Pond B
BUOYANCY CALCULATIONS

Buoyant Force Calculations

Buoyant Force = Volume Displaced, V_d x Specific Weight of Water

(Specific Weight of Water = 62.4 Lbs/Ft^3)

Volume Displaced, V_d							
	Outside Diameter	Area	Height	Volume Displaced			
	(Ft)	(Ft^2)	(Ft)	(Ft^3)			
Body	6	28.27	12.65	358	from elev	323.65 to	311.00
Bottom Slab	6	28.27	0.67	19	from elev	311.00 to	310.33
			V_d =	377	Ft^3		

Buoyancy Force = 377 Ft^3 x 62.4 Lbs/Ft^3 = **23,501 Lbs**

Downward Force Calculations

Downward Force = Weight, W_d x Specific Weight of Concrete + Weight of the Trash Rack

(Specific Weight of Concrete = 145 Lbs/Ft^3)

Weight, W_d							
	NET Area	Height		Volume			
	(Ft^2)	(Ft)		(Ft^3)			
Walls	8.64	12.65		109	from elev	323.65 to	311.00
Concrete in bottom of structure	19.63	4.00		79	from elev	315.00 to	311.00
Bottom Slab	28.27	0.67		19	from elev	311.00 to	310.33
			W_d =	207	Ft^3		

Downward Force = 207 Ft^3 x 145 Lbs/Ft^3 = 29,982 Lbs Concrete

135 Lbs Trash Rack

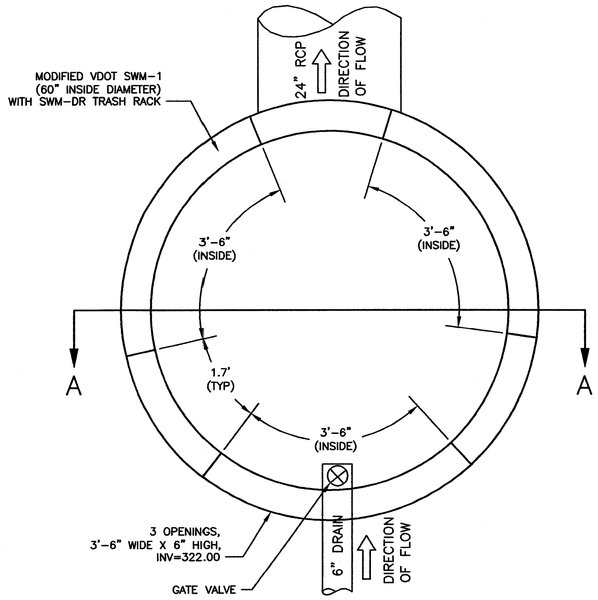
30,117 Lbs TOTAL WT OF STR

Resultant Force = Buoyant Force - Downward Force = **-6,616 Lbs (Downward)**

Safety Factor Required = 1.25

Safety Factor Provided = 1.28 (Downward Force/Buoyant Force)

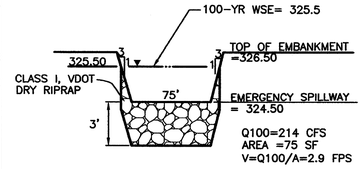
Pond B
STRUCTURE DETAILS



STRUCTURE NO. 4
PLAN

(WITH SWM-DR TRASH RACH REMOVED)
N.T.S.

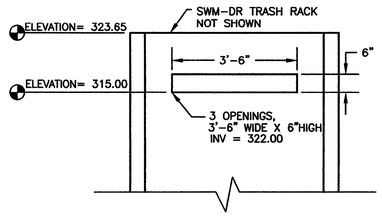
Pond B
EMERGENCY SPILLWAY



EMERGENCY SPILLWAY
CROSS SECTION D-D
N.T.S.

