



January 23, 2017

Ms. Cindy Mulkey, Program Administrator
Office of Siting Coordination
Florida Department of Environmental Protection
2600 Blairstone Road, MS 5500
Tallahassee, FL 32399-2400

RE: Florida Power & Light Company
West County Energy Center
Power Plant Site Certification No. PA 05-47
Post-Certification Amendment Request

Dear Ms. Mulkey,

Florida Power & Light Company (FPL) is providing the following post-certification amendment request to expand the existing substation on the south end of the West County Energy Center (WCEC) to accommodate a 500kv switchyard. The expansion will increase the total impervious area of the substation by approximately 12 acres, creating a total impervious area of 22.5 acres. The proposed expansion will be located within the impervious 26.54 acre "South Basin" which was previously authorized, as described in the stormwater calculations for the WCEC Unit 3 expansion project. Stormwater runoff from this area will be diverted to the existing stormwater system. No dewatering is planned. Construction activities will adhere to the requirements of the "Conditions of Certification for the West County Energy Center Unit 1-3" and best management practices will be utilized to ensure there is no offsite erosion during construction.

A site map, WCEC site certification application "Appendix 10.6 – Stormwater Calculations", and the project design are attached for your review. If you have any questions regarding this submittal, please do not hesitate to contact Daniel Moretz at 561-691-2914.

Sincerely yours,
Florida Power & Light Company

A handwritten signature in blue ink that reads "Jena S. Mier". The signature is fluid and cursive, with the first name "Jena" being more prominent.

Jena S. Mier
Manager, FPL Licensing and Permitting

cc: Paul Wierzbicki, FDEP SED Office
Mindy Parrott, SFWMD
Lisa Prather, FDEP

Sugar Substaion Expansion

Write a description for your map.

Legend

 Expansion Area

Refer to page
15 of 24
"South Basin"
26.5 acres
impervious
area

Existing

New

1,155 ft. x 850 ft.
(22.5 acres, Total)

Google earth

© 2016 Google

2000 ft



APPENDIX 10.6

STORMWATER CALCULATIONS

**SURFACE WATER MANAGEMENT CALCULATIONS
FOR
FPL WCEC UNIT 3 EXPANSION
(ALL ELEVATIONS ARE NAVD)**

PREPARED BY:

SERRA ENGINEERING, INC.
10105 DOGWOOD AVENUE
PALM BEACH GARDENS, FLORIDA 33410
PH: (561) 627-5254 FAX: (561) 627-5446
EMAIL: serraeng@aol.com
FBPE CERTIFICATION AUTHORIZATION NUMBER: 7976

NOVEMBER, 2007



A circular professional engineer seal for the State of Florida. The seal contains the text "SERRA ENGINEERING, INC.", "S. SERRA", "P.E.", "NO. 35224", and "STATE OF FLORIDA". Overlaid on the seal is a handwritten signature "S. Serra" and the date "11/5/07".

FPL WCEC - UNIT 3 EXPANSION

11.14.07

SUMMARY

	WATER TABLE ELEV 11.5' NAVD	
	NORTH BASIN	SOUTH BASIN
BASIN AREA	89.75 AC	114.5 AC
BASIN POND AREA		
AT BOTTOM EL 15.0' NAVD	11.8 AC	13.0 AC
AT TOP EL 23.0' NAVD	14.1 AC	14.3 AC
25 YR - 3 DAY RUNOFF VOLUME	64.38 AC-FT	73.72 AC-FT
25 YR -3 DAY STAGE IN POND	20.13 FT NAVD	20.35 FT NAVD
MODRET INFILTRATION STAGE	17.22 FT NAVD	17.15 FT NAVD
2ND 25 YR-3 DAY STORM STAGE	22.22 FT NAVD	22.68 FT NAVD
100 YR-3 DAY STORM STAGE	20.86 FT NAVD	22.33 FT NAVD
TOP ELEVATION IN POND	23.0 FT NAVD	23.0 FT NAVD
OVERFLOW ELEVATION	23.75 FT NAVD	23.75 FT NAVD

EMERGENCY
SPILLWAY

NORTH BASIN
Contributing Area
89.75ac

IMPERVIOUS
AREAS

SOUTH BASIN
Contributing Area
114.5ac

EMERGENCY
SPILLWAY

14.1ac
TOB
(11.8ac at Bottom)

S 1000

S 2000

S 3000

S 7000

Serra Engineering, Inc.
10105 Dogwood Avenue
Palm Beach Gardens, FL 33410
11/14/07

**SURFACE WATER MANAGEMENT CALCULATIONS
FOR
FPL WCEC UNIT 3 EXPANSION**

TOTAL DRAINAGE AREA = 204.25 ACRES

NORTH BASIN AREA = 89.75 ACRES * UNITS 1 & 2

SOUTH BASIN AREA = 114.50 ACRES * UNIT 3

TOTAL CONTRIBUTING AREA = 204.25 ACRES

* AREAS FROM B&V'S 4/13/07 SITE RUNOFF ANALYSIS. FOR NORTH BASIN, AREA DOES NOT INCLUDE UNIT 1 & 2 COOLING TOWERS, FUEL OIL TRANSFORMER CONTAINERS & SCU'S

NORTH BASIN

LANDUSE BREAKDOWN

LANDUSE	AREA	IMPERVIOUS	PERVIOUS
DRY POND	14.10	0.00	14.10
IMPERVIOUS AREA **	55.85	55.85	0.00
OPEN SPACE	19.80	0.00	19.80
TOTAL	89.75	55.85	33.90

** INCLUDES UNIT 1, UNIT 2 AND ROADWAYS - DOES NOT INCLUDE RETENTION POND

% IMPERVIOUS AREA = 55.85 / 89.75 = 62.23 %

SOIL STORAGE FOR 25 YEAR - 3 DAY BACK TO BACK STORMS

NO SOIL STORAGE CREDIT TAKEN FOR DRY POND AREA. INFILTRATION THROUGH THE BOTTOM AND SIDES OF THE POND WILL BE ANALYZED USING MODRET

