Seminole Electric
COOPERATIVE, INC.
IN PARTNERSHIP WITH THOSE WE SERVE

June 22, 2006

Hamilton S. Oven, Administrator
Office of Siting Coordination
Department of Environmental Protection
2600 Blair Stone Road
Tallahassee, Fl 32399

Re: Seminole Electric Cooperative, Inc.
Seminole Generating Station Unit 3 – PA 78-10A2
Application for Site Certification
Responses to Agency Sufficiency Comments – May 15, 2006

Dear Mr. Oven:

Seminole Electric Cooperative, Inc. (Seminole) hereby submits its responses to the May 15, 2006 Notice of Sufficiency relating to the application for site certification for the Seminole Generating Station Unit 3 Project. Seminole has provided responses to the items identified by FDEP and the other agencies that submitted comments. Copies of Seminole's sufficiency responses are being provided directly to recipients or reviewers of the Site Certification Application and as appropriate to counsel or representatives of the parties to this proceeding.

We would like to discuss these responses with agency staff in order to facilitate their review, and we will be calling to arrange meetings as necessary for this purpose. In the meantime, should you or any other recipients have any questions or concerns regarding these responses, please contact me.

Sincerely,

James R. Frauen
Project Director, SGS3

Cc: Ann Seiler, FDEP
Scott Goorland, Esq., FDEP
Bureau of Air Regulation, FDEP
Recipients of Site Certification Application – PA 78-10A2
Parties to Certification – PA 78-10A2

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SEMINOLE ELECTRIC COOPERATIVE, INC.
SITE CERTIFICATION APPLICATION

RESPONSE TO SUFFICIENCY REQUEST

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SECTION 1.0

FDEP Bureau of Air Regulation

1. **The Department is not clear regarding Seminole's rationale that bag houses are not considered as equivalent to ESP's in high sulfur coal applications. Please explain.**

   Seminole discussed the rationale for selecting an ESP for Unit 3 instead of a bag house in Section 3.4.3.2 of the SCA and Section 4.3 of the Application for PSD Permit. An ESP has lower capital and O&M costs, and requires less energy to operate than a bag house. A bag house is more susceptible to corrosion than an ESP due to higher air in-leakages which can contribute to cold spots and, therefore, corrosion. The SO_2 and SO_3 concentrations in the flue gas entering a bag house would be high. Fly ash from the fuels to be burned will have a very low alkaline content. A sorbent injection system upstream of the bag houses would likely be necessary to control SO3 concentrations, provide adequate bag life and minimize corrosion. Even with sorbent injection, the expected bag life for the bag houses would be much shorter than for a bag house application with low sulfur, high alkaline fuels.

   There is only one known high-sulfur coal boiler currently utilizing a bag house and it has experienced operating problems. Full-scale experience with bag houses on high-sulfur coal-fired PC boilers in the 1980s was fraught with problems including blinding of bags, rapidly increasing pressure drop across the bag house and mechanical failure of bags due to excessive accumulation of ash that could not be discharged from the bags during normal cleaning. Review of the available data from EPA's National Electric Energy Data System (NEEDS) database (www.epa.gov/airmarkets/epa-ipm/needs_2003.xls) indicates that of 1,104 total electric utility units ("coal steam" units >25 MW), only 132 (12 percent) are equipped with bag houses (bag houses). None of these bag houses are serving boilers firing high sulfur coal in which the flue gas is exposed to the bags prior to passing through a SOx removal device (e.g., FBC boiler or dry scrubber). A full-scale pulse-jet bag house was installed at Vectren's high-sulfur coal-fired A.B. Brown Unit 1 in late 2004. The bags experienced plugging problems very similar to those described above for reverse gas bag houses on high-sulfur coal. Due to unacceptably high pressure drop, Vectren was forced to replace the bags after less than 18 months of service. Performance tests on the Vectren A.B. Brown Unit 1 bag house in July 2005, approximately 8 months after installation, indicated average filterable PM emissions of 0.019 lb/MMBtu, which is higher than the proposed PM emissions rate of 0.015 lb/MMBtu for SGS Unit 3.