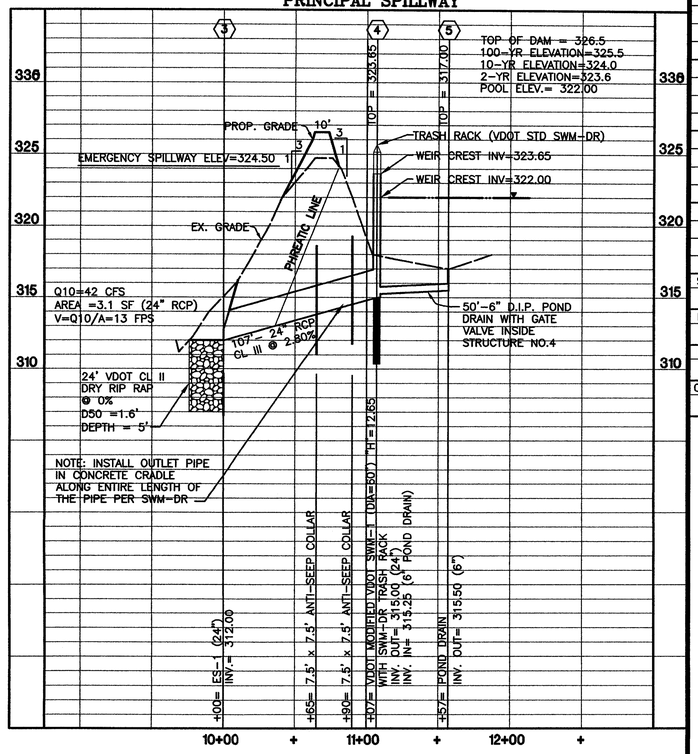
NOTES:

1. STRUCTURE NO. 4 IS A VDOT STANDARD SWM-1 EXCEPT FOR THE (3) 3'-6" WIDE X 6" HIGH OPENINGS AS SHOWN ON STRUCTURE NO. 4 PLAN VIEW DETAIL, THIS SHEET. FOR DETAILS NOT SHOWN (SEE VDOT, ROAD AND BRIDGE STANDARDS, SWM-1 AND SWM-DR, REV 3/03)
2. STRUCTURE NO.4 INVERT IS TO BE SHAPED IN ACCORDANCE WITH VDOT STANDARD IS-1.
3. STEPS ARE TO BE PROVIDED. FOR DETAILS OF STEPS, SEE VDOT STANDARD ST-1.
4. STRUCTURE 4 SHALL BE PRE-CAST.



SECTION A-A
N.T.S.

Pond B
PRINCIPAL SPILLWAY



Pond A
BUOYANCY CALCULATIONS

Buoyant Force Calculations

Buoyant Force = Volume Displaced, V_d x Specific Weight of Water

(Specific Weight of Water = 62.4 Lbs/Ft^3)

Volume Displaced, V_d							
	Outside Diameter	Area	Height	Volume Displaced			
	(Ft)	(Ft^2)	(Ft)	(Ft^3)			
Body	6	28.27	11.00	311	from elev	325.50 to	314.50
Bottom Slab	6	28.27	0.67	19	from elev	314.50 to	313.83
			V_d =	330	Ft^3		

Buoyancy Force = 330 Ft^3 x 62.4 Lbs/Ft^3 = **20,590 Lbs**

Downward Force Calculations

Downward Force = Weight, W_d x Specific Weight of Concrete + Weight of the Trash Rack

(Specific Weight of Concrete = 145 Lbs/Ft^3)

Weight, W_d							
	NET Area	Height		Volume			
	(Ft^2)	(Ft)		(Ft^3)			
Walls	8.64	11.00		95	from elev	325.50 to	314.50
Concrete in bottom of structure	19.63	3.25		64	from elev	317.75 to	314.50
Bottom Slab	28.27	0.67		19	from elev	314.50 to	313.83
			W_d =	178	Ft^3		

Downward Force = 178 Ft^3 x 145 Lbs/Ft^3 = 25,780 Lbs Concrete

135 Lbs Trash Rack

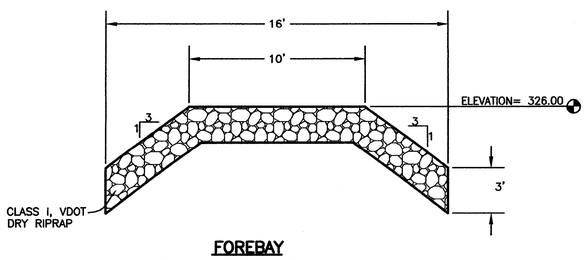
25,915 Lbs TOTAL WT OF STR

Resultant Force = Buoyant Force - Downward Force = **-5,325 Lbs (Downward)**

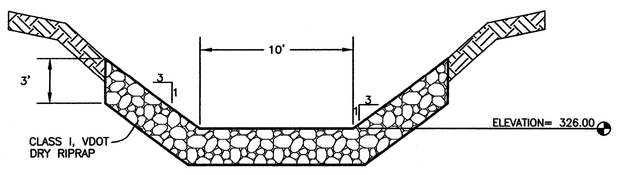
Safety Factor Required = 1.25

Safety Factor Provided = 1.26 (Downward Force/Buoyant Force)

Pond A
FOREBAY

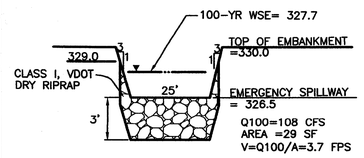


FOREBAY
CROSS SECTION B-B



FOREBAY
CROSS SECTION A-A

Pond A
EMERGENCY SPILLWAY



EMERGENCY SPILLWAY
CROSS SECTION C-C
N.T.S.

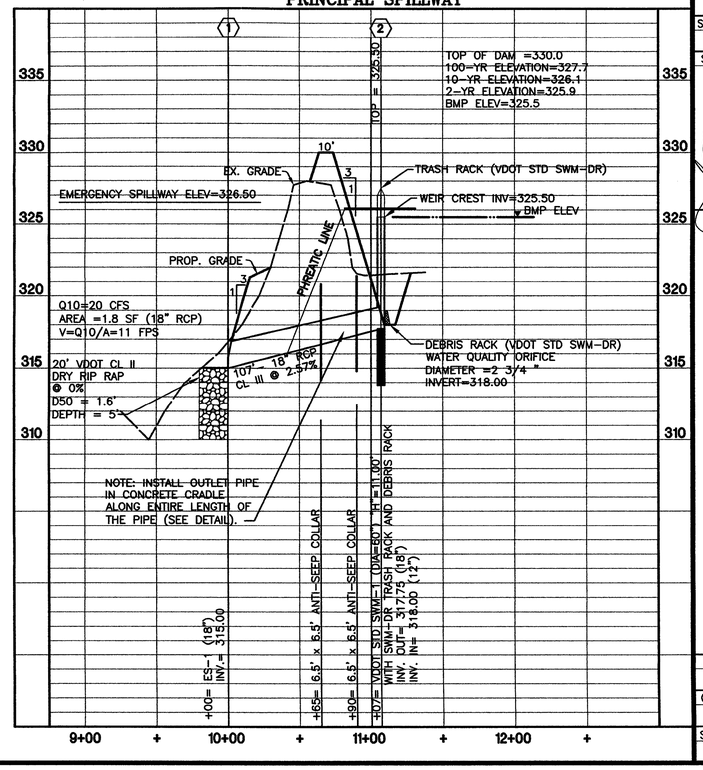
NOTES:

1. STRUCTURE NO. 2 IS A VDOT STANDARD SWM-1 INSIDE DIAMETER = 60" . FOR DETAILS NOT SHOWN (SEE VDOT, ROAD AND BRIDGE STANDARDS, SWM-1 AND SWM-DR, REV 3/03)
2. STRUCTURE NO.2 INVERT IS TO BE SHAPED IN ACCORDANCE WITH VDOT STANDARD IS-1.
3. STEPS ARE TO BE PROVIDED. FOR DETAILS OF STEPS, SEE VDOT STANDARD ST-1.
4. STRUCTURE 2 SHALL BE PRE-CAST.

ANTI-SEEP COLLAR NOTES

1. ALL ANTI-SEEP COLLARS AND THEIR CONNECTIONS TO THE CONDUIT SHALL BE WATERTIGHT AND MADE OF MATERIAL COMPATIBLE WITH THE CONDUIT.
2. ANTI-SEEP COLLARS SHALL BE PLACED A MINIMUM OF TWO FEET FROM PIPE JOINTS EXCEPT WHERE FLANGED JOINTS ARE USED.

Pond A
PRINCIPAL SPILLWAY



REVISIONS

SURVEY N/A

DESIGN SCP

DRAWN SCP

CHECKED JEM

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DATE 2/2004

SCALE HORZ: 1"=50' VERT: 1"=5'

SEAL

COMMONWEALTH OF VIRGINIA
JOHN E. MORRIS No. 7964
PROFESSIONAL ENGINEER
4/12/04

PROJECT

PROFILES AND STRUCTURE DETAILS

FINAL CONVERSION OF EXISTING SWM FACILITIES
LOUDOUN COUNY GOVERNMENT CENTER
CATOCTIN ELECTION DISTRICT
LOUDOUN COUNTY, VIRGINIA

JOB 2000-0501

CADD 07Plt-Detail.dwg

SHEET 7 OF 10

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