DEPTH TO WATER TABLE GREATER THAN 4'
USE COASTAL SANDS SOILS, DWT = 4'

"S" =
10.9 X 0.75 X 19.80 / 89.75 = 1.80 INCHES

CURVE NUMBER FOR 25 YEAR - 3 DAY BACK TO BACK STORMS

CN = (1000) / (10 + "S") = 84.7

SOIL STORAGE FOR 100 YEAR - 3 DAY STORM

DEPTH TO WATER WATER GREATER THAN 4'
USE COASTAL SANDS SOILS, DWT = 4'

"S" =
10.9 X 0.75 X 33.90 / 89.75 = 3.09 INCHES

CURVE NUMBER FOR 100 YEAR - 3 DAY STORM

CN = (1000) / (10 + "S") = 76.4

SITE GRADING - ALL ELEVATIONS ARE NAVD

11.8	ACRES OF	DRY POND	STORE	VERTICAL FROM EL	15.0		
2.30	ACRES OF	DRY POND	STORE	LINEAR FROM EL	15.0	TO	23.0
19.80	ACRES OF	OPEN SPACE	STORE	LINEAR FROM EL	23.0	TO	24.5
33.90	TOTAL SITE AREA						

SURFACE WATER MANAGEMENT CALCULATIONS

FOR

FPL WCEC UNIT 3 EXPANSION

NORTH BASIN CONT.

POST DEVELOPMENT SITE STORAGE

	DRY POND	DRY POND BK	OPEN SPACE	TOTAL AREA	ACRES
AREA	11.80	2.30	19.80	33.90	
S. ELEV	15.0	15.0	23.0		
E. ELEV		23.0	24.5		
STAGE FEET	VERTICAL STORAGE AC-FT	LINEAR STORAGE AC-FT	LINEAR STORAGE AC-FT	TOTAL STORAGE AC-FT	
NAVD					
15.0	0.00	0.00	0.00	0.00	
16.0	11.80	0.14	0.00	11.94	
17.0	23.60	0.57	0.00	24.17	
18.0	35.40	1.29	0.00	36.69	
19.0	47.20	2.30	0.00	49.50	
20.0	59.00	3.59	0.00	62.59	
21.0	70.80	5.17	0.00	75.97	
22.0	82.60	7.04	0.00	89.64	
23.0	94.40	9.20	0.00	103.60	
24.0	106.20	11.50	6.60	124.30	

NOTE: NO SITE STORAGE CREDIT TAKEN FOR IMPERVIOUS AREAS

DISCHARGE

THE SITE WILL CONTAIN ALL RUNOFF UP TO AND INCLUDING THE 100 YR - 3DAY STORM EVENT

SITE MUST PROVIDE ENOUGH STORAGE TO HOLD TWO 25 YEAR - 3 DAY STORM EVENTS
BACK TO BACK WITH A 72 HOUR DURATION BETWEEN STORMS (TOTAL VOLUME LESS
PERCOLATION AND EVAPORATION)

RAINFALL

STORM EVENT	RAINFALL	
25 YEAR - 3 DAY	10.5	INCHES
100 YEAR - 3 DAY	13.0	INCHES

25 YEAR - 3 DAY RUNOFF VOLUME

$$\text{R.O. VOLUME} = \frac{[P - (.2 S)]^2}{[P + (.8 S)]}$$

$$S = 1.80 \text{ INCHES}$$

$$P = 10.50 \text{ INCHES}$$

$$\text{R.O.} = 8.61 \text{ INCHES}$$

$$8.61 \text{ IN}/12 \text{ IN}/\text{FT} \times 89.75 \text{ ACRES} = 64.38 \text{ AC-FT}$$

$$\text{STAGE IN POND} = 20.13 \text{ FT NAVD}$$

SURFACE WATER MANAGEMENT CALCULATIONS

FOR

FPL WCEC UNIT 3 EXPANSION

NORTH BASIN CONT.

25 YEAR - 3 DAY INFILTRATION

UTILIZE MODRET TO ACCOUNT FOR THE INFILTRATION/PERCOLATION IN THE DRY POND FOR A 72 HOUR PERIOD AFTER THE FIRST 25 YEAR - 3 DAY STORM EVENT (ZERO DISCHARGE OFF-SITE). SINCE THERE IS NO DISCHARGE OFF-SITE, USE THE "POLLUTION" OPTION OF MODRET. THIS OPTION PUTS THE ENTIRE 25 YEAR - 3 DAY RUNOFF VOLUME INTO THE POND AS A "SLUG" VOLUME AND THEN CALCULATES THE INFILTRATION IN THE POND FOR A 72 HOUR DURATION. THE RESULTING STAGE WILL BE UTILIZED AS THE STARTING STAGE FOR THE NEXT 25 YEAR - 3 DAY STORM EVENT (ZERO DISCHARGE OFF-SITE).

INPUT PARAMETERS FOR MODRET

DESIGN HIGH WATER = 20.13 FT NAVD
(25 YEAR -3 DAY ZERO DISCHARGE STORM STAGE)

AREA AT STARTING WATER LEVEL =
(BOTTOM AREA OF DRY POND)
11.80 AC X 43560.0 FT²/AC= 514008.00 FT²

VOLUME BETWEEN STARTING WATER LEVEL & ESTIMATED HIGH WATER LEVEL
(25 YEAR - 3 DAY ZERO DISCHARGE RUNOFF VOLUME)
64.38 AC-FT X 43560.00 FT²/AC = 2804467.54 FT³

POND LENGTH TO WIDTH RATIO (L/W) = 1.95
POND LENGTH (L) = 1300 FT
AVE POND WIDTH (W) = 665 FT

ELEVATION OF EFFECTIVE AQUIFER BASE = -201.50 FT NAVD
FROM SFWMD, THE BOTTOM OF THE SURFICAL AQUIFER
IN THIS AREA IS AT ELEVATION -201.5' NAVD

ELEVATION OF SEASONAL HIGH GROUNDWATER TABLE = 11.50 FT NAVD
AVERAGE EXISTING GROUND ELEVATION AND
NORMAL CONTROL ELEVATION OF THE WEST PALM BEACH CANAL

ELEVATION OF STARTING WATER LEVEL = 15.00 FT NAVD
(BOTTOM ELEVATION OF POND)

ELEVATION OF POND BOTTOM = 15.00 FT NAVD

AVERAGE EFFECTIVE STORAGE COEFFICIENT OF SOIL FOR UNSATURATED ANALYSIS

BOTTOM ELEVATION OF POND = 15.00 FT NAVD
WATER TABLE ELEVATION = 11.50 FT NAVD
DEPTH TO WATER TABLE = 3.50 FT

USING TABLE A-1 FOR COMPACTED SOIL, f= 0.155

UNSATURATED VERTICAL HYDRAULIC CONDUCTIVITY

SOILS ARE SAND TO SLIGHTLY SILTY SAND, USCS = SP, SP-SM
FROM TABLE A-2, K_h = 30.00 FT/DAY
K_v CAN BE ESTIMATED FROM K_h USING A FACTOR OF

K_v = 30.00 FT/DAY / 1.5 = 20.00 FT/DAY

**SURFACE WATER MANAGEMENT CALCULATIONS
FOR
FPL WCEC UNIT 3 EXPANSION**

NORTH BASIN CONT.

FACTOR OF SAFETY FOR K_v (STANDARD VALUE) =	2	
SATURATED HORIZONTAL HYDRAULIC CONDUCTIVITY		
SOILS ARE SAND TO SLIGHTLY SILTY SAND, USCS = SP, SP-SM	30.00 FT/DAY	
FROM TABLE A-2, K_h =	30.00 FT/DAY	
AVERAGE EFFECTIVE STORAGE COEFFICIENT OF SOIL FOR SATURATED ANALYSIS		
25 YEAR - 3 DAY STAGE =	20.13 FT	NAVD
BOTTOM ELEVATION OF POND =	15.00 FT	NAVD
AVERAGE WATER ELEVATION IN POND =		
$\left[\frac{20.13 + 15.00}{2} \right] =$	17.57 FT	NAVD
WATER TABLE ELEVATION =	11.50 FT	NAVD
AVERAGE WATER DEPTH =	6.07 FT	
USING TABLE A-1 FOR COMPACTED SOIL, f =	0.22	
AVERAGE EFFECTIVE STORAGE COEFFICIENT OF POND (STANDARD VALUE)	1.00	
IMPERVIOUS BARRIER		
THERE IS AN IMPERVIOUS BARRIER (SLURRY WALL) INSTALLED ALONG A SEGMENT OF THE PROPERTY LINE BETWEEN FPL & THE PALM BEACH AGGREGATES SITE IN THE VICINITY OF THE NORTH POND		
BOTTOM ELEVATION OF BARRIER	-50.00 FT	NAVD
FROM MODRET ANALYSIS THE PEAK STAGE IN THE POND IS = (STAGE IS LESS THAN THE ZERO DISCHARGE STAGE AS THE MODRET STAGE ACCOUNTS FOR THE INITIAL INFILTRATION INTO THE BOTTOM OF THE POND)	19.49 FT	NAVD
72 HOUR STAGE =	17.22 FT	NAVD
TOTAL VOLUME INFILTRATED =	1566105.0 FT ³ 35.95 AC-FT	
VOLUME REMAINING IN POND =	28.43 AC-FT	
25 YEAR - 3 DAY RUNOFF VOLUME =	64.38 AC-FT	
ADD 25 YEAR - 3 DAY VOLUME TO REMAINING VOLUME		
TOTAL RESULTING VOLUME =	92.81 AC-FT	
NEW STAGE IN POND IS =	22.22 FT	NAVD
TOP OF POND ELEVATION =	23.0 FT	NAVD
OFF-SITE OVERFLOW ELEVATION =	23.75 FT	NAVD

NORTH BASIN IS RETAINING 2 - 25 YEAR- 3 DAY BACK TO BACK STORMS

**SURFACE WATER MANAGEMENT CALCULATIONS
FOR
FPL WCEC UNIT 3 EXPANSION**

NORTH BASIN CONT.

100 YEAR - 3 DAY RUNOFF VOLUME

$$\text{R.O. VOLUME} = \frac{[P - (.2 S)]^2}{[P + (.8 S)]}$$

$$S = 3.09 \text{ INCHES}$$

$$P = 13.00 \text{ INCHES}$$

$$\text{R.O.} = 9.91 \text{ INCHES}$$

$$9.91 \text{ IN}/12 \text{ IN/FT} \times 89.75 \text{ ACRES} = 74.13 \text{ AC-FT}$$

$$\text{STAGE IN POND} = 20.86 \text{ FT NAVD}$$

MODRET

SUMMARY OF UNSATURATED & SATURATED INPUT PARAMETERS

PROJECT NAME : FPL WCEC UNIT 3 DRAINS SOUTH-NORTH BASIN
POLLUTION VOLUME RUNOFF DATA USED
UNSATURATED ANALYSIS INCLUDED

Pond Bottom Area	514,008.00 ft ²
Pond Volume between Bottom & DHWL	2,804,467.50 ft ³
Pond Length to Width Ratio (L/W)	1.95
Elevation of Effective Aquifer Base	-201.50 ft
Elevation of Seasonal High Groundwater Table	11.50 ft
Elevation of Starting Water Level	15.00 ft
Elevation of Pond Bottom	15.00 ft
Design High Water Level Elevation	20.13 ft
Avg. Effective Storage Coefficient of Soil for Unsaturated Analysis	0.16
Unsaturated Vertical Hydraulic Conductivity	20.00 ft/d
Factor of Safety	2.00
Saturated Horizontal Hydraulic Conductivity	30.00 ft/d
Avg. Effective Storage Coefficient of Soil for Saturated Analysis	0.22
Avg. Effective Storage Coefficient of Pond/Exfiltration Trench	1.00

Hydraulic Control Features:

	Top	Bottom	Left	Right
Groundwater Control Features - Y/N	N	N	N	N
Distance to Edge of Pond	0.00	0.00	0.00	0.00
Elevation of Water Level	0.00	0.00	0.00	0.00
Impervious Barrier - Y/N	N	N	N	Y
Elevation of Barrier Bottom	0.00	0.00	0.00	-50.00

MODRET

SUMMARY OF RESULTS

PROJECT NAME : FPL WCEC UNIT 3 DRAINS SOUTH-NORTH BASIN

CUMULATIVE TIME (hrs)	WATER ELEVATION (feet)	INSTANTANEOUS INFILTRATION RATE (cfs)	AVERAGE INFILTRATION RATE (cfs)	CUMULATIVE OVERFLOW (ft ³)
00.00 - 0.00	11.500	0.000 *		
			0.00000	
0.00	11.500	55.14967		
			39.78410	
2.30	19.486	24.41853		0.00
			12.48967	
4.09	19.339	11.82380		0.00
			11.15793	
5.88	19.208	10.61127		0.00
			10.06460	
7.66	19.089	9.60926		0.00
			9.15393	
9.45	18.981	8.77379		0.00
			8.39365	
11.24	18.883	8.07129		0.00
			7.74893	
13.02	18.791	7.47439		0.00
			7.19984	
14.81	18.707	6.96354		0.00
			6.72724	
16.60	18.627	6.52425		0.00
			6.32125	
18.39	18.553	6.14265		0.00
			5.96405	
20.17	18.483	5.80894		0.00
			5.65384	
21.96	18.416	5.51527		0.00
			5.37670	
23.75	18.353	5.25491		0.00

Analysis Date: 11/14/2007

MODRET

SUMMARY OF RESULTS

PROJECT NAME : FPL WCEC UNIT 3 DRAINS SOUTH-NORTH BASIN

CUMULATIVE TIME (hrs)	WATER ELEVATION (feet)	INSTANTANEOUS INFILTRATION RATE (cfs)	AVERAGE INFILTRATION RATE (cfs)	CUMULATIVE OVERFLOW (ft ³)
			5.13311	
25.53	18.293	5.02404		0.00
			4.91496	
27.32	18.235	4.81707		0.00
			4.71918	
29.11	18.179	4.62964		0.00
			4.54009	
30.90	18.126	4.45979		0.00
			4.37948	
32.68	18.074	4.30598		0.00
			4.23248	
34.47	18.024	4.16482		0.00
			4.09715	
36.26	17.976	4.03492		0.00
			3.97268	
38.04	17.930	3.91531		0.00
			3.85794	
39.83	17.884	3.80364		0.00
			3.74935	
41.62	17.840	3.69975		0.00
			3.65016	
43.41	17.797	3.60438		0.00
			3.55859	
45.19	17.755	3.51499		0.00
			3.47140	
46.98	17.714	3.42934		0.00
			3.38728	
48.77	17.674	3.35001		0.00

Analysis Date: 11/14/2007

MODRET

SUMMARY OF RESULTS

PROJECT NAME : FPL WCEC UNIT 3 DRAINS SOUTH-NORTH BASIN

CUMULATIVE TIME (hrs)	WATER ELEVATION (feet)	INSTANTANEOUS INFILTRATION RATE (cfs)	AVERAGE INFILTRATION RATE (cfs)	CUMULATIVE OVERFLOW (ft ³)
			3.31273	
50.55	17.635	3.27505		0.00
			3.23737	
52.34	17.597	3.20382		0.00
			3.17027	
54.13	17.560	3.13640		0.00
			3.10252	
55.92	17.524	3.07222		0.00
			3.04191	
57.70	17.488	3.01168		0.00
			2.98146	
59.49	17.453	2.95309		0.00
			2.92473	
61.28	17.418	2.89807		0.00
			2.87141	
63.06	17.384	2.84507		0.00
			2.81874	
64.85	17.351	2.79451		0.00
			2.77028	
66.64	17.319	2.74613		0.00
			2.72198	
68.43	17.287	2.69945		0.00
			2.67692	
70.21	17.255	2.65440		0.00
			2.63187	
72.00	17.224			0.00

Maximum Water Elevation: 19.486 feet @ 2.30 hours

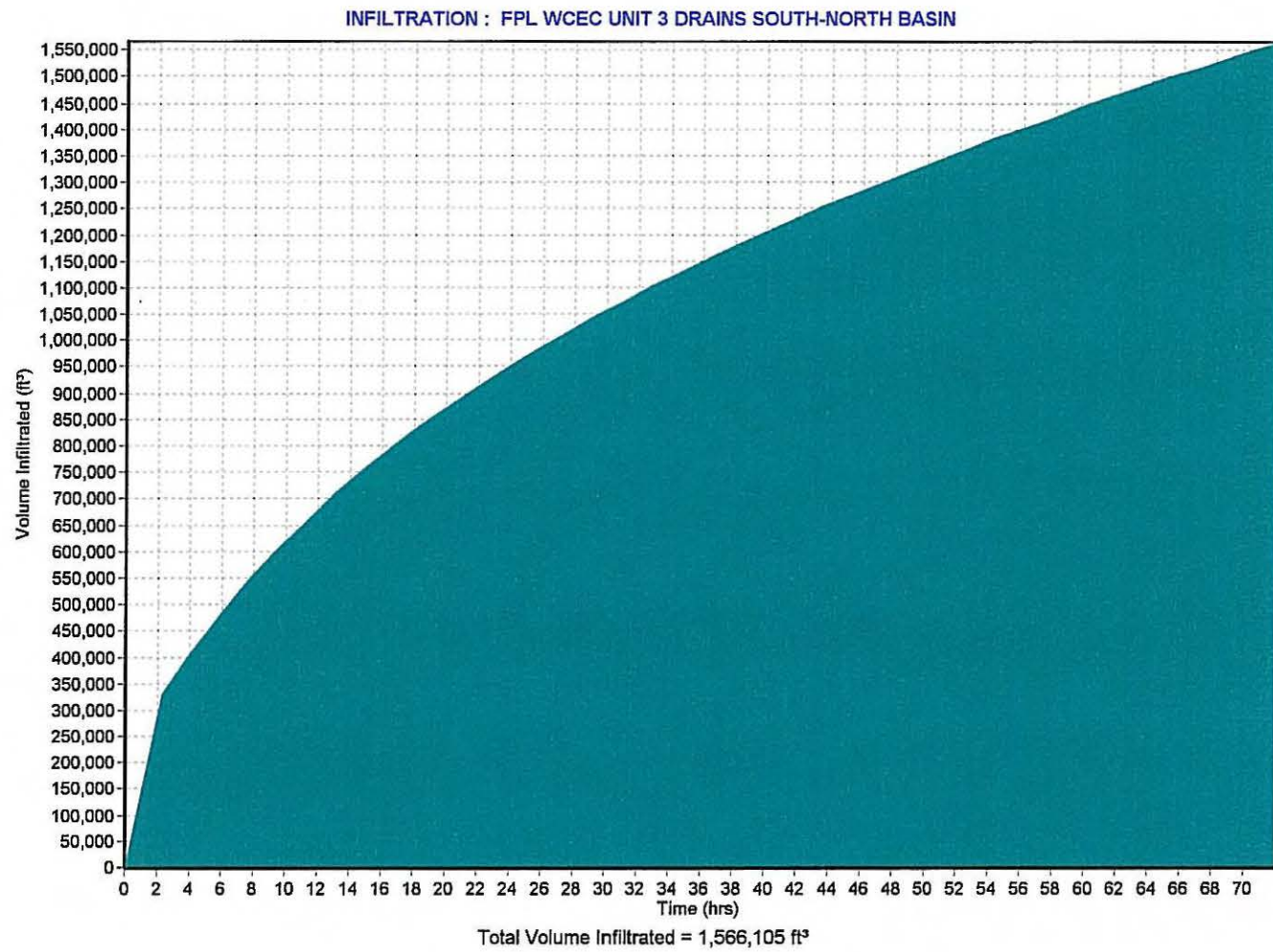
Recovery @ > 72.000 hours

* Time increment when there is no runoff

Maximum Infiltration Rate: 6.288 ft/day

Analysis Date: 11/14/2007

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**SURFACE WATER MANAGEMENT CALCULATIONS
FOR
FPL WCEC UNIT 3 EXPANSION**

SOUTH BASIN

LANDUSE BREAKDOWN

LANDUSE	AREA	IMPERVIOUS	PERVIOUS
DRY POND	15.30	0.00	15.30
IMPERVIOUS AREA *	59.46	59.46	0.00
OPEN SPACE	39.74	0.00	39.74
TOTAL	114.50	59.46	55.04

* INCLUDES UNIT 3 BOUNDARY (29.9 AC), 1200' X 925' AREA (26.54 AC) AND ROADWAYS (3.02 AC) - DOES NOT INCLUDE RETENTION POND

$$\% \text{ IMPERVIOUS AREA} = 59.46 / 114.50 = 51.93 \%$$

SOIL STORAGE FOR 25 YEAR - 3 DAY BACK TO BACK STORMS

NO SOIL STORAGE CREDIT TAKEN FOR DRY POND AREA. INFILTRATION THROUGH THE BOTTOM AND SIDES OF THE POND WILL BE ANALYZED USING MODRET

DEPTH TO WATER TABLE GREATER THAN 4'
USE COASTAL SANDS SOILS, DWT = 4'

$$\text{"S"} = 10.9 \times 0.75 \times 39.74 / 114.50 = 2.84 \text{ INCHES}$$

CURVE NUMBER FOR 25 YEAR - 3 DAY BACK TO BACK STORMS

$$\text{CN} = (1000) / (10 + \text{"S"}) = 77.9$$

SOIL STORAGE FOR 100 YEAR - 3 DAY STORM

DEPTH TO WATER WATER GREATER THAN 4'
USE COASTAL SANDS SOILS, DWT = 4'

$$\text{"S"} = 10.9 \times 0.75 \times 55.04 / 114.50 = 3.93 \text{ INCHES}$$

CURVE NUMBER FOR 100 YEAR - 3 DAY STORM

$$\text{CN} = (1000) / (10 + \text{"S"}) = 71.8$$

SITE GRADING - ALL ELEVATIONS AREA NAVD

13.00	ACRES OF	DRY POND	STORE	VERTICAL FROM EL	15.0		
2.30	ACRES OF	DRY POND	STORE	LINEAR FROM EL	15.0	TO	23.0
39.74	ACRES OF	OPEN SPACE	STORE	LINEAR FROM EL	23.0	TO	24.5
55.04	TOTAL SITE AREA						

**SURFACE WATER MANAGEMENT CALCULATIONS
FOR
FPL WCEC UNIT 3 EXPANSION - UNIT 3 DRAINS SOUTH**

SOUTH BASIN CONT.

POST DEVELOPMENT SITE STORAGE

	DRY POND	DRY POND BK	OPEN SPACE	TOTAL AREA	
AREA	13.00	2.30	39.74	55.04	ACRES
S. ELEV	15.0	15.0	23.0		
E. ELEV		23.0	24.5		
STAGE FEET	VERTICAL STORAGE AC-FT	LINEAR STORAGE AC-FT	LINEAR STORAGE AC-FT	TOTAL STORAGE AC-FT	
NAVD					
15.0	0.00	0.00	0.00	0.00	
16.0	13.00	0.14	0.00	13.14	
17.0	26.00	0.57	0.00	26.57	
18.0	39.00	1.29	0.00	40.29	
19.0	52.00	2.30	0.00	54.30	
20.0	65.00	3.59	0.00	68.59	
21.0	78.00	5.17	0.00	83.17	
22.0	91.00	7.04	0.00	98.04	
23.0	104.00	9.20	0.00	113.20	
24.0	117.00	11.50	13.25	141.75	

NOTE: NO SITE STORAGE CREDIT TAKEN FOR IMPERVIOUS AREAS

DISCHARGE

THE SITE WILL CONTAIN ALL RUNOFF UP TO AND INCLUDING THE 100 YR - 3DAY STORM EVENT

SITE MUST PROVIDE ENOUGH STORAGE TO HOLD TWO 25 YEAR - 3 DAY STORM EVENTS
BACK TO BACK WITH A 72 HOUR DURATION BETWEEN STORMS (TOTAL VOLUME LESS
PERCOLATION AND EVAPORATION)

RAINFALL

STORM EVENT	RAINFALL	
25 YEAR - 3 DAY	10.5	INCHES
100 YEAR - 3 DAY	13.0	INCHES

25 YEAR - 3 DAY RUNOFF VOLUME

$$\text{R.O. VOLUME} = \frac{[P - (.2 S)]^2}{[P + (.8 S)]}$$

$$S = 2.84 \text{ INCHES}$$

$$P = 10.50 \text{ INCHES}$$

$$\text{R.O.} = 7.73 \text{ INCHES}$$

$$7.73 \text{ IN}/12 \text{ IN}/\text{FT} \times 114.50 \text{ ACRES} = 73.72 \text{ AC-FT}$$

$$\text{STAGE IN POND} = 20.35 \text{ FT NAVD}$$

SURFACE WATER MANAGEMENT CALCULATIONS

FOR

FPL WCEC UNIT 3 EXPANSION

SOUTH BASIN CONT.

25 YEAR - 3 DAY INFILTRATION

UTILIZE MODRET TO ACCOUNT FOR THE INFILTRATION/PERCOLATION IN THE DRY POND FOR A 72 HOUR PERIOD AFTER THE FIRST 25 YEAR - 3 DAY STORM EVENT (ZERO DISCHARGE OFF-SITE). SINCE THERE IS NO DISCHARGE OFF-SITE, USE THE "POLLUTION" OPTION OF MODRET. THIS OPTION PUTS THE ENTIRE 25 YEAR - 3 DAY RUNOFF VOLUME INTO THE POND AS A "SLUG" VOLUME AND THEN CALCULATES THE INFILTRATION IN THE POND FOR A 72 HOUR DURATION. THE RESULTING STAGE WILL BE UTILIZED AS THE STARTING STAGE FOR THE NEXT 25 YEAR - 3 DAY STORM EVENT (ZERO DISCHARGE OFF-SITE).

INPUT PARAMETERS FOR MODRET

DESIGN HIGH WATER = 20.35 FT NAVD
(25 YEAR -3 DAY ZERO DISCHARGE STORM STAGE)

AREA AT STARTING WATER LEVEL =
(BOTTOM AREA OF DRY POND)
13.00 AC X 43560.0 FT²/AC= 566280.00 FT²

VOLUME BETWEEN STARTING WATER LEVEL & ESTIMATED HIGH WATER LEVEL
(25 YEAR - 3 DAY ZERO DISCHARGE RUNOFF VOLUME)
73.72 AC-FT X 43560.00 FT²/AC = 3211041.19 FT³

POND LENGTH TO WIDTH RATIO (L/W) = 1.60
POND LENGTH (L) = 1245 FT
AVE POND WIDTH (W) = 780 FT

ELEVATION OF EFFECTIVE AQUIFER BASE = -201.50 FT NAVD
FROM SFWMD, THE BOTTOM OF THE SURFICAL AQUIFER
IN THIS AREA IS AT ELEVATION -201.5' NAVD

ELEVATION OF SEASONAL HIGH GROUNDWATER TABLE = 11.50 FT NAVD
AVERAGE EXISTING GROUND ELEVATION AND
NORMAL CONTROL ELEVATION OF THE WEST PALM BEACH CANAL

ELEVATION OF STARTING WATER LEVEL = 15.00 FT NAVD
(BOTTOM ELEVATION OF POND)

ELEVATION OF POND BOTTOM = 15.00 FT NAVD

AVERAGE EFFECTIVE STORAGE COEFFICIENT OF SOIL FOR UNSATURATED ANALYSIS

BOTTOM ELEVATION OF POND = 15.00 FT NAVD
WATER TABLE ELEVATION = 11.50 FT NAVD
DEPTH TO WATER TABLE = 3.50 FT

USING TABLE A-1 FOR COMPACTED SOIL, f= 0.155

UNSATURATED VERTICAL HYDRAULIC CONDUCTIVITY

SOILS ARE SAND TO SLIGHTLY SILTY SAND, USCS = SP, SP-SM
FROM TABLE A-2, K_h = 30.00 FT/DAY

K_v CAN BE ESTIMATED FROM K_h USING A FACTOR OF 1.5
K_v = 30.00 FT/DAY / 1.5 = 20.00 FT/DAY

**SURFACE WATER MANAGEMENT CALCULATIONS
FOR
FPL WCEC UNIT 3 EXPANSION**

SOUTH BASIN CONT.

FACTOR OF SAFETY FOR K_v (STANDARD VALUE) =	2	
SATURATED HORIZONTAL HYDRAULIC CONDUCTIVITY		
SOILS ARE SAND TO SLIGHTLY SILTY SAND, USCS = SP, SP-SM	30.00 FT/DAY	
FROM TABLE A-2, K_h =	30.00 FT/DAY	
AVERAGE EFFECTIVE STORAGE COEFFICIENT OF SOIL FOR SATURATED ANALYSIS		
25 YEAR - 3 DAY STAGE =	20.35 FT	NAVD
BOTTOM ELEVATION OF POND =	15.00 FT	NAVD
AVERAGE WATER ELEVATION IN POND =		
$\left[\frac{20.35 + 15.00}{2} \right] =$	17.68 FT	NAVD
WATER TABLE ELEVATION =	11.50 FT	NAVD
AVERAGE WATER DEPTH =	6.18 FT	
USING TABLE A-1 FOR COMPACTED SOIL, f =	0.22	
AVERAGE EFFECTIVE STORAGE COEFFICIENT OF POND (STANDARD VALUE)	1.00	
GROUND WATER CONTROL FEATURE		
THE WEST PALM BEACH CANAL IS LOCATED ALONG THE SOUTH PROPERTY BOUNDARY		
DISTANCE FROM TOP OF POND	300.00 FT	
WATER ELEVATION OF CANAL	11.50 FT	NAVD
FROM MODRET ANALYSIS THE PEAK STAGE IN THE POND IS = (STAGE IS LESS THAN THE ZERO DISCHARGE STAGE AS THE MODRET STAGE ACCOUNTS FOR THE INITIAL INFILTRATION INTO THE BOTTOM OF THE POND)	19.38 FT	NAVD
72 HOUR STAGE =	17.15 FT	NAVD
TOTAL VOLUME INFILTRATED =	1699528.0 FT ³ 39.02 AC-FT	
VOLUME REMAINING IN POND =	34.70 AC-FT	
25 YEAR -3 DAY RUNOFF VOLUME =	73.72 AC-FT	
ADD 25 YEAR - 3 DAY VOLUME TO REMAINING VOLUME		
TOTAL RESULTING VOLUME =	108.41 AC-FT	
NEW STAGE IN POND IS =	22.68 FT	NAVD
TOP OF POND ELEVATION =	23.0 FT	NAVD
OFF-SITE OVERFLOW ELEVATION =	23.75 FT	NAVD

SOUTH BASIN IS RETAINING 2 - 25 YEAR- 3 DAY BACK TO BACK STORMS

**SURFACE WATER MANAGEMENT CALCULATIONS
FOR
FPL WCEC UNIT 3 EXPANSION**

SOUTH BASIN CONT.

100 YEAR - 3 DAY RUNOFF VOLUME

$$\text{R.O. VOLUME} = \frac{[P - (.2 S)]^2}{[P + (.8 S)]}$$

$$S = 3.93 \text{ INCHES}$$

$$P = 13.00 \text{ INCHES}$$

$$\text{R.O.} = 9.24 \text{ INCHES}$$

$$9.24 \text{ IN}/12 \text{ IN/FT} \times 114.50 \text{ ACRES} = 88.17 \text{ AC-FT}$$

$$\text{STAGE IN POND} = 22.33 \text{ FT NAVD}$$

MODRET

SUMMARY OF UNSATURATED & SATURATED INPUT PARAMETERS

PROJECT NAME : FPL WCEC UNIT 3 DRAINS SOUTH-SOUTH BASIN
POLLUTION VOLUME RUNOFF DATA USED
UNSATURATED ANALYSIS INCLUDED

Pond Bottom Area	566,280.00 ft ²
Pond Volume between Bottom & DHWL	3,211,041.25 ft ³
Pond Length to Width Ratio (L/W)	1.60
Elevation of Effective Aquifer Base	-201.50 ft
Elevation of Seasonal High Groundwater Table	11.50 ft
Elevation of Starting Water Level	15.00 ft
Elevation of Pond Bottom	15.00 ft
Design High Water Level Elevation	20.35 ft
Avg. Effective Storage Coefficient of Soil for Unsaturated Analysis	0.16
Unsaturated Vertical Hydraulic Conductivity	20.00 ft/d
Factor of Safety	2.00
Saturated Horizontal Hydraulic Conductivity	30.00 ft/d
Avg. Effective Storage Coefficient of Soil for Saturated Analysis	0.22
Avg. Effective Storage Coefficient of Pond/Exfiltration Trench	1.00

Hydraulic Control Features:

Groundwater Control Features - Y/N

Distance to Edge of Pond
Elevation of Water Level

Top	Bottom	Left	Right
N	Y	N	N
0.00	300.00	0.00	0.00
0.00	11.50	0.00	0.00

Impervious Barrier - Y/N

Elevation of Barrier Bottom

Top	Bottom	Left	Right
N	N	N	N
0.00	0.00	0.00	0.00

MODRET

SUMMARY OF RESULTS

PROJECT NAME : FPL WCEC UNIT 3 DRAINS SOUTH-SOUTH BASIN

CUMULATIVE TIME (hrs)	WATER ELEVATION (feet)	INSTANTANEOUS INFILTRATION RATE (cfs)	AVERAGE INFILTRATION RATE (cfs)	CUMULATIVE OVERFLOW (ft ³)
00.00 - 0.00	11.500	0.000 *		
			0.00000	
0.00	11.500	60.79459		
			43.79232	
2.30	19.379	26.79006		0.00
			13.59058	
4.09	19.233	12.83497		0.00
			12.07937	
5.88	19.104	11.46318		0.00
			10.84698	
7.66	18.987	10.34191		0.00
			9.83684	
9.45	18.882	9.41478		0.00
			8.99271	
11.24	18.785	8.63871		0.00
			8.28470	
13.02	18.697	7.98559		0.00
			7.68648	
14.81	18.614	7.42972		0.00
			7.17296	
16.60	18.537	6.95339		0.00
			6.73381	
18.39	18.465	6.54369		0.00
			6.35356	
20.17	18.397	6.18648		0.00
			6.01940	
21.96	18.333	5.87340		0.00
			5.72741	
23.75	18.271	5.59929		0.00

Analysis Date: 11/14/2007

MODRET

SUMMARY OF RESULTS

PROJECT NAME : FPL WCEC UNIT 3 DRAINS SOUTH-SOUTH BASIN

CUMULATIVE TIME (hrs)	WATER ELEVATION (feet)	INSTANTANEOUS INFILTRATION RATE (cfs)	AVERAGE INFILTRATION RATE (cfs)	CUMULATIVE OVERFLOW (ft ³)
			5.47118	
25.53	18.212	5.35757		0.00
			5.24395	
27.32	18.156	5.14093		0.00
			5.03790	
29.11	18.102	4.94564		0.00
			4.85338	
30.90	18.050	4.77100		0.00
			4.68862	
32.68	18.000	4.61353		0.00
			4.53844	
34.47	17.951	4.47011		0.00
			4.40178	
36.26	17.904	4.33808		0.00
			4.27438	
38.04	17.858	4.21744		0.00
			4.16050	
39.83	17.814	4.10792		0.00
			4.05534	
41.62	17.770	4.00392		0.00
			3.95249	
43.41	17.728	3.90757		0.00
			3.86264	
45.19	17.686	3.81949		0.00
			3.77634	
46.98	17.646	3.73675		0.00
			3.69716	
48.77	17.606	3.65881		0.00

Analysis Date: 11/14/2007

MODRET

SUMMARY OF RESULTS

PROJECT NAME : FPL WCEC UNIT 3 DRAINS SOUTH-SOUTH BASIN

CUMULATIVE TIME (hrs)	WATER ELEVATION (feet)	INSTANTANEOUS INFILTRATION RATE (cfs)	AVERAGE INFILTRATION RATE (cfs)	CUMULATIVE OVERFLOW (ft ³)
			3.62047	
50.55	17.568	3.58426		0.00
			3.54805	
52.34	17.530	3.51486		0.00
			3.48168	
54.13	17.492	3.45036		0.00
			3.41904	
55.92	17.456	3.38799		0.00
			3.35694	
57.70	17.420	3.32856		0.00
			3.30018	
59.49	17.384	3.27242		0.00
			3.24466	
61.28	17.349	3.21753		0.00
			3.19039	
63.06	17.315	3.16708		0.00
			3.14377	
64.85	17.282	3.11904		0.00
			3.09431	
66.64	17.248	3.07171		0.00
			3.04911	
68.43	17.216	3.02616		0.00
			3.00321	
70.21	17.183	2.98274		0.00
			2.96228	
72.00	17.152			0.00

Maximum Water Elevation: 19.379 feet @ 2.30 hours

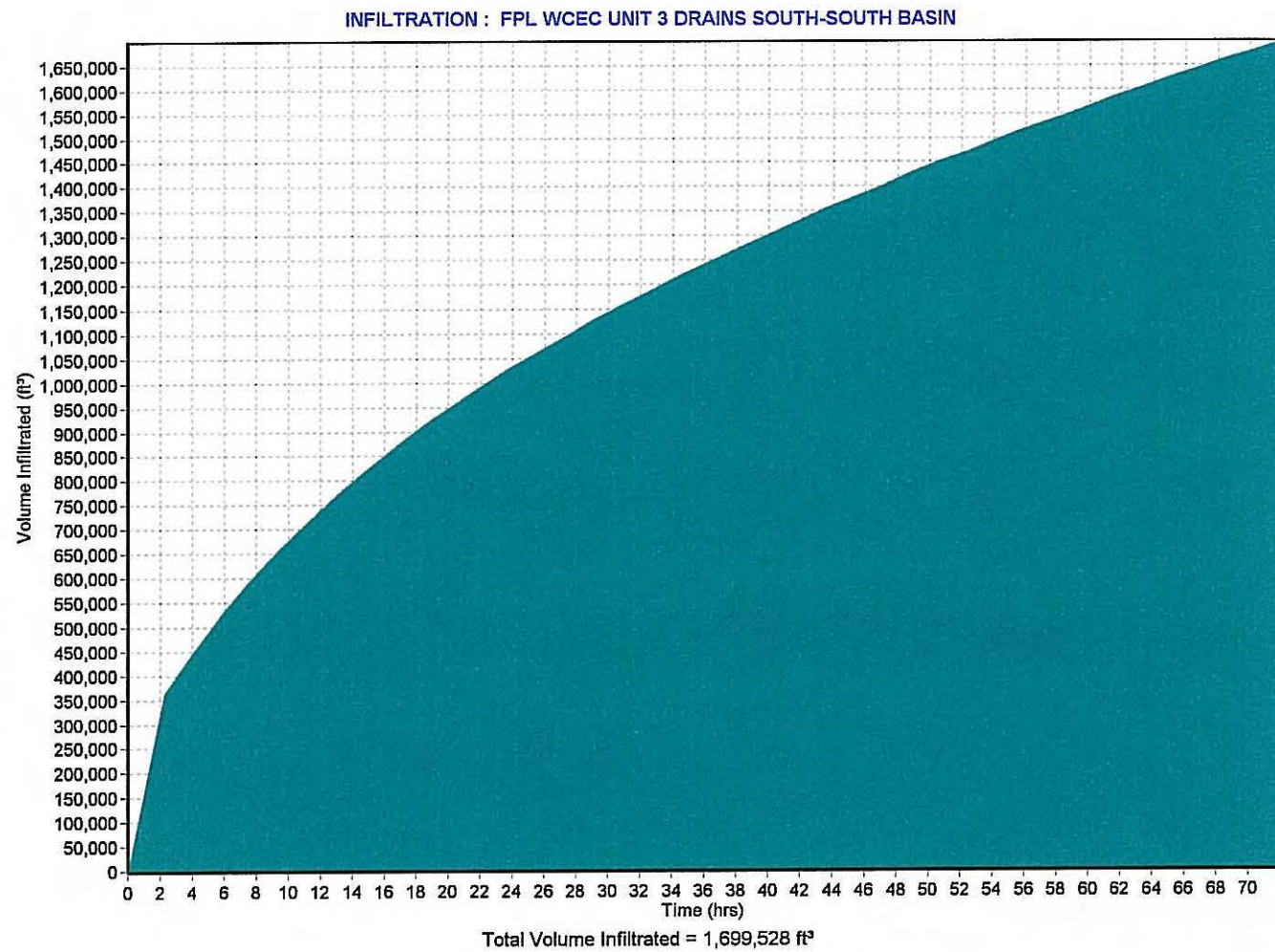
Recovery @ > 72.000 hours

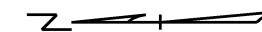
* Time increment when there is no runoff

Maximum Infiltration Rate: 6.304 ft/day

Analysis Date: 11/14/2007

22





1. BEFORE ADDING A SECOND DECK TO ANY EXISTING AF STRUCTURE OR A NEW DOUBLE DECKER TOWER, HAVE THE STRUCTURAL ENGINEER CHECK IF THE STANDARD FOUNDATIONS ON THIS SITE ARE CAPABLE OF WITHSTANDING THE TENSION OF THE NEW LINE PLUS THE OHGW BEING ADDED.

	(SU, E, EP)	
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C A R E		

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SUGAR SUBSTATION
230kV AND 500kV
ULTIMATE PLAN

(SU, E, EP