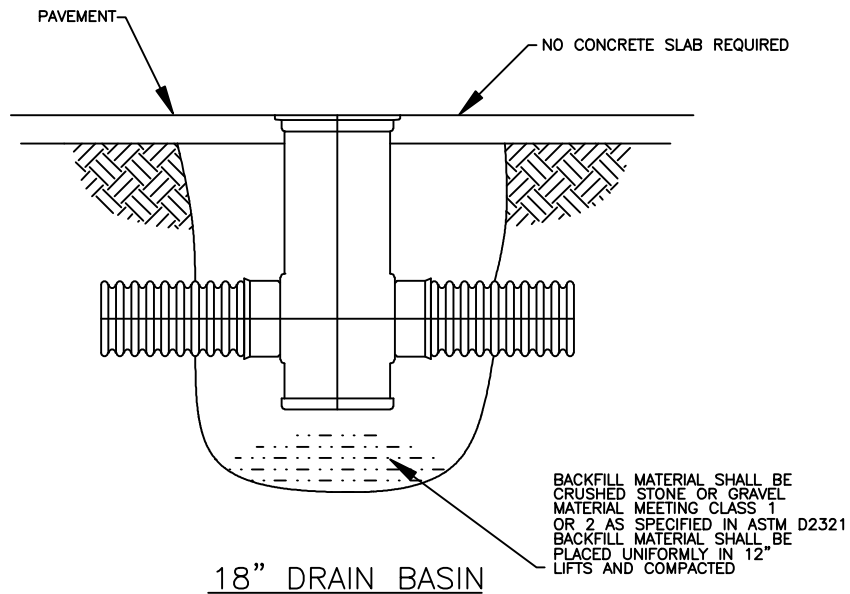
STANDARD DETAILS

FIGURE DR-5

CITY OF TAMARAC, BROWARD COUNTY, FLORIDA



NOTE: YARD DRAINS SHALL BE HIGH DENSITY POLYETHYLENE (HDPE) N-12 (ADVANCED DRAINAGE SYSTEMS) OR EQUAL.



YARD INLET DETAIL (NYLOPLAST OR EQUAL)

REVISIONS			
No.	Date	Description	By

Date: 4/20/09

YARD INLET

Seal:

STANDARD DETAILS

FIGURE DR-6

CITY OF TAMARAC, BROWARD COUNTY, FLORIDA

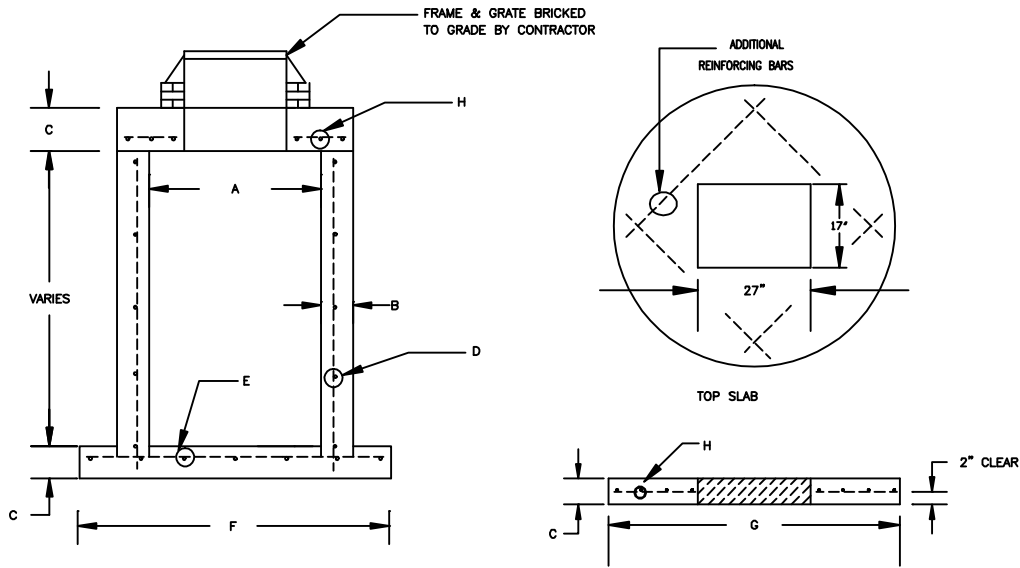
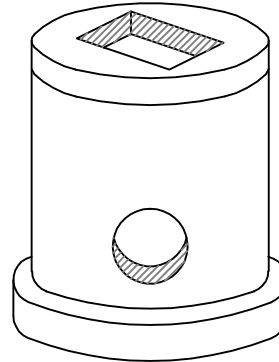
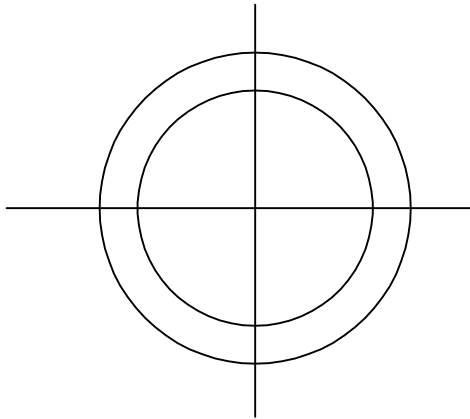


TABLE OF DIMENSIONS									
A#	B	C	D	E* C.C.E.W.	F#	G#	H* C.C.E.W.	HOLDING CAPACITY (gal./cft.)	
3'-6"	8"	8"	ASTM C-478	#4 AT 12"	4'-8"	4'-2"	#4 AT 6"	72	
3'-6"	8"	8"	ASTM C-478	#4 AT 12"	5'-0"	4'-6"	#4 AT 6"	72	
4'-0"	8"	8"	ASTM C-478	#4 AT 12"	6'-0"	5'-0"	#4 AT 6"	94	
4'-0"	8"	8"	ASTM C-478	#4 AT 12"	6'-4"	5'-4"	#4 AT 6"	94	
5'-0"	8"	8"	ASTM C-478	#5 AT 12"	7'-4"	6'-4"	#5 AT 6"	147	
6'-0"	6"	8"	ASTM C-478	#5 AT 6"	8'-0"	7'-0"	#5 AT 6"	211	
6'-0"	8"	8"	ASTM C-478	#5 AT 6"	8'-4"	7'-4"	#5 AT 6"	211	
7'-0"	8"	8"	ASTM C-478	#5 AT 6"	9'-4"	8'-4"	#5 AT 6"	288	
8'-0"	10"	10"	ASTM C-478	#5 AT 6"	10'-8"	9'-8"	#6 AT 6"	376	
10'-0"	12"	12"	ASTM C-478	#5 AT 6"	12'-0"	12'-0"	#6 AT 6"	587	

*GRADE 40, OR FOR EQUIVALENT STEEL DESIGNS.

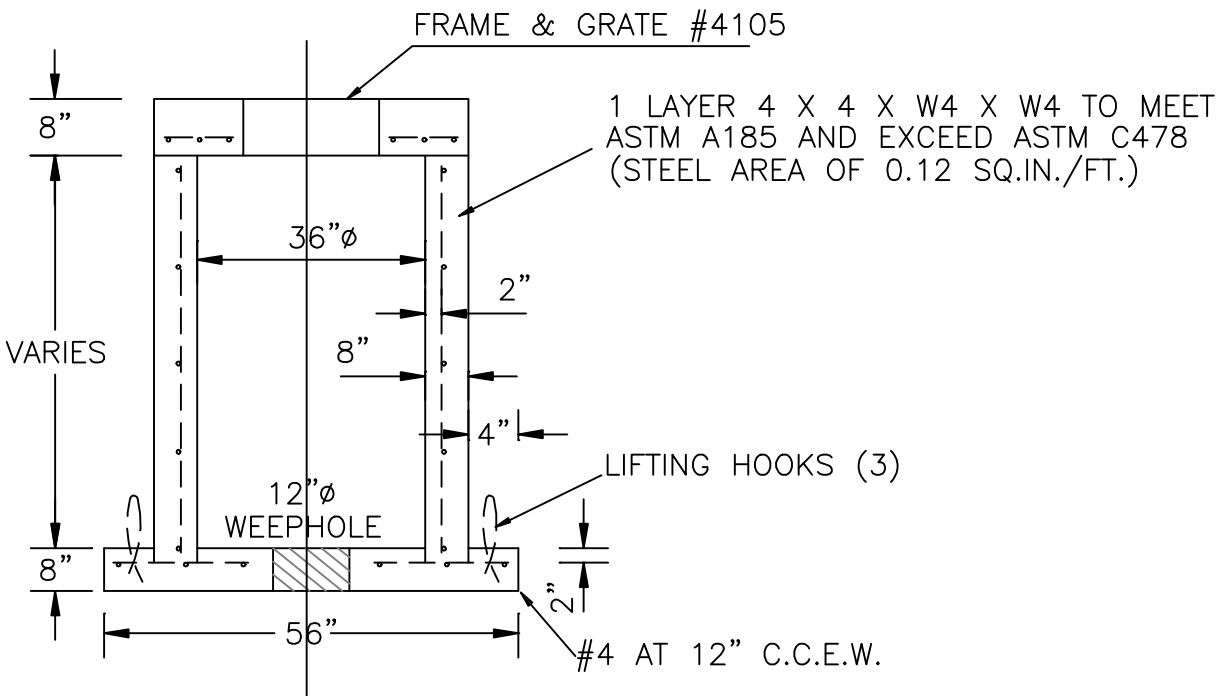
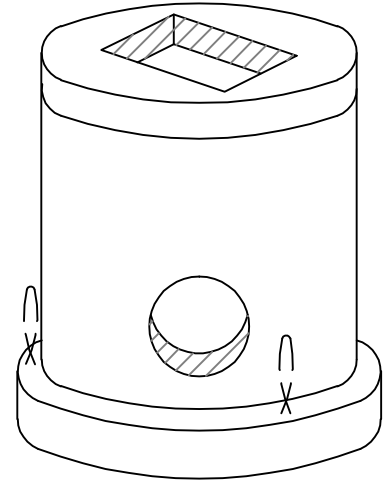
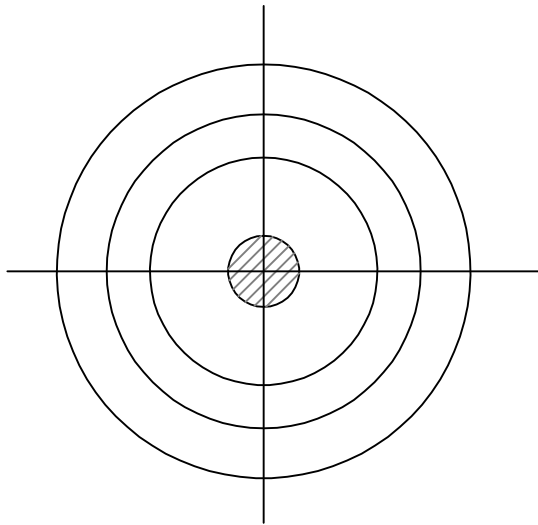
TYPE "C" CATCH BASINS 42"Ø - 120"Ø

REVISIONS		
No.	Date	Description

Date: 4/20/09
By: _____
TYPE "C"
CATCH BASIN

Seal: _____

STANDARD DETAILS
FIGURE DR-7
CITY OF TAMARAC, BROWARD COUNTY, FLORIDA



36" ROUND STRUCTURE

REVISIONS		
No.	Date	By

Date: 4/20/09

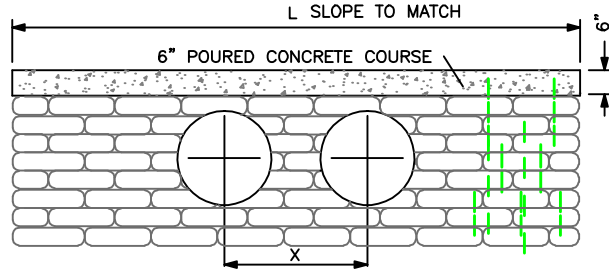
36" ROUND DRAINAGE STRUCTURE

Seal:

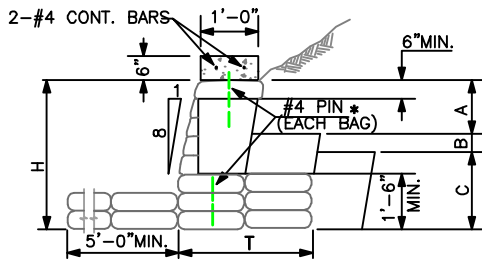
STANDARD DETAILS

FIGURE DR-9

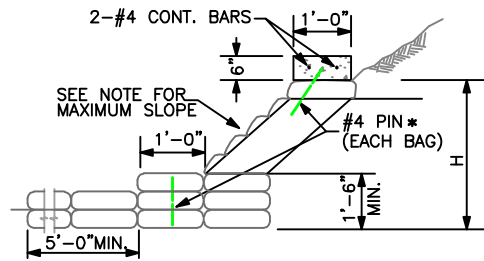
CITY OF TAMARAC, BROWARD COUNTY, FLORIDA



FRONT ELEVATION



TYPICAL SECTION
STRAIGHT END PIPE



TYPICAL SECTION
BEVEL END PIPE

		TABLE OF DIMENSIONS										
STRAIGHT END & BEVEL END	PIPE SIZE	H	T	A	B	C	X	L ONE PIPE	L TWO PIPES	L THREE PIPES	L FOUR PIPES	
		24"	4'-5"	2'-0"	2'-0"	2'-5"	0'-0"	3'-5"	9'-8"	13'-1"	16'-6"	19'-11"
	30"	5'-0"	2'-0"	2'-0"	3'-0"	0'-0"	4'-3"	11'-3"	15'-6"	19'-9"	24'-0"	
	36"	5'-7"	2'-0"	2'-0"	3'-7"	0'-0"	5'-1"	12'-11"	18'-0"	23'-1"	28'-2"	
	42"	6'-3"	3'-0"	2'-0"	2'-0"	2'-3"	6'-0"	14'-7"	20'-7"	26'-7"	32'-7"	
	48"	6'-10"	3'-0"	2'-0"	2'-0"	2'-10"	6'-9"	16'-3"	23'-0"	29'-9"	36'-6"	
BEVEL END ONLY	54"	7'-6"	* EXTEND THRU 3 BAGS MIX RATIO 3:PARTS SAND 1:PART CEMENT					7'-8"	18'-0"	25'-8"	33'-4"	41'-0"
	60"	8'-2"						8'-6"	19'-9"	28'-3"	36'-9"	45'-3"
	66"	8'-7"						21'-7"				
	72"	9'-3"						22'-6"				
	84"	10'-7"						24'-6"				
	96"	11'-11"						26'-6"				
	108"	13'-3"						28'-6"				
	120"	14'-7"						30'-6"				
	132"	15'-11"	32'-6"									
	144"	17'-3"	34'-6"									

NOTE:

BEVEL SLOPE SHALL NOT BE GREATER THAN 1:1 FOR SINGLE TIER CONSTRUCTION. WHEN THE PIPE BEVEL IS GREATER THAN 1:1, HEADWALLS SHALL BE CONSTRUCTED AS REQUIRED FOR STRAIGHT END PIPES.

STRAIGHT SAND-CEMENT RIP RAP HEADWALL

REVISIONS		
No.	Date	Remarks

Date: 4/20/09

Seal:

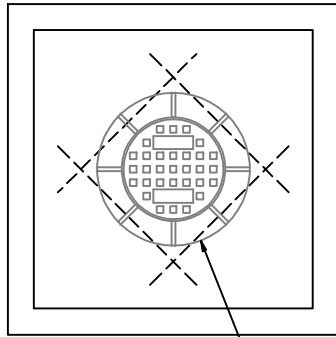
STRAIGHT SAND-CEMENT
RIP-RAP HEADWALL

Seal:

STANDARD DETAILS

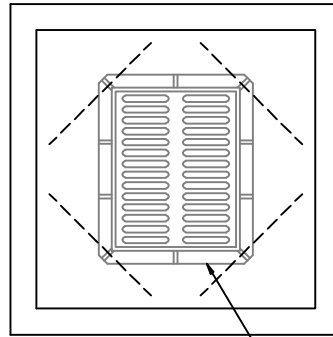
FIGURE DR-10

CITY OF TAMARAC, BROWARD COUNTY, FLORIDA



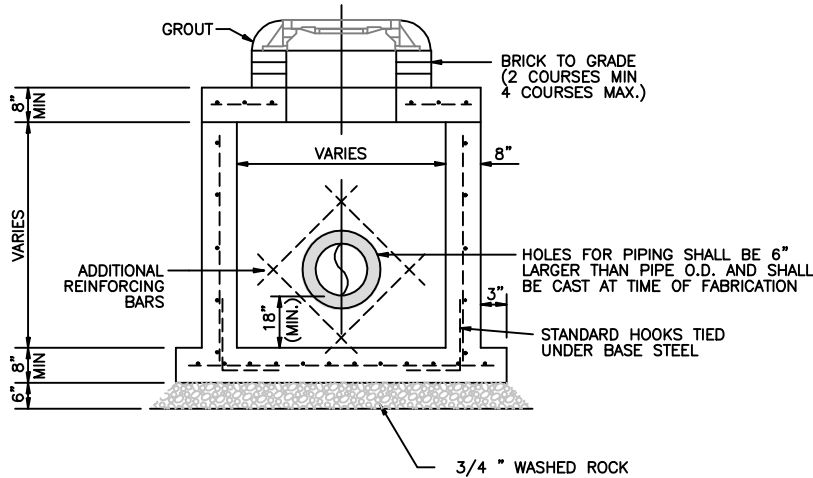
U.S. FOUNDRY FRAME & GRATE
 DRAWING No.420-B
 LABELED "STORM SEWER"
 (OR APPROVED EQUAL)

PLAN



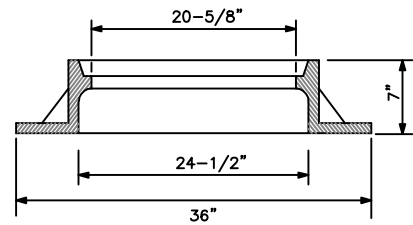
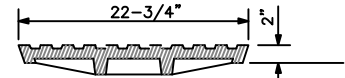
U.S. FOUNDRY FRAME & GRATE
 DRAWING No.4155-6212
 (OR APPROVED EQUAL)

IN GRASS AREAS, ALL GRATES
 SHALL HAVE A 2' CONCRETE
 APRON ALL AROUND.



SECTION

PRECAST DRAINAGE MANHOLE



MANHOLE FRAME & LID

USF# 420 C

REVISIONS		
No.	Date	Description

Date: 4/20/09

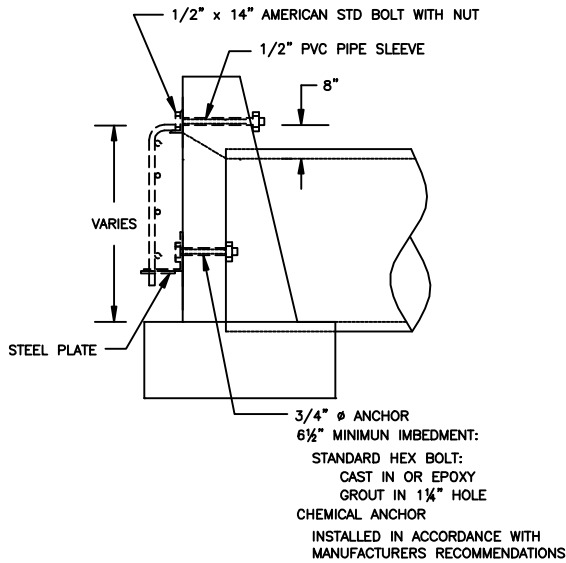
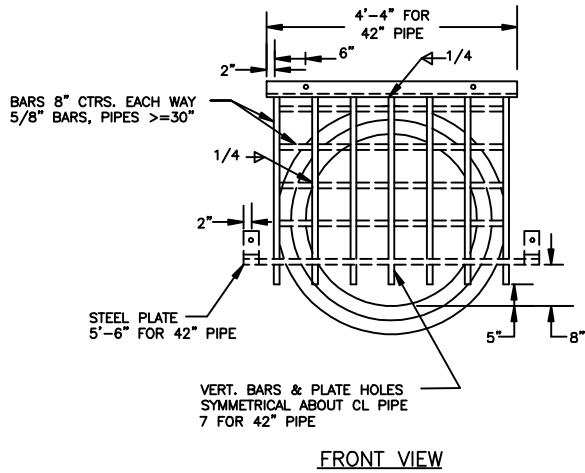
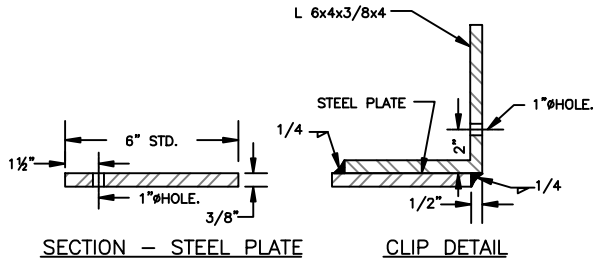
Seal:

PRECAST DRAINAGE
 MANHOLE

STANDARD DETAILS

FIGURE DR-12

CITY OF TAMARAC, BROWARD COUNTY, FLORIDA



SIDE VIEW

PIPE DIA	18"	24"	30"	36"	42"
GRATE (Lbs)	48	58	74	90	111

NOTE:

- GUARDS TO BE CONSTRUCTED ONLY AT LOCATIONS SPECIFICALLY CALLED FOR IN PLANS. GUARD, PLATE &
- FOR OTHER SIZES CHECK FDOT INDEX NO. 280

GUARD AT PIPE ENDS

REVISIONS		
No.	Date	Remarks

Date: 4/20/09

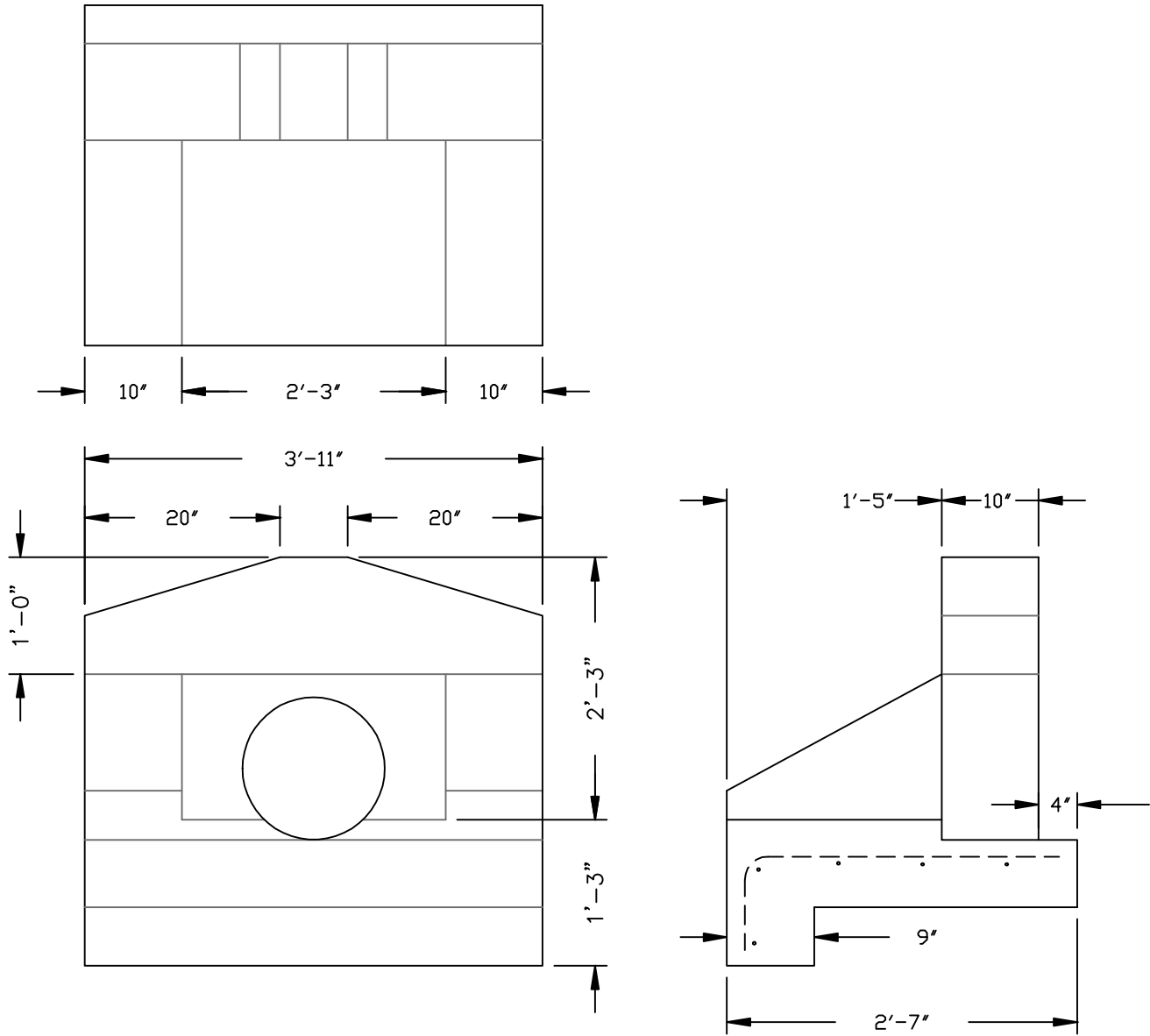
Seal:

GUARD AT PIPE END
PER FDOT INDEX N° 280

STANDARD DETAILS

FIGURE DR-13

CITY OF TAMARAC, BROWARD COUNTY, FLORIDA



F.D.O.T. TYPE U-ENDWALL WITH WINGS

REVISIONS		
No.	Date	Description

Date: 4/20/09

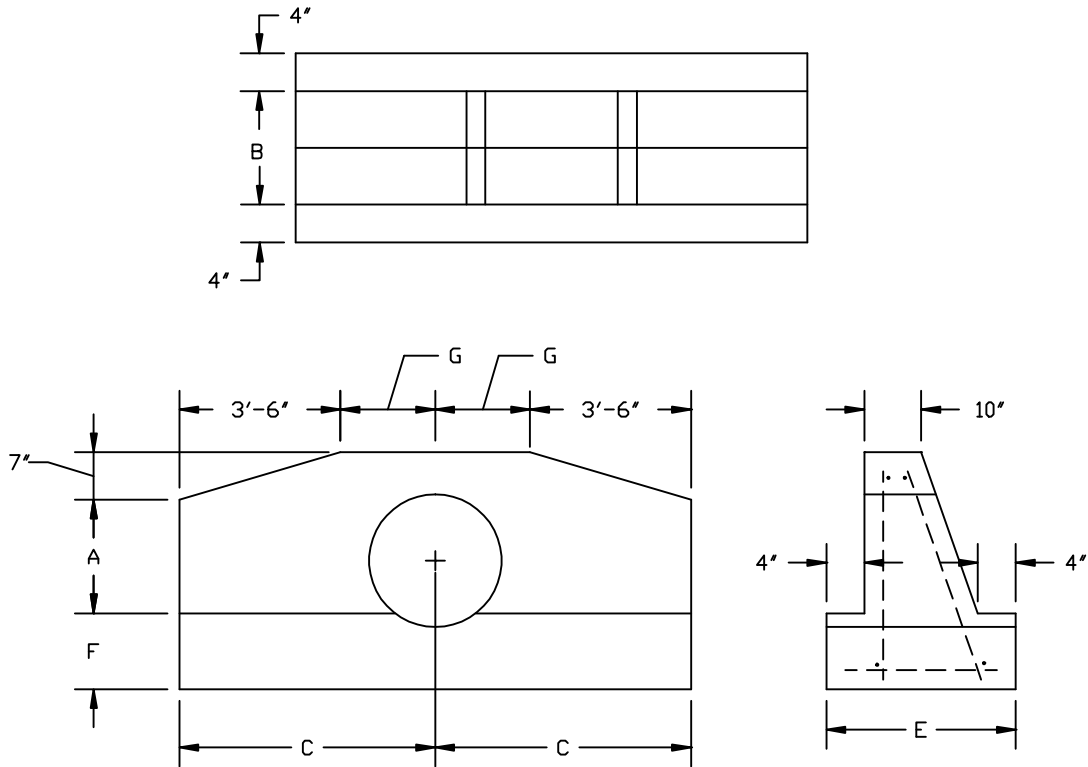
F.D.O.T. TYPE U-ENDWALL
 WITH WINGS

Seal:

STANDARD DETAILS

FIGURE DR-15

CITY OF TAMARAC, BROWARD COUNTY, FLORIDA



PIPE SIZE	A	B	C	E	F	G
15"	1'-11"	1'-2"	4'-0"	1'-10"	1'-2"	0'-6"
18"	2'-2"	1'-3"	4'-6"	1'-11"	1'-3"	1'-0"
24"	2'-8"	1'-4"	5'-0"	2'-0"	1'-4"	1'-6"

F.D.O.T. TYPE STRAIGHT ENDWALL

REVISIONS		
No.	Date	By

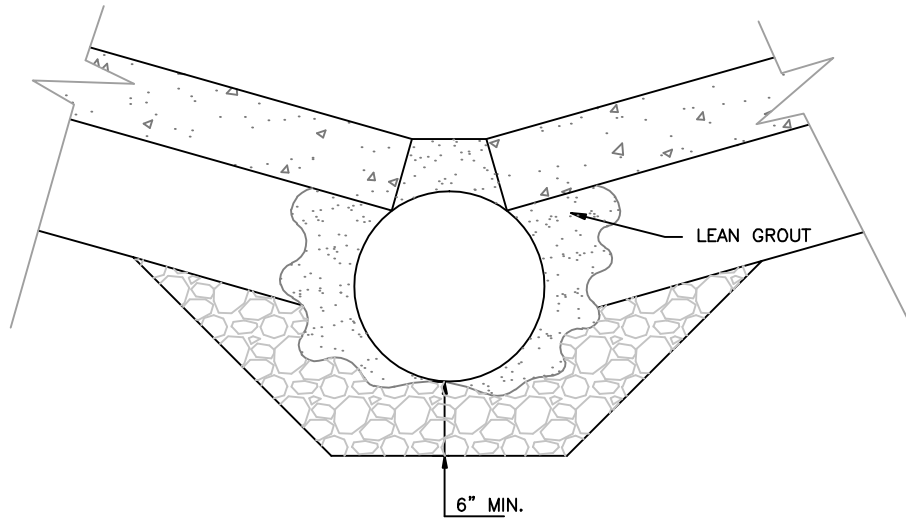
Date: 4/20/09
 STRAIGHT CONCRETE ENDWALL
 (FDOT INDEX N° 250)

Seal:

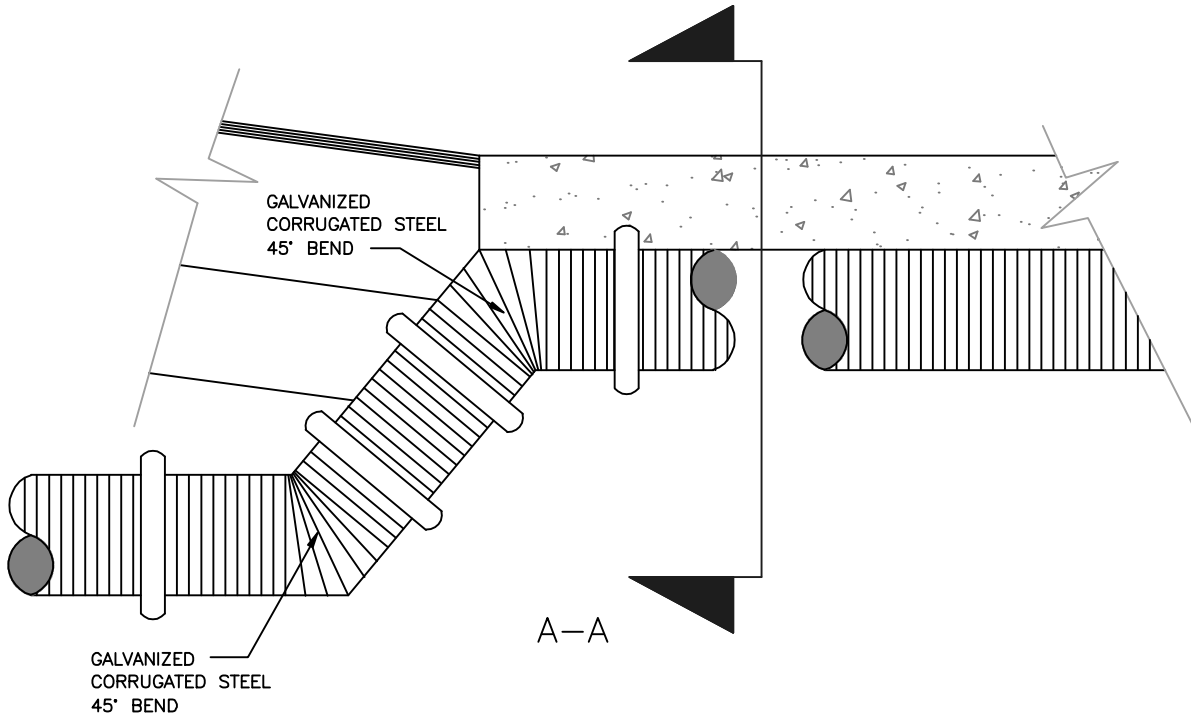
STANDARD DETAILS

FIGURE DR-16

CITY OF TAMARAC, BROWARD COUNTY, FLORIDA



SECTION "A-A"



WATER RATED SLOTTED DRAIN

REVISIONS		
No.	Date	Description

Date: 4/20/09

WATER RATED
SLOTTED DRAIN

Seal:

STANDARD DETAILS

FIGURE DR-17

CITY OF TAMARAC, BROWARD COUNTY, FLORIDA

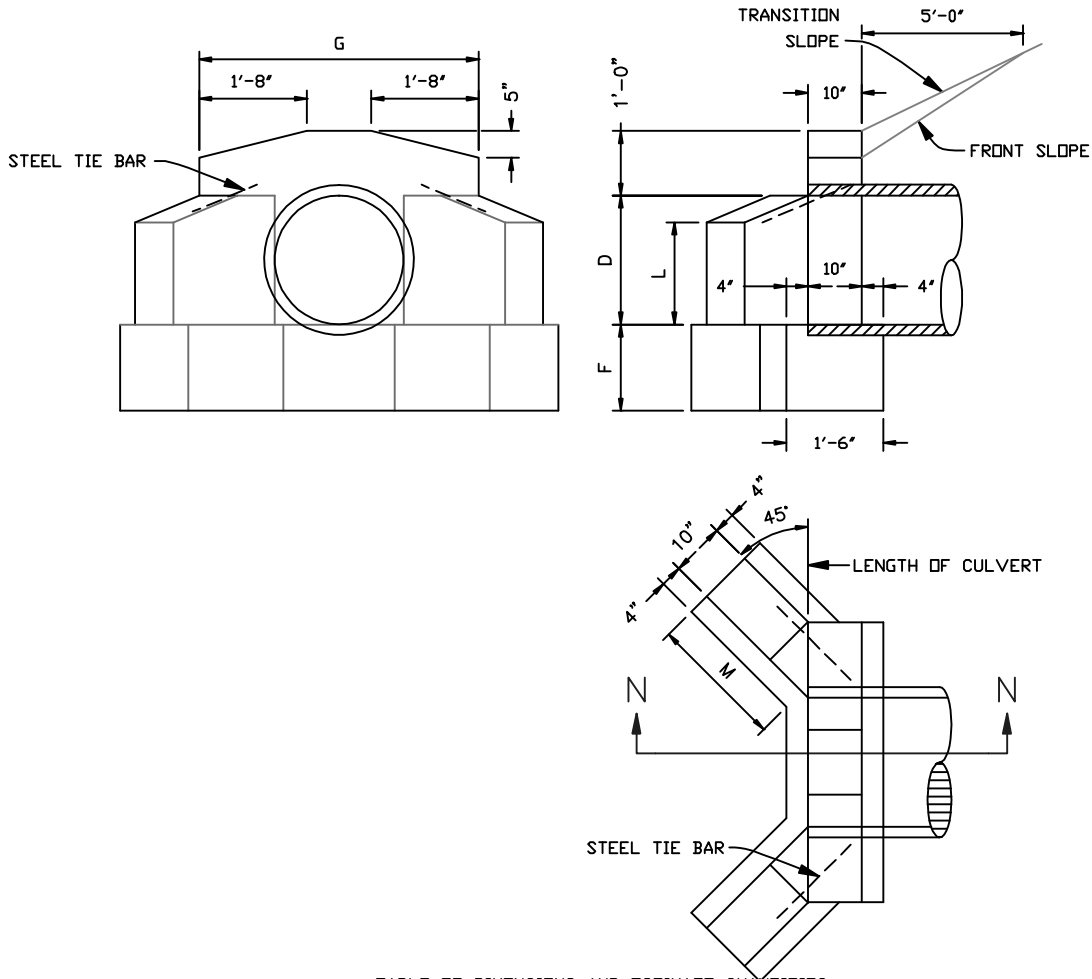


TABLE OF DIMENSIONS AND ESTIMATE QUANTITIES
 PIPE CULVERT ENDWALLS WITH 45° WINGS

DIMENSIONS							QUANTITIES IN ONE ENDWALL			
OPENING		WALL				FOOTING	CONCRETE, CLASS I			STEEL TIE BARS
D	AREA (S.F.)	H	G	L	M	F	TOTAL (C.Y.)			
							CONC. PIPE	C.M. PIPE	C.I. PIPE	
15"	1.2	2'-3"	3'-7"	1'-0"	1'-3"	1'-3"	0.56	0.59	0.59	NONE
18"	1.8	2'-6"	3'-10"	1'-2"	1'-7"	1'-3"	0.74	0.77	0.77	NONE
24"	3.1	3'-0"	4'-4"	1'-5"	2'-1"	1'-4"	1.01	1.06	1.06	2- 3/4"Ø x 2'-0"
30"	4.9	3'-6"	4'-10"	1'-9"	2'-5"	1'-6"	1.32	1.40	1.39	2- 3/4"Ø x 2'-0"
36"	7.1	4'-0"	5'-4"	2'-0"	2'-11"	1'-8"	1.72	1.83	1.82	2- 3/4"Ø x 3'-0"
42"	9.6	4'-6"	5'-10"	2'-3"	3'-6"	2'-0"	2.34	2.47		2- 3/4"Ø x 3'-0"
48"	12.6	5'-0"	6'-4"	2'-6"	4'-0"	2'-0"	2.74	2.90		2- 3/4"Ø x 3'-0"

CONCRETE ENDWALL WITH 45° WINGS

REVISIONS			
No.	Date	Description	By

Date: 4/20/09

Seal:

CONCRETE ENDWALL
 WITH 45° WINGS

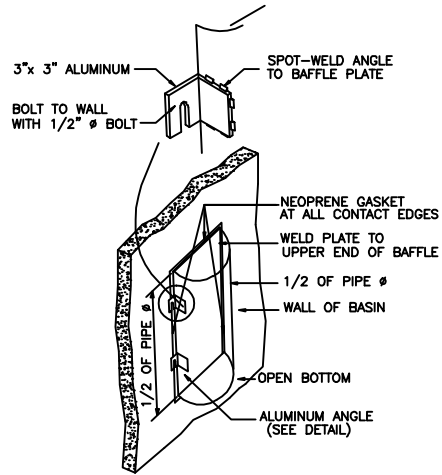
STANDARD DETAILS

FIGURE DR-18

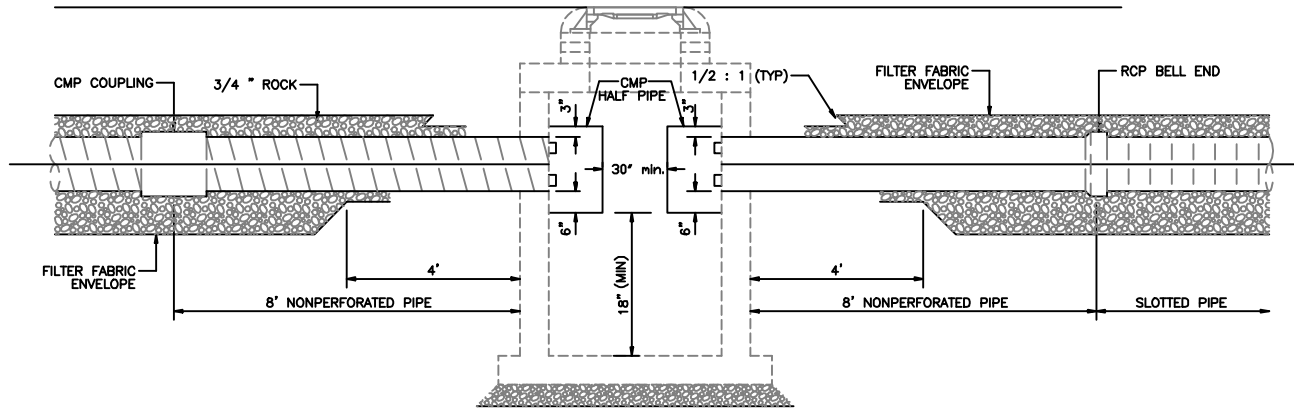
CITY OF TAMARAC, BROWARD COUNTY, FLORIDA

NOTES:

1. HALF ROUND PLATE TO BE WELDED TO TOP FOR POLLUTION RETARDANT BASIN.
2. THE HALF ROUND PIPE SHALL BE ONE SIZE LARGER THAN DISCHARGE PIPE.
3. FOR STRUCTURE'S CONSTRUCTION DIMENSIONS AND SPEC'S., SEE PRECAST CATCH BASIN DETAIL.
4. WEEP HOLES ARE NOT PERMITTED IN WELLFIELD AREAS.



CMP HALF PIPE WITH GASKET



TYPICAL EXFILTRATION TRENCH LONGITUDINAL SECTION

REVISIONS			
No.	Date	Description	By

Date: 4/20/09

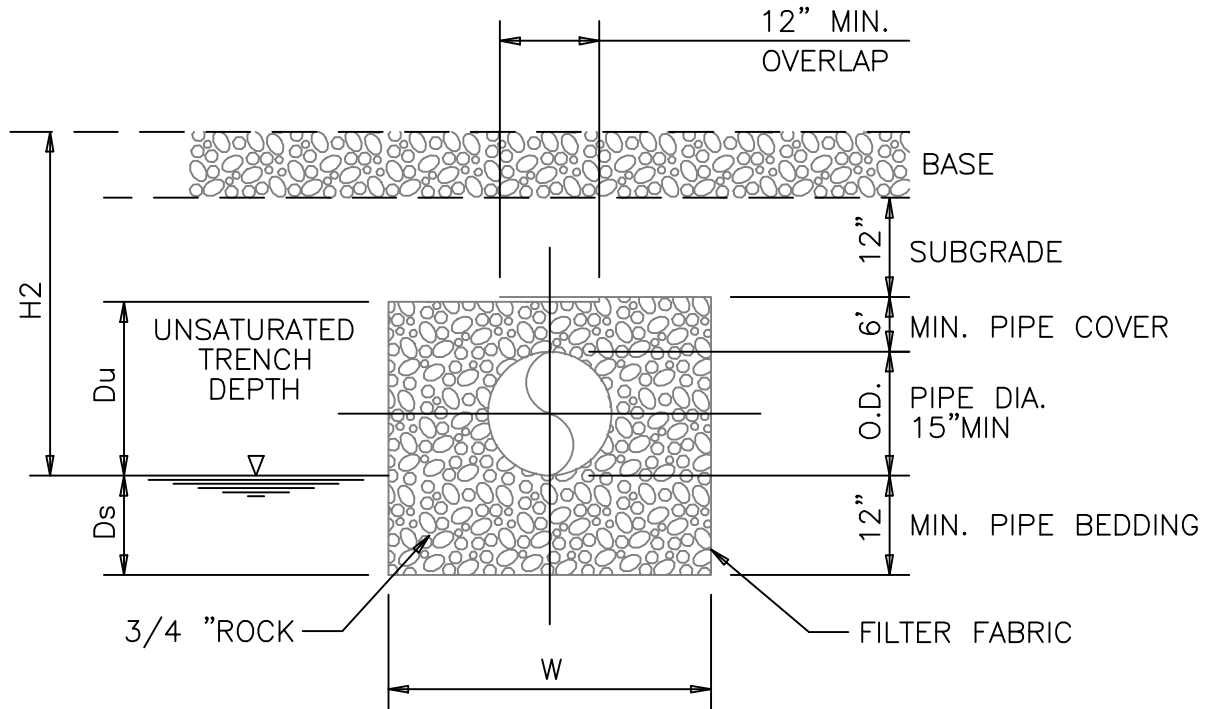
EXFILTRATION TRENCH LONGITUDINAL SECTION

Seal:

STANDARD DETAILS

FIGURE DR-19

CITY OF TAMARAC, BROWARD COUNTY, FLORIDA



- L= LENGTH OF TRENCH REQUIRED (FEET)
- V= VOLUME TREATED (ACRE - INCHES)
- W= TRENCH WIDTH (FEET)
- K= HYDRAULIC CONDUCTIVITY (CFS/FT²- FT. HEAD)
- H₂= DEPTH TO WATER TABLE (FEET)
- D_u= NON-SATURATED TRENCH DEPTH (FEET)
- D_s= SATURATED TRENCH DEPTH (FEET)

TYPICAL EXFILTRATION TRENCH

REVISIONS		
No.	Date	Remarks

Date: 4/20/09

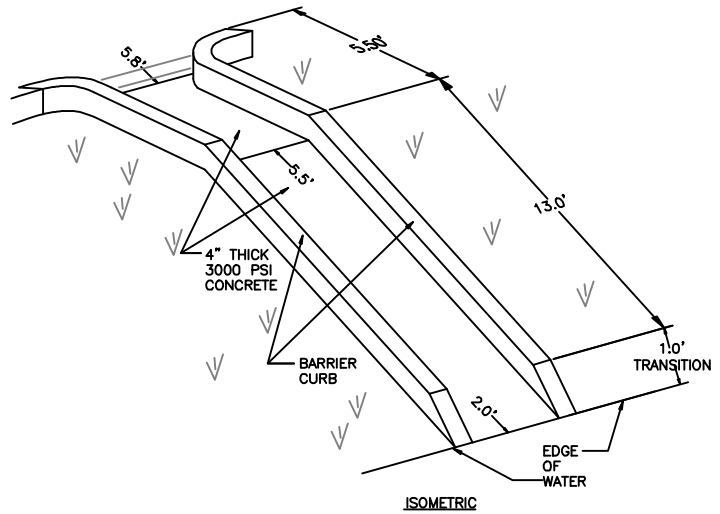
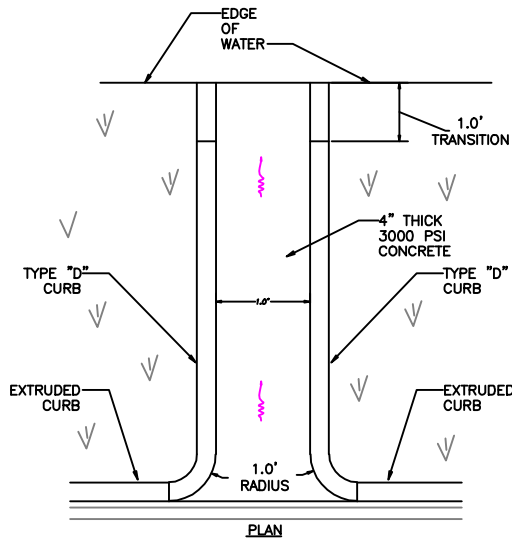
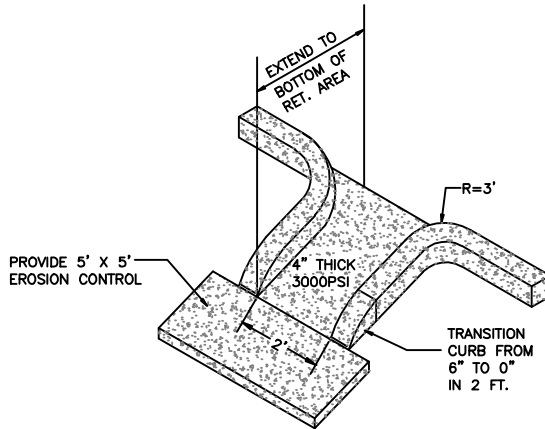
Seal:

TYPICAL EXFILTRATION TRENCH

STANDARD DETAILS

FIGURE DR-20

CITY OF TAMARAC, BROWARD COUNTY, FLORIDA

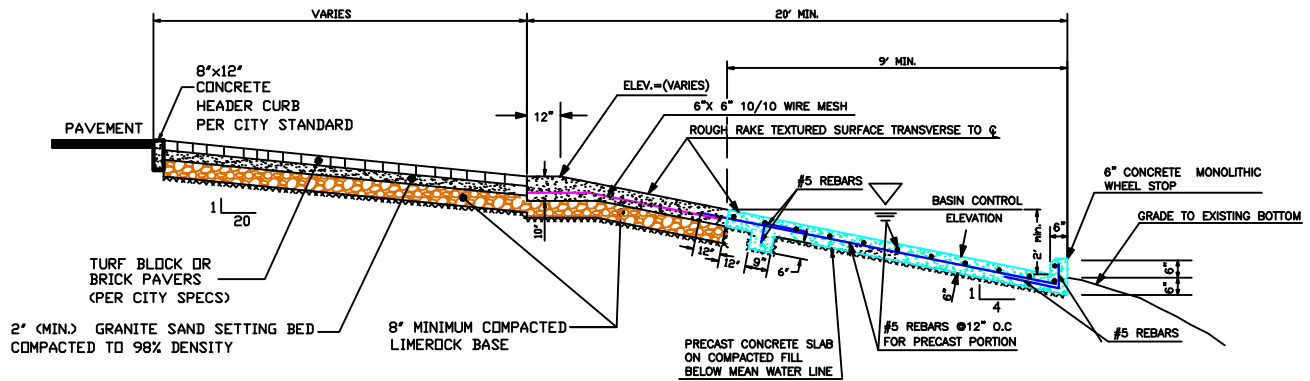


CONCRETE FLUME

REVISIONS		
No.	Date	Description

Date: 4/20/09	Seal:
CONCRETE FLUME	

STANDARD DETAILS
FIGURE DR-21
CITY OF TAMARAC, BROWARD COUNTY, FLORIDA



NOTES:

1. LOCATION OF BOAT RAMP(S) MUST BE IDENTIFIED, INSPECTED AND APPROVED BY THE CITY OF TAMARAC, ENGINEERING DIVISION PRIOR TO CONSTRUCTION.
2. THE BOAT RAMP(S) SHALL BE MINIMUM 12 FEET WIDE WITH #5 REBARS @12" O.C.E.W. AND REBARS SHALL EXTEND 12" BEYOND THE PRECAST STRUCTURE.
3. PROVIDE CONCRETE HEADER CURB AT PAVEMENT WHERE APPLICABLE.
4. CONTRACTOR/ ENGINEER SHALL PROVIDE TOPOGRAPHIC SURVEY INFORMATION OF BANK AND SUBAQUEOUS SURFACE TO ENSURE CONSTRUCTABILITY.
5. CONCRETE FOR SLAB TO BE MINIMUM OF 3,000 PSI AT 28 DAYS.
6. SIX (6)-INCHES THICK CONCRETE SLAB ON 8-INCHES LIME ROCK BASE. LIME ROCK BASE TO BE PROVIDED ABOVE MEAN WATER LINE.
7. RAMP SHALL EXTEND 2 FEET BELOW MEAN WATER LINE
8. ALL REINFORCING STEEL SHALL HAVE TWO (2) INCHES MINIMUM COVER

**SECTION THROUGH BOAT RAMP
 FOR BRICK PAVERS OR TURF BLOCK**

REVISIONS			
No.	Date	Description	By

Date: 4/20/09

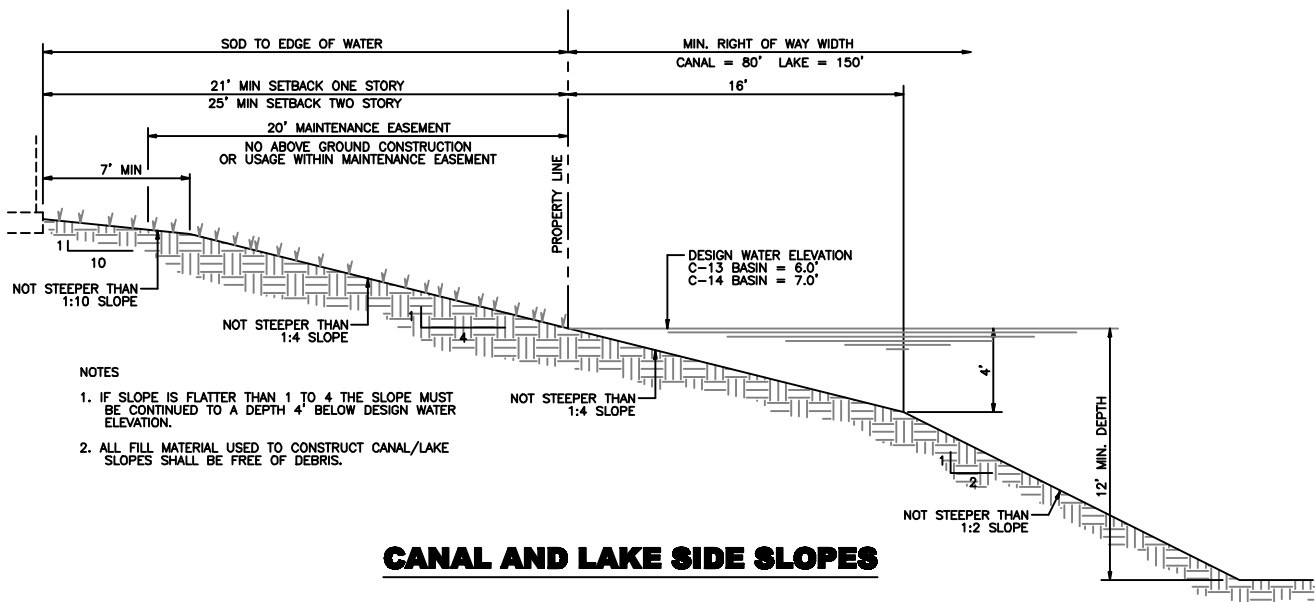
Seal:

SECTION THROUGH
 BOAT RAMP

STANDARD DETAILS

FIGURE DR-22

CITY OF TAMARAC, BROWARD COUNTY, FLORIDA



NOTES

1. IF SLOPE IS FLATTER THAN 1 TO 4 THE SLOPE MUST BE CONTINUED TO A DEPTH 4' BELOW DESIGN WATER ELEVATION.
2. ALL FILL MATERIAL USED TO CONSTRUCT CANAL/LAKE SLOPES SHALL BE FREE OF DEBRIS.

CANAL AND LAKE SIDE SLOPES

REVISIONS			
No.	Date	Description	By

Date: 4/20/09

Seal:

CANAL AND LAKE SIDE SLOPES

STANDARD DETAILS

FIGURE DR-23

CITY OF TAMARAC, BROWARD COUNTY, FLORIDA



NOTES:

*GEOWEB SPECIFICATIONS GW20V – 100 MM (4 IN) DEPTH
 (BY PRESTO PRODUCTS OR EQUAL)*

BASE MATERIAL:

- POLYMER – POLYETHYLENE WITH DENSITY OF 0.935–0.965 G/CM³
- COLOR – BLACK
- STABILIZER – CARBON BLACK CONTENT 1.5%–2.0% BY WEIGHT
- MINIMUM ESCR – 3000 HR

STRIP PROPERTIES:

SURFACE TREATMENT

PERFORMANCE – THE POLYETHYLENE STRIPS SHALL BE TEXTURED AND PERFORATED SUCH THAT THE PEAK FRICTION ANGLE BETWEEN THE SURFACE OF THE TEXTURED/PERFORATED PLASTIC AND A # 40 SILICA SAND AT 100% RELATIVE DENSITY SHALL BE NO LESS THAN 85% OF THE PEAK FRICTION ANGLE OF THE SILICA SAND IN ISOLATION WHEN TESTED BY THE DIRECT SHEAR METHOD PER ASTM D 5321. THE QUANTITY OF PERFORATIONS SHALL REMOVE 13.8% ±2.1 % OF THE CELL WALL AREA. MATERIAL – THE POLYETHYLENE STRIPS SHALL BE TEXTURED WITH A MULTITUDE OF RHOMBOIDAL (DIAMOND SHAPE) INDENTATIONS. THE RHOMBOIDAL INDENTATIONS SHALL HAVE A SURFACE DENSITY OF 22–31 PEN SQUARE CENTIMETER (140–200 PER SQUARE INCH). IN ADDITION, THE STRIPS SHALL BE PERFORATED WITH HORIZONTAL ROWS OF 10 MM (0.391 IN.) DIAMETER HOLES. PERFORATIONS WITHIN EACH ROW SHALL BE 19 MM (0.75 IN.) ON-CENTER. HORIZONTAL ROWS SHALL BE STAGGERED AND SEPARATED 12 MM (0.50 IN.) RELATIVE TO THE HOLE CENTERS. OUTER PERFORATION CENTERS SHALL BE 12 MM (0.50 IN.) FROM THE STRIP EDGES AND 25 MM (1.0 IN.) FROM THE CELL WELD POINTS.

CELL AND SEAM PROPERTIES:

CELL DETAILS

- DEPTH – 100 MM (4 IN.)
- LENGTH – 224 MM (8.8 IN.)
- WIDTH – 259 MM (10.2 IN.)
- DENSITY PER SQUARE METER (SQUARE YARD) – 36.4 (28.9)
- NOMINAL AREA ± 1 % – 289 SQUARE CENTIMETER (44.8 SQUARE INCHES)

SHORT-TERM SEAM PEEL STRENGTH

- CELL DEPTH – 75 MM (3 IN.)
- MINIMUM CERTIFIED CELL SEAM STRENGTH – 1420 N (320 LBF)

SEAM HANG STRENGTH TEST

A 100 MM (4 IN.) WIDE SEAM SHALL SUPPORT A 72.5 KG. (160 LB) LOAD FOR 7 DAYS MINIMUM IN A TEMPERATURE-CONTROLLED ENVIRONMENT UNDERGOING A TEMPERATURE CHANGE ON A 1-HOUR CYCLE FROM AMBIENT ROOM TO 54° C (130° F). AMBIENT ROOM TEMPERATURE PER ASTM E 41.

ALTERNATIVE SEAM HANG STRENGTH TEST

A 100 MM (4 IN.) WIDE SEAM SHALL SUPPORT A 72.5 KG. (160 LB) LOAD FOR 30 DAYS IN AN AMBIENT ROOM TEMPERATURE ENVIRONMENT. AMBIENT ROOM TEMPERATURE PER ASTM E 41.

SECTION PROPERTIES:

SECTION DIMENSIONS

- SECTION WIDTH (VARIABLE) 2.3 M (7.7 FT.) TO 2.8 M (9.2 FT.)
- SECTION LENGTH RANGE – MINIMUM 3.7 M (12.0 FT.) MAXIMUM 9.8 M (32.2 FT.)

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Date: 4/20/09

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 SPECIFICATIONS

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STANDARD DETAILS

FIGURE DR-24

CITY OF TAMARAC, BROWARD COUNTY, FLORIDA



GENERAL REQUIREMENTS

Engineering plans.

All final engineering plans for public and private improvements, including but not limited to canal or lake excavation, dredging, bulkheads, bridges, culverts, headwalls, endwalls, earthwork (cut or fill), grading, paving (including subgrade preparation, base and surface), sidewalks, curbs and gutters, median crossings, guardrails, street signs, storm drainage, water, sewer, utilities, cable, shall be submitted to the city engineer for review and approval prior to any construction.

(a) Application for an engineering permit shall include the following:

1. Four (4) complete sets signed and sealed plans by a registered professional engineer in the State of Florida.
- (a) Plans shall be submitted on 24" X 36" sheets except that for small projects, plans may be submitted on smaller sheets, provided all the required information fits on one (1) sheet.
- (b) Plans shall clearly indicate how proposed work and existing conditions are being integrated to meet the requirements of all applicable codes.
- (c) The plans shall bear the following statement by the engineer of record: "The proposed work has been designed in accordance with all applicable Federal, State, County and City of Tamarac Codes and regulations having jurisdiction. If any discrepancies exist between the plans/specifications prepared by the designer and the City of Tamarac Code and/or the City of Tamarac standard details, the later or most stringent shall govern."
2. Detailed certified cost estimate sealed by a registered professional engineer in the State of Florida on the approved City of Tamarac form, referred to as the cost estimate, copies of which form are available in the city engineer's office or www.tamarac.org.
3. All required development permits and staff reports from the South Florida Water Management District, State of Florida Department of Environmental Regulation, Florida Department of Transportation, Broward County Engineering Department, Broward County Environmental Protection Department, etc., that have jurisdiction.
4. Copies of the contractor's certificate of competency and insurance.
5. One (1) copy of the final plat with the plat report.
6. Prior to the issuance of any permit, other than for clearing and grubbing, submittal and approval of the public improvement bond is required. The bond shall be posted by the developer or his general contractor with the city in the amount of one hundred (100) percent of the itemized estimated cost, prepared and certified by an engineer registered in the state for all required public improvements. This bond shall be cash, irrevocable bank letter of credit, a cashier's check or other negotiable instrument, or a surety bond written by a company listed in the latest revision of circular 470 standard Surety Companies Acceptable on Federal Bonds. Also acceptable is a letter from a savings and loan or commercial bank stating that:
 - (a) It has committed funds in an amount equal to the cost of the project
 - (b) Moneys will be disbursed as work is done but only after inspection and approval by the design engineers and approval of the bank's engineers;
 - (c) The work will be completed in accordance with the approved engineering drawings and specifications as well as all applicable city ordinances;
 - (d) The bank or savings and loan guarantees completion if the developer does not complete;
 - (e) It is holding a separate collateral account in an amount equal to twenty-five (25) percent of the cost of the improvements, which moneys are to remain available one (1) year after formal approval and acceptance of subdivision improvement by the city, together with any needed corrections or insufficiencies in design, workmanship and/or materials which are found within one (1) year of the date of formal acceptance; and
 - (f) The moneys held will be released to the city upon demand if the city certifies that the work is not being done in accordance with specifications and drawings.
- (g) All bonds shall be approved by the city attorney (as to form) and the city engineer (as to dollar amount). Either may require such terms and/or conditions as they deem necessary for the protection of the city. The bond shall guarantee the completion of all stipulated improvements in accordance with the approved engineering plans and within a specified time period, approved by the city engineer and the city commission.

Permits.

Following approval of the final site development plan by the city commission, posting of all required public improvement bonds, execution of water and sewer developer's agreement payment of required fees and obtaining permits from all agencies having jurisdiction for the proposed work, the owner of the land being developed, or his bona fide agent, is required to obtain permits from the city for all land improvements occurring on public or private property. No improvement or alteration of any existing public or private property or utility shall be allowed without a city permit issued for such specific improvement. The permit shall be visibly displayed at all times during construction. As a condition of the permit, a copy of the approved record drawings furnished by the city engineer shall be on the project site at all times.

- (a) No person shall open any streets or median or alter or cut any curb adjacent to any street or thoroughfare without first obtaining a permit from the city authorizing such alteration or change of pavement or median cut.

Permits issued pursuant to this article shall be deemed in full force and effect until such time as the work covered thereby is complete. However, if work covered by a permit has not commenced within three (3) months from the date of issuance of the permit, or has been commenced and then suspended or abandoned for a period of sixty (60) days from the date of the most recent inspection, the permit automatically is terminated and shall become null and void unless special exception is granted by the city commission. Work shall be considered to have commenced and be in active progress when, in the opinion of the city engineer, a full complement of workers and equipment is present at the site to diligently incorporate materials and improvements into the project. When a permit has been terminated, all fees paid shall be forfeited and any work started after such termination shall be subject to all applicable city ordinances in effect at the time a subsequent permit is issued, and submittal of new cost estimates for all remaining incomplete improvements and fees paid for a new permit at the time of resumption of the work, and bond adjusted accordingly.

REVISIONS		
No.	Date	Remarks

Date: 6/9/09	Seal:
GENERAL REQUIREMENTS	

<p>STANDARD DETAILS</p> <p><i>FIGURE DR-25</i></p> <p>CITY OF TAMARAC, BROWARD COUNTY, FLORIDA</p>



GENERAL REQUIREMENTS

Roadways and Parking areas

- 1) The project designer shall provide a sufficient combination of lane width and edge of pavement radii to allow all passenger vehicle turning movements (into, out of and within the site) to occur without encroaching into other lanes.
- 2) A minimum backup distance of twenty (20) feet is required between property lines or interior drives and the first parking stall
- 3) Banks, savings and loans, and restaurants having drive-in window facilities are required to provide one-hundred-foot stacking lanes for each window, free of adjacent parking stalls and associated backup lanes
- 4) Each parking space required and provided shall be not less than ten (10) feet in width and eighteen (18) feet in length, with a two (2) feet overhang. This requirement is intended to be the minimum parking space size requirement and is not intended to require existing parking spaces to be decreased in size to meet this minimum requirement. All parking shall conform to this section and the City of Tamarac's standard details.
 - (a) All required parking stalls shall have direct and unobstructed access from a parking aisle
 - (b) All off-street parking areas shall be so arranged and marked as to provide for orderly, safe loading, unloading, parking and storage of vehicles, with individual parking stalls clearly defined with approved pavement markings or curbing and traffic signs provided as necessary for traffic control
 - (c) No driveway shall be constructed in the radius return of an intersection. No driveway shall be constructed closer than twenty-five (25) feet to the intersection of street right-of-way lines. No driveway entrance shall include any public facility such as traffic signal standards, catch basins, crosswalks, loading zones, utility poles, fire alarm supports, meter boxes, sewer cleanouts or other similar-type structures
- 5) Markings and curbing shall be as follows
 - (a) Parking lots shall be marked by painted lines or raised concrete curbs or other means to indicate individual spaces
 - (b) Posted signs and markers shall be used as necessary to ensure sufficient traffic operation of the lot
 - (c) All ingress and egress lanes shall be marked by appropriate painted lines, arrows and stop signs. The arrows shall be painted with plastic silicone reflective paint
 - (d) Each stall shall be marked by a painted four-inch-wide line on each side. The width of the stall shall be measured from centerline to centerline of the painted lines. Each stall shall be provided with wheel stops.
 - (e) All pavement markings located within the public right-of-way or City owned property shall be thermoplastic material, in accordance with FDOT Standard Specifications

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GENERAL REQUIREMENTS

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STANDARD DETAILS

FIGURE DR-25a

CITY OF TAMARAC, BROWARD COUNTY, FLORIDA



GENERAL REQUIREMENTS

Pavement requirements:

1. Vegetation, muck, large roots, stumps or other matter not suitable for inclusion in roadways, parking lots, and within the right-of-way limits of roadways and off-street parking areas shall be removed.
2. Subgrade fill material shall be clean material meeting FDOT Standard Specifications. All Subgrade material shall have a minimum LBR of 40. The top twelve (12) inches of the subgrade material shall meet or exceed 98% modified proctor density per AASHTO T-180 and compacted in maximum six (6) inch lifts. After the subgrade is complete, the Contractor shall obtain from an independent testing laboratory at his expense a minimum of one (1) density test per two thousand five hundred (2,500) square feet.
3. Base course shall consist of an eight (8) inch (compacted thickness) limerock layer. Limerock shall have a minimum percentage of Carbonates of Calcium and Magnesium of 70% and a minimum LBR of 100. The base shall meet or exceed 98% modified proctor density per AASHTO T-180. After the base is complete, the Contractor shall obtain from an independent testing laboratory at his expense a minimum of one (1) density test per two thousand five hundred (2,500) square feet of material.
4. A prime coat shall be used on the finished limerock base and a tack coat shall be used between paving courses. All paved areas shall receive a minimum asphaltic concrete surface course of one and one half (1 ½) inches, compacted thickness, two (2) ¾" Lifts.
5. The final layer of asphaltic concrete directly adjacent to on going construction shall not be constructed until such construction is complete. The developer shall place three-fourths inch of asphalt cement surface course and after construction is completed, the final three-fourths inch layer will be constructed
6. All roadways shall have required sodding and landscaping prior to final acceptance by the city.
7. Roadways shall be striped in accordance with the latest Florida Department of Transportation Standards for Pavement Markings, the Manual on Uniform Traffic Control Devices, Broward County Traffic Engineering and the City of Tamarac engineering standard details which can be obtained from the City Engineer's office.
8. The placement and maintenance of shrubbery, aboveground sprinkler systems, mailboxes, signs, tree trimmings, refuse, concrete blocks, coral rock, pyramid-shaped cement curbstones, or any other sharp-edged or pointed organic or nonorganic or poisonous material which could cause a road or traffic hazard, or injury to pedestrians, on the swale area adjacent to the public right-of-way within the ten-foot area measured from the edge of the paved surface of the vehicular right-of-way is prohibited.

Sight distance

If a driveway intersects a public right-of-way, there shall be no sight obstruction within a triangular area of property on both sides of a driveway formed by the intersection of each side of the driveway and the public right-of-way line, with two (2) sides of each triangle being ten (10) feet in length from the point of intersection and the third side being a line connecting the ends of the two (2) other sides

- (a) If a crosswalk intersects a vehicular access aisle, driveway or a public right-of-way, there shall be no sight obstruction within a triangular area of property on both sides of a crosswalk or walkway formed by the intersection of each side of the walkway and the public right-of-way or aisle, with two (2) sides of each triangle being ten (10) feet in length from the point of intersection and the third side being a line connecting the ends of the two (2) sides
- (b) Within the triangular areas described above, it shall not be permissible to install, set out or maintain, or to allow the installation, setting out or maintenance of, either temporarily or permanently, any vehicular parking space, sign, wall, hedge, shrubbery, tree, earth mound, natural growth or other obstruction of any kind which obstructs cross-visibility at a level between thirty (30) inches and eight (8) feet above the level of the center of the adjacent intersection. Any wall or fence within the sight triangle must be constructed in such a manner as to provide adequate cross-visibility over or through the structure between thirty (30) inches and eight (8) feet in height above the driving surface
- (c) The following will be permitted within that portion of the triangular area described above that is not in the public right-of-way:
 - 1) Trees having limbs and foliage trimmed in such a manner that no limbs or foliage extend into the area between thirty (30) inches and eight (8) feet above the level of the center of the adjacent intersection. Trees must be so located so as not to create a traffic hazard.
 - 2) Trees having a trunk diameter less than or equal to (4) four inches.
 - 3) Landscaping, except required grass or ground cover, shall not be located closer than five (5) feet from the edge of any roadway pavement, and three (3) feet from the edge of any alley or driveway pavement
 - 4) Fire hydrants, public utility poles, street markers and traffic-control devices.

Sidewalks.

Sidewalks shall be constructed in accordance with the City of Tamarac's standard detail sheets and this section.

- a) Sidewalks shall be required in all new construction. All buildings shall be connect by a continuous path and provide accessible routes throughout the development to the public transportation system. Sidewalks shall also be required in all rights of way adjacent to the private and public property to create a continuous network throughout the City.
- b) Sidewalks shall be a minimum of five (5) feet in width and four (4) inches thick for residential developments and (6) inches thick for commercial developments and sidewalks that cross over driveways. Sidewalks shall be constructed to a true line and grade from transit mix concrete having a minimum twenty-eight-day compressive strength of three thousand (3,000) psi. Metal or approved wood forms shall be used for all concrete work and all surfaces exposed when forms are removed shall be rubbed while the concrete is green to produce a finished surface smooth and even, free of form marks, voids and honeycomb. Any irregularities greater than one-fourth inch, as determined by placing a ten-foot straightedge parallel with, or a four-foot straightedge perpendicular to the long axis of the sidewalk, shall be cause for rejection of that section of sidewalk between joints. Sidewalk wearing surfaces shall have broom finish. Sidewalk shall meet ADA requirements.
- c) Subgrade material under sidewalks shall be clean material free of vegetation, muck, large roots or other deleterious material. The top six (6) inches of the soil shall be compacted to 98% per AASHTO T-180.

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GENERAL REQUIREMENTS

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STANDARD DETAILS <i>FIGURE DR-25b</i> CITY OF TAMARAC, BROWARD COUNTY, FLORIDA



GENERAL REQUIREMENTS

Engineer final certification

After all required improvements have been installed, the owner shall have the Engineer of record submit certification to the City that the improvements have been constructed according to the City of Tamarac Code and standard details, ADA requirements, approved plans/specifications and all other requirements set forth by agencies having jurisdiction, based on inspections of the site and review of as-built drawings.

As-built record drawings.

The developer shall engage the services of a professional engineer or land surveyor in the State of Florida to prepare record drawings of the improvements. Mylar sepia of the as-built project for the site plan and engineering drawings, signed, sealed and dated by the responsible professional. In addition, plans are to be submitted in a digital format in AutoCAD latest version. Digital File to be compatible with the City's GIS system. Record Drawings submitted to the City as part of the project acceptance shall comply with the following requirements:

a) Storm drainage. Record drawings shall include:

- 1) Length of pipe runs from center of structure to center of next structure, including the size and type of pipe used;
- 2) Type and size of each structure and its location with reference to property lines and/or the street centerline;
- 3) Top of rim elevations, grate elevations, manhole elevations and invert elevations of all pipes;
- 4) Inverts of swales shown at fifty-foot intervals coinciding with pavement interval elevations;
- 5) Cross-section drawings of the lakes and canals within and adjacent to the development at two-hundred-foot intervals;

The above-noted record drawings shall be submitted to the city engineer, and his approval thereof must be obtained prior to placement of limerock base course adjacent thereto. If the city engineer finds any or all of the work to be unacceptable, it shall be the responsibility of the developer to correct the unacceptable work and provide new record drawings for that portion of the work as provided above. In any event, approval of the drainage must be obtained from the city engineer prior to the placement of any limerock base course.

b) Pavement. Record drawings shall include:

- 1) Finish grades at the edge of finished rock and centerline at longitudinal intervals of not more than fifty (50) feet, street intersections and/or all changes in gradient;
- 2) Top of rim elevations of all sanitary sewer manholes within areas to be paved.
- 3) Top and/or Lip of curb elevations and curb flow line elevations if applicable.

The above-noted record drawings shall be provided to the city engineer and his approval must be obtained prior to the placement of the asphaltic surface course. If the city engineer finds any or all of the work to be unacceptable, then it shall be the responsibility of the developer to correct the unacceptable work and provide new record drawings for that portion of the work as provided above. In any event, approval of the base course must be obtained from the city engineer prior to placement of any asphaltic surface course.

Easements

Recorded easements shall be provided for the installation of all underground utilities facilities, in conformance with such size and location of easements as may be determined by the city engineer to be compatible with the requirements of all utility companies involved with respect to a particular utility service.

- a) Easements across lots or centered on rear or side lot lines shall be provided for public utilities where necessary and shall be at least twelve (12) feet in total width
- b) Where a subdivision is traversed by a watercourse, drainage way, canal or stream, there shall be provided a drainage easement or right-of-way, conforming substantially with the lines of such watercourses. Parallel streets or maintenance easements may be required where necessary for service or maintenance
- c) Easements may be required for drainage purposes, of such size and location as may be determined by the city engineer or by a drainage district if the plat lies within its jurisdiction. Such shall be required if necessary to tie into the city drainage system or any drainage district plan by the city engineer or the drainage district engineer
- d) All canal maintenance easements shall be a minimum of twenty (20) feet. No above ground construction or usage of this maintenance easement will be allowed.

Restoration

Pavement restorations shall conform with requirements of all applicable agencies having jurisdiction and the City of Tamarac' details.

- (a) Relocation of foliage. All natural foliage removed as a result of street cuts, median cuts, sidewalks or thoroughfare cuts shall be replaced or relocated at the expense of the applicant.
- (b) Laboratory and field tests which are necessary in the opinion of the city engineer to establish compliance with the compacted requirements of this section shall be conducted at the applicant's expense.
- (c) Temporary restoration shall be provided within the same day for the cutting of the pavement, street, curb or median. Such temporary restoration shall be constructed in a manner to provide a safety for the general public.
- (d) During the course of cutting and restoring any thoroughfare or street which consists of more than one (1) lane in either direction, not more than one (1) lane in either direction may be rendered impassable by traffic at any given time. Where practical, steel plates shall be used to facilitate through traffic during the period of construction.
- (e) Wherever pavement is damaged by the installation of new work or installation equipment, it shall be repaired to the full width of the lane.

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GENERAL REQUIREMENTS

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STANDARD DETAILS

FIGURE DR-25d

CITY OF TAMARAC, BROWARD COUNTY, FLORIDA



GENERAL REQUIREMENTS

Retention Requirements

(a) Water Quality and Pretreatment

- a. Water Quality and Pretreatment storage shall be designed in accordance with the South Florida Water Management District's (SFWMD) Permit Information Manual "Management and Storage of Surface Waters", latest edition.
- b. Water quality storage shall be provided for all development and shall be no less than one (1) inch of rainfall over the entire site.
- c. In addition to water quality storage, pretreatment storage shall be provided for all commercial and industrial development and shall be no less than one-half (1/2) inch of the rainfall over the entire site.
- d. Only the following storage volumes shall be credited towards water quality and pretreatment:
 - i. For the C-14 basin:
 - 1. Volumes stored in dry retention areas between elevations of 7.5 MSL and 10.0 MSL
 - 2. Volumes stored in wet detention areas between elevations of 7.0 MSL and 10.0 MSL
 - ii. For the C-13 basin:
 - 1. Volumes stored in dry retention areas between elevations of 6.5 MSL and 9.0 MSL.
 - 2. Volumes stored in wet detention areas between elevations of 6.0 MSL and 9.0 MSL.
 - iii. For either C-14 or C-13 basins, volumes stored in exfiltration trenches, calculated using the equations found in the South Florida Water Management District's Permit Information Manual "Management and Storage of Surface Waters", latest edition.
- e. The bottom of all dry retention areas shall be no lower than elevation 7.5 MSL within the C-14 basin and elevation 6.5 MSL within the C-13 basin.
- f. All water quality and pretreatment storage must be provided on site.

(b) Additional Retention

- a. The rains of April of 1979 and October of 1999 underscored the need for additional water storage areas within the City. The following minimum standards for additional retention within the C-14 drainage basin have been developed. It is imperative that all new development be subject to the minimum standards set for herein.
- b. The additional retention requirement applies only to the (C-14 basin) portion of the City of Tamarac lying west of NW 64th Avenue, less the area of land section 7, township 49 south, range 41 east.
- c. In addition to any other regulatory agency's storage requirements, new site plans shall be designed to provide nine thousand one hundred twenty five (9,125) cubic feet of additional stormwater retention per acre of development.
- d. Only the following storage volumes shall be credited towards additional retention:
 - i. Volumes stored in dry retention areas between elevations of 7.5 MSL and 10.0 MSL
 - ii. Volumes stored in wet detention areas between elevations of 7.0 MSL and 10.0 MSL
 - iii. Volumes stored in exfiltration trenches, calculated using the equations found in the South Florida Water Management District's Permit Information Manual "Management and Storage of Surface Waters", latest edition.
- e. The bottom of all dry retention areas used for the purpose of additional retention storage shall be no lower than elevation 7.5 MSL.
- f. All additional retention storage must be provided on site.

(c) Exfiltration Systems

- a. Exfiltration systems may be used to supplement retention areas for the purpose of water quality, pretreatment, and additional retention storage.
- b. Exfiltration trenches shall be designed in accordance with the South Florida Water Management District's (SFWMD) Permit Information Manual "Management and Storage of Surface Waters", latest edition.
- c. Final calculations for dimensioning exfiltration trenches shall be based on actual soil permeability tests performed on site.
- d. Exfiltration systems shall not be used in public right-of-ways or for any public facility.
- e. Maintenance access shall be provided on both sides of exfiltration trenches in the form of approved manholes or catch basins. The maximum distance between such access structures shall not exceed three hundred (300) feet.
- f. Geotextile materials used in the construction of exfiltration trenches shall be in accordance with the criteria of FDOT "Roadway and Traffic Design Standards", latest edition, Index no. 199.

Flood Protection

(a) Method of Discharge

- a. Connection to Public System
 - i. All development shall drain via positive outlets to a public system of adequate capacity. Such system may consist of an existing pipe of adequate capacity to accept the additional discharge generated from the project, a public canal or lake. If a connection to an existing system is proposed, calculations shall be submitted to prove that it can accept the proposed discharge in addition to existing areas.
 - ii. The connection to a public drainage system shall be at no cost to the City.
- b. Stand-Alone System
 - i. Land locked developments that do not have an adequate discharge point will have the option to build a system connected to an existing lake or canal, or to design a stand alone drainage system by detaining the runoff volume from the 100-Year/3-Day storm event on site with no impact to adjacent roadways or developments.
 - ii. Calculations shall be submitted to show that the proposed development will retain water on site up to the 100-Year/3-Day storm elevation with no impact to adjacent roadways or developments. Such calculations shall also show that the detained water will be drawn down to the design water elevation within 10 days.

(b) Design Storm Stage Elevations

- a. Drainage calculations shall show that the 10-Year/1-Day storm stage elevation is equal to, or lower than the lowest catch basin rim elevation within the roadway or parking area.
- b. Drainage calculations shall show that the 25-Year/3-Day storm stage elevation is equal to, or lower than the site perimeter elevation.
- c. Drainage calculations shall show that the minimum finished floor elevation is at or above the 100-Year/3-Day storm stage elevation.

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Date: 6/9/09

GENERAL REQUIREMENTS

Seal:

STANDARD DETAILS

FIGURE DR-25e

CITY OF TAMARAC, BROWARD COUNTY, FLORIDA