2. **Within the cost effectiveness calculations for a bag house compared to an ESP, please explain the rationale for expecting that the removal rates are identical (8.5 lb/MMBtu inlet and 0.015 lb/MMBtu outlet).**

   Due to the problems cited in the response to FDEP question 1 above, bag houses on PC boilers burning high-sulfur coal are not proven to provide better emission control than ESPs. In fact, performance tests on the A.B. Brown Unit 1 bag house in July 2005 indicated average filterable PM emissions of 0.019 lb/MMBtu, which is higher than the BACT limit requested for SGS Unit 3 of 0.015 lb/MMBtu. Nonetheless, as a conservative approach, Seminole assumed that the removal rates were identical.

3. **What consideration was given to $PM_{2.5}$ in the selection of an ESP versus a baghouse?**

   The $PM_{2.5}$ component of PM will be controlled by the entire air pollution control technology train and thus, was not individually evaluated in the selection of the ESP versus a bag house The particulate emissions from Unit 3 including $PM_{2.5}$ will be controlled by three mechanisms. The cold-side ESP will be the primary control device. This is followed by the FGD system which,

although designed to removed acid gases, will provide additional removal of PM. Finally, Unit 3 will be equipped with a Wet ESP (WESP), which is highly efficient in removing the majority of condensable PM. Condensable PM primarily consists of sulfuric acid mist. In addition, a WESP is highly efficient in removing other than $PM_{2.5}$ particles. When considering the entire air pollution control technology train, the use of a bag house instead of an ESP for the primary PM control device will have an insignificant influence on $PM_{2.5}$ emitted from the Project. Moreover, as described above, based on test data from the high-sulfur bag house application at A.B. Brown, bag houses do not necessarily provide better filterable PM control than dry ESPs when operating on high-sulfur coal. It should be noted that concentrations in the environment of $PM_{2.5}$ are due in large part to conversions of SO_2 and NO_X in the atmosphere to form $PM_{2.5}$ aerosols. The Project will not only limit the emissions of these pre-cursor pollutants but have a net reduction from the plant site.

If a bag house were installed, the control equipment lineup would likely include a sorbent injection system, bag house and wet FGD. The configuration would probably not include a wet ESP to control sulfuric acid mist emissions because control could be accomplished by a sorbent injection upstream of the bag house. Because there is no wet ESP, PM10 emissions would likely be higher with a bag house/wet FGD than if a dry ESP/wet FGD/ wet ESP were installed. In addition, due to the costs of sorbent injection and more frequent bag replacements over the life of the system, a bag house will have a significantly higher control cost ($/ton removed) than a dry ESP over the life of the system.

4. **The proposed BACT emission rate for CO appears to be high, for a newly designed, non-retrofit application. Please comment.**

As explained in the Application for PSD Permit, the only feasible control for CO is combustion optimization. Maintaining the combustion process to minimize NO_X emissions will increase the potential CO emissions. The issues relating to setting the value for CO at a level below 0.15 lb/MMBtu are the ability to get a guarantee from the manufacturer and the costs and emission expenses related to NO_X control for the proposed coal/pet coke blend. If the combustion controls are optimized to minimize CO emissions, then the NO_X emissions will not be minimized and additional reliance will be placed on the effectiveness of the SCR system to control the additional NO_X emissions. There are a few units with NO_X proposed at 0.07 lb/MMBtu and CO less than 0.15 lb/MMBtu. However, none of these facilities are built, or in operation and, therefore, none of these facilities have demonstrated the ability to achieve compliance with the proposed NO_X limit and lower CO limit.

However, because of differences in CO emissions based on fuel type, Seminole is proposing a fuel-specific BACT limit for C0 of 1,125 lbs/hr, based on a rate of 0.15 lb/MMBtu when burning a coal/pet coke blend and a limit of 975 lbs/hr, based on a rate of 0.13 lb/MMBtu when burning coal firing only. Compliance with the limit for the coal/pet coke blend (1,125 lbs/hr) will be determined by use of CO CEMs (30-day rolling average) and compliance with the CO limit for coal only (975 lbs/hr) will be based on an annual emissions compliance test.

5. **No comprehensive SO_2 ambient air quality standards (AAQS) or PSD Class II increment modeling has been performed in the area of Seminole Generating Station in the last ten years. Generally, when a large power plant is requesting a major modification, the Department requests SO_2 multiple source ambient quality modeling for comparison with the AAQS and Class II PSD increments in the vicinity of the facility, even if projected SO_2**

emissions do not trigger PSD review. Please submit an SO_2 AAQS and Class II PSD air quality analysis in the vicinity of the plant for all averaging times.

A comprehensive SO_2 AAQS and PSD Class II increment modeling analysis was performed in the area of Seminole Generating Station for the planned upgrades to Units 1 and 2. The upgrades include burner modifications, the addition of selective catalytic reduction (SCR) systems for nitrogen oxide (NO_X) removal, an alkali injection system and the flue gas desulfurization (FGD) system upgrades for SO_2 control. The permit application and air modeling analyses were submitted in February 2006. The air modeling analyses demonstrated compliance with the SO_2 AAQS and PSD Class II increments in the area of Seminole Generating Station using meteorological data from the Jacksonville International Airport from 1986 to 1990, the recommended dataset by the Department at the time of the analyses.

In May 2006, the Department developed meteorological data for the Jacksonville International Airport for 2001 to 2005 to be used for AERMOD applications. These meteorological data were recently obtained from the FDEP and were used in the air modeling analyses to confirm compliance with the SO_2 AAQS and PSD Class II increments for the proposed Unit 3 application, even though SO_2 emissions will decrease even after Unit 3 comes online.

Summaries of the SO_2 AAQS and PSD Class II increment modeling using the meteorological data for 2001 to 2005 are presented in Tables 1-1 and 1-2. As shown in these tables, the maximum SO_2 concentrations predicted for the Seminole Generating Station, including Units 1 and 2 and the proposed Unit 3 together with background sources, comply with the SO_2 National and State AAQS and PSD Class II increments.

This information will be updated based on revised receptor locations.

6. **Please provide a map showing the location of the fence line and fence line receptors in UTM coordinates around Seminole Generating Station. The map should have a scale and preferably should be in AUTOCAD format. Any roads into and out of the property should be shown.**

   A map showing the location of the fence line and fence line receptors in UTM coordinates around Seminole Generating Station is presented in Figure 1-1.

7. **As was done for the Okefenokee Wilderness Area, please perform a multiple source SO_2 PSD Class I increment analysis for the Chassahowitzka National Wilderness Area showing the impacts of reduced SO_2 emissions from this project. Please use 2001-2003 CALPUFF meteorological data.**

   In order to provide a complete assessment of SO_2 PSD Class I increment consumption using the 2001-2003 CALPUFF meteorological data at the PSD Class I areas within 200 km of the Seminole Generating Station, air modeling analyses were performed for both the Okefenokee and Chassahowitzka National Wilderness Areas. These meteorological data were made available and obtained from the FDEP in mid-April 2006. Previous modeling analyses were performed using the meteorological data for 1990, 1992, and 1996, as recommended by the Department, EPA, and Federal Land Managers.

   Summaries of the SO_2 PSD Class I increment modeling for the Okefenokee and Chassahowitzka National Wilderness Areas (NWA) using the CALPUFF meteorological data for 2001 to 2003 are presented in Tables 1-3 and 1-4, respectively. As shown in Table 1-3, the maximum SO_2

concentrations predicted for the Seminole Generating Station, including Units 1 and 2 and the proposed Unit 3 together with background sources, comply with the PSD Class I increments at the Okefenokee NWA.

As shown in Table 1-4, the maximum SO_2 concentrations are predicted to exceed the 24-hour and 3-hour PSD Class I increment for each year at the Chassahowitzka National Wilderness Area. The maximum predicted impact for each time period is presented in Table 1-5, along with the contribution from the Seminole Generating Station Unit 3. As this information shows, the Seminole Generating Station's Unit 3 contribution is predicted to be less than the PSD Class I significant impact levels. Therefore, the potential SECI Unit 3 emissions are not predicted to significantly impact any predicted exceedances at the Chassahowitzka NWA.

This information will be updated based on revised receptor locations.

8. Please redo the NO_X, CO and PM_{10} air quality modeling using the 2001-2005 Jacksonville meteorological data, which the Department will provide.

The NO_X, CO, and PM_{10} air quality modeling was redone using the 2001-2005 Jacksonville meteorological data, as provided by the Department in May 2006. These results are summarized in Table 1-6. As shown in this table, the maximum NO_X, CO and PM_{10} impacts due to the proposed Unit 3 are predicted to be less than the significant impact levels. For PM_{10} analysis, wind speed emissions due to wind erosion for these sources only occurred when the wind speed was greater than or equal to 12 knots. The portion of the coal pile emissions due to vehicle maintenance continued to not include the wind speed factors. As a result, the proposed project will comply with the appropriate AAQS and PSD Class II increments for those pollutants.

All computer modeling files are being transmitted to the DEP via FTP.

Please refer to Attachment 1-1 which includes revised pages associated with the SGS Unit 3 PSD Application. These revisions were based on comments associated with the Units 1 and 2 application packages and are not related to comments in the Sufficiency Request.

TABLE 1-1
MAXIMUM PREDICTED SO_2 IMPACTS FOR COMPARISON TO THE FLORIDA AAQS

Averaging Time and Rank	Concentrations ($\mu g/m^3$)[a] Total (c=a+b)	Modeled Sources (a)	Background[b] (b)	Receptor Location UTM Coordinates (m) East	North	Time Period (YYMMDDHH)	Florida Ambient Air Quality Standards ($\mu g/m^3$)
Highest Annual							
	28.0	22.0	6	434600	3283400	01123124	60
	26.8	20.8	6	433300	3283300	02123124	
	28.4	22.4	6	434600	3283400	03123124	
	27.6	21.6	6	434600	3283400	04123124	
	27.2	21.2	6	434600	3283400	05123124	
HSH 24-Hour							
	182	148	34	434500	3283300	01030524	260
	188	154	34	434540	3283129	02022724	
	183	149	34	434600	3283200	03121724	
	165	131	34	434600	3283400	04041424	
	178	144	34	434600	3283300	05122624	
HSH 3-Hour							
	650	522	128	434600	3283300	01012012	1,300
	646	518	128	434600	3283400	02031318	
	596	468	128	434500	3283400	03042215	
	653	525	128	434600	3283400	04040112	
	614	486	128	434600	3283300	05113015	

Note: YYMMDDHH = Year, Month, Day, Hour Ending.
HSH = Highest, second-highest
AAQS = Ambient Air Quality Standards

[a] Concentrations are based on highest concentrations predicted using AERMOD with five years of meteorological data from 2001 to 2005 of surface and upper air data from the National Weather Service station at Jacksonville International Airport as received from the FDEP.

[b] Background concentrations are highest mean and HSH 24-and 3-hour concentrations, measured during 2004 and 2005 from Palatka monitoring station 12-107-1008

TABLE 1-2
MAXIMUM PREDICTED SO_2 IMPACTS FOR COMPARISON TO
ALLOWABLE PSD CLASS II INCREMENTS

Averaging Time and Rank	Concentration ($\mu g/m^3$)	Receptor Location UTM Coordinates (m) East	Receptor Location UTM Coordinates (m) North	Time Period (YYMMDDHH)	Allowable PSD Class II Increment ($\mu g/m^3$)
Highest Annual					
	7.48	437,200	3,289,200	01123124	20
	7.24	437,100	3,289,100	02123124	
	6.57	440,500	3,289,700	03123124	
	5.26	440,600	3,289,400	04123124	
	6.11	437,300	3,289,600	05123124	
HSH 24-Hour					
	55.0	437,300	3,288,900	01072224	91
	58.7	437,200	3,289,200	02090624	
	59.5	437,300	3,289,700	03090124	
	51.6	437,100	3,290,000	04061324	
	57.0	437,600	3,290,000	05071824	
HSH 3-Hour					
	151.0	437,400	3,289,000	01072212	512
	147.1	437,841	3,290,157	02061315	
	144.3	440,300	3,289,400	03050818	
	148.5	440,311	3,289,301	04053012	
	149.2	437,544	3,289,543	05092515	

Note: YYMMDDHH = Year, Month, Day, Hour Ending.
HSH = Highest, second-highest
PSD = Prevention of Significant Deterioration

[a] Concentrations are based on highest concentrations predicted using AERMOD with five years of meteorological data from 2001 to 2005 of surface and upper air data from the National Weather Service station at Jacksonville International Airport as received from the FDEP.

TABLE 1-3
MAXIMUM SO_2 IMPACTS PREDICTED FOR COMPARISON TO THE
SO_2 PSD CLASS I INCREMENTS AT THE OKEFENOKEE NWA

Averaging Time/Rank	Maximum Concentration [a] ($\mu g/m^3$)	Receptor Location LCC Coordinates (km) X	Y	Time Period (YYMMDDHH)	PSD Class I Increment ($\mu g/m^3$)
Annual					
Highest	0.00 [b]	NA	NA	NA	2
	0.00	NA	NA	NA	
	0.00	NA	NA	NA	
24-Hour					
Second-highest	3.99	1,421.564	-921.107	01112924	5
	2.44	1,397.157	-930.757	02010924	
	2.16	1,397.157	-930.757	03111824	
3-Hour					
Second-highest	19.1	1,422.472	-926.620	01121221	25
	16.8	1,416.891	-912.442	02021006	
	24.4	1,419.983	-921.368	03112312	

Note: YYMMDDHH = Year, Month, Day, Hour Ending
LCC = Lambert Conic Conformal
NA = Not Applicable

[a] Based on the CALPUFF model using 3 years of CALMET meteorological data for 2001, 2002, and 2003, 4-km Florida domain.

[b] A "0.00" impact means that the predicted concentration was zero or less. The CALPUFF model does not printout a negative concentration

TABLE 1-4
MAXIMUM SO_2 IMPACTS PREDICTED FOR COMPARISON TO THE
SO_2 PSD CLASS I INCREMENTS AT THE CHASSAHOWITZKA NWA

Averaging Time/Rank	Maximum Concentration [a] ($\mu g/m^3$)	Receptor Location LCC Coordinates (km) X	Y	Time Period (YYMMDDHH)	PSD Class I Increment ($\mu g/m^3$)
Annual					
Highest	0.05 [b]	1,411.565	-1,143.104	01123124	2
	0.00	NA	NA	NA	
	0.00	NA	NA	NA	
24-Hour					
Second-highest	4.91	1,411.565	-1,143.104	01112724	5
	5.81	1,402.723	-1,139.772	02122724	
	7.75	1,405.965	-1,139.257	03082724	
3-Hour					
Second-highest	81.7	1,404.713	-1,136.613	01111012	25
	39.9	1,402.283	-1,136.999	02011524	
	68.9	1,404.638	-1,141.364	03120109	

Note: YYMMDDHH = Year, Month, Day, Hour Ending
LCC = Lambert Conic Conformal
NA = Not Applicable

[a] Based on the CALPUFF model using 3 years of CALMET meteorological data for 2001, 2002, and 2003, 4-km Florida domain.

[b] A "0.00" impact means that the predicted concentration was zero or less. The CALPUFF model does not printout a negative concentration

TABLE 1-5
SGS UNIT 3'S CONTRIBUTION TO TIME PERIODS PREDICTED TO EXCEED THE 24- AND 3-HOUR ALLOWABLE SO_2 INCREMENT AT THE CHASSAHOWITZKA NWA PSD CLASS I AREA

Year	Julian Day	Month	Day	Hour Ending for Period	Maximum Concentration ($\mu g/m^3$)[a]		Class I Significant Impact Level ($\mu g/m^3$)	Affected Chassahowitzka NWA Receptors[c]
					All Modeled Sources	SECI Unit 3 Only		
3-Hour Exceedances								
2001	314	11	10	12	81.7	<.004	1.0	35-36, 39-113
2001	314	11	10	15	78.9	<.001	1.0	51, 52, 59, 89, 95, 101, 106, 107, 112, 113
2002	15	1	15	24	39.9	<.0001	1.0	45, 60, 62, 69, 71, 90, 96, 102, 108
2002	15	1	15	21	31.2	<.0002	1.0	54, 84
2002	42	2	11	21	30.9	<.001	1.0	87, 93, 94, 98, 99, 100
2002	44	2	13	9	31.4	<.001	1.0	60, 61, 69, 70, 76, 77, 83, 96, 102, 108
2002	332	11	28	9	29.2	<.0001	1.0	108
2002	361	12	27	9	30.1	< 0.1	1.0	60, 90, 109
2002	361	12	27	12	33.7	0.041	1.0	45, 53, 54, 61, 67-70, 77, 83, 90-91, 96,102, 104-105, 109-111
2003	335	12	1	6	62.0	< 0.4	1.0	37, 45-48, 53-56, 90-94, 98, 99
2003	335	12	1	9	68.9	< 0.3	1.0	57, 60-65, 69-74, 77-81, 83-87
24-Hour Exceedances								
2002	30	1	30	24	5.24	< .0001	0.2	15, 19, 20, 21
2002	352	12	18	24	5.39	0.018	0.2	1-18
2002	361	12	27	24	5.81	0.03	0.2	90
2003	238	8	26	24	5.72	< .001	0.2	4, 9, 15, 21, 40-44, 48-52, 57-59, 65
2003	239	8	27	24	7.75	< .0001	0.2	1-37
2003	279	10	6	24	7.08	0.112	0.2	9, 15, 36, 38-47, 50, 53-56, 61-64, 70-71
2003	335	12	1	24	6.54	0.03	0.2	47, 65, 75, 82, 88, 97, 100, 105

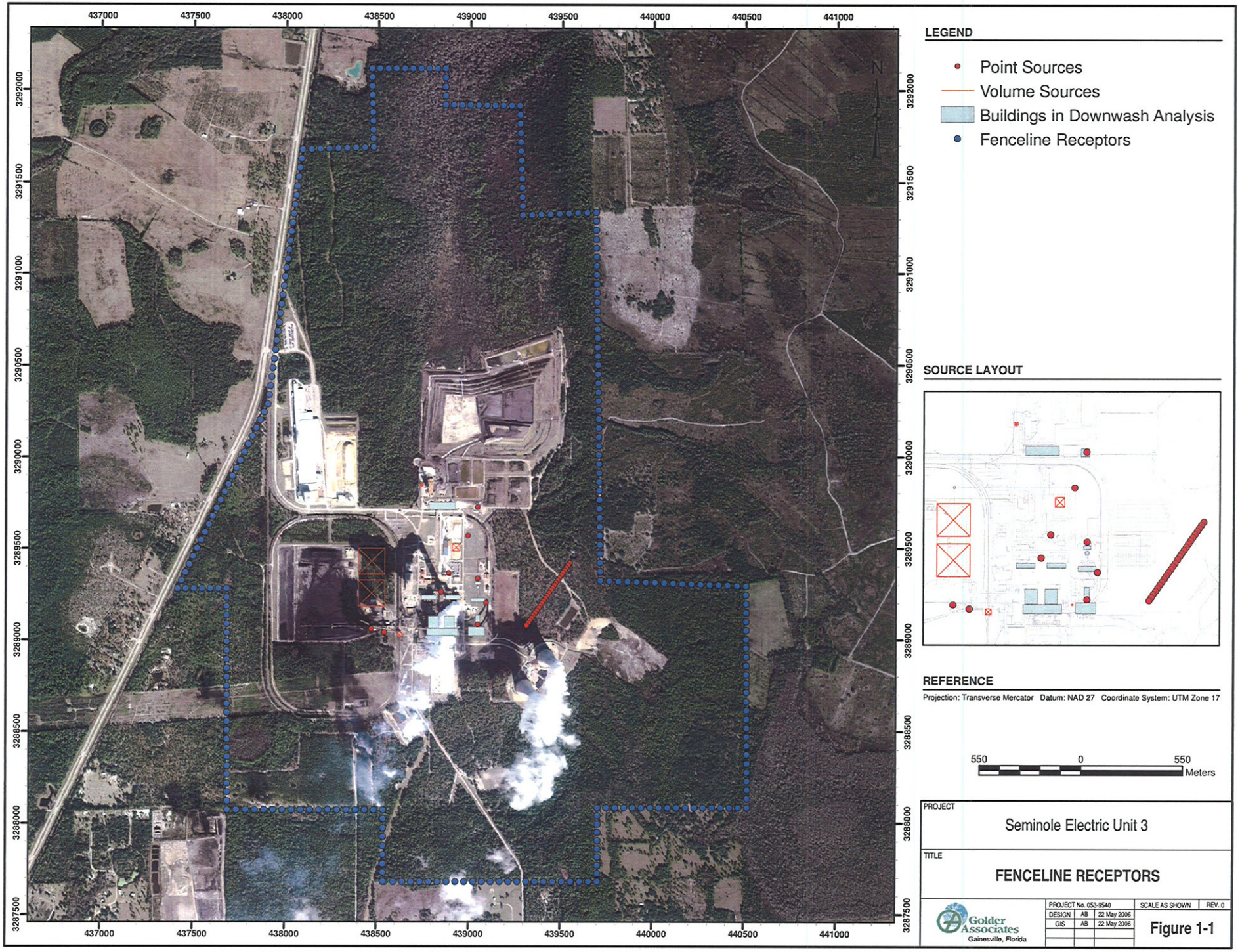
[a] Based on the CALPUFF model using 3 years of CALMET meteorological data for 2001, 2002, and 2003, 4-km Florida domain.
[b] Includes only emission for SECI Units 1, 2, and 3
[c] Based on 113 National Park Service receptors for Chassahowitzka NWA

TABLE 1-6
MAXIMUM PREDICTED IMPACTS FOR COMPARISON TO SIGNIFICANT IMPACT LEVELS
SGS UNIT 3 PROJECT

Pollutant and Averaging Time	Maximum Concentration ($\mu g/m^3$)	Receptor Location UTM Coordinates (m) East	Receptor Location UTM Coordinates (m) North	Time Period (YYMMDDHH)	Significant Impact Levels ($\mu g/m^3$)
NO_2					
Annual					
	0.84	439,706	3,289,961	01123124	1
	0.90	439,706	3,289,961	02123124	
	0.97	439,706	3,289,961	03123124	
	0.96	439,706	3,289,961	04123124	
	0.94	439,706	3,289,961	05123124	
PM_{10}					
Annual					
	0.58	439,715	3,289,372	01123124	1
	0.59	439,715	3,289,372	02123124	
	0.56	439,715	3,289,372	03123124	
	0.59	439,715	3,289,372	04123124	
	0.61	439,715	3,289,372	05123124	
24-Hour					
	3.35	439,716	3,289,323	01080924	5
	4.18	437,685	3,289,232	02092124	
	3.07	438,138	3,288,071	03101224	
	3.35	439,715	3,289,372	04011424	
	3.59	437,686	3,289,038	05092324	
CO					
8-Hour					
	16.7	440,500	3,289,900	01052216	500
	18.3	437,686	3,288,990	02092216	
	18.1	437,600	3,289,100	03091316	
	19.4	440,800	3,289,500	04103016	
	21.4	437,600	3,289,700	05092516	
1-Hour					
	43.9	438,800	3,286,700	01020413	2,000
	44.5	441,050	3,290,200	02072609	
	43.9	440,300	3,285,700	03011311	
	46.0	437,300	3,288,500	04060810	
	61.3	437,300	3,289,200	05041810	

Note: YYMMDDHH = Year, Month, Day, Hour Ending.

[a] Concentrations are based on highest concentrations predicted using AERMOD with five years of meteorological data from 2001 to 2005 of surface and upper air data from the National Weather Service station at Jacksonville International Airport as received from the FDEP.


437000
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3290500
3290000
3289500
3289000
3288500
3288000
3287500
N
LEGEND
Point Sources
Volume Sources
Buildings in Downwash Analysis
Fenceline Receptors
SOURCE LAYOUT
REFERENCE
Projection: Transverse Mercator Datum: NAD 27 Coordinate System: UTM Zone 17
550
0
550
Meters
PROJECT
Seminole Electric Unit 3
TITLE
FENCELINE RECEPTORS
Golder Associates
Gainesville, Florida
PROJECT No. 053-9540
SCALE AS SHOWN
REV. 0
DESIGN AB 22 May 2006
GIS AB 22 May 2006
Figure 1-1

ATTACHMENT 1-1

As part of the PSD review, PSD Class II and Class I increment analyses are required if the proposed facility's impacts are greater than the EPA Class I significant impact levels (these impacts levels are proposed for Class I Areas). The nearest PSD Class I area is the Okefenokee National Wilderness Area (NWA), located approximately 108 kilometers (km) north of the SGS; the Chassahowitzka NWA, located about 137 km to the southwest; and the Wolf Island NWA, located about 186 km to the north. As indicated, these PSD Class I areas are within 200 km of the SGS. Air impact modeling analyses for the Class I increment and for applicable AQRVs were performed for the PSD Class I areas of Okefenokee and Chassahowitzka NWA.

The emission rates of SO_2, NO_X and SAM for Units 1 and 2 used in the PSD Class I air quality analysis were determined by subtracting the Project's potential future emissions for these pollutants from the actual baseline emissions from SGS. As shown in Table 3-4, annual emissions for Units 1 and 2 for SO_2, NO_X and SAM (after subtracting the potential emissions of Unit 3) are 23,637 tons per year, 20,334 tons per year and 1,965 tons per year, respectively. Using the maximum heat input for Units 1 and 2 of 14,344 MMBtu/hr for both units combined, the short-term emissions used in the air quality analysis were 5,397 lb/hr, 4,642 lb/hr and 449 lb/hr for SO_2, NO_X and SAM, respectively. The equivalent emission rates are 0.38, 0.32 and 0.03 lb/MMBtu for SO_2, NO_X and SAM, respectively. Because these rates show compliance with the AAQS and increments and regional haze, as discussed in Sections 6 and 7 of this PSD application, Seminole is also proposing a weighted-average short term emission limit for SO_2, NO_X and SAM for Units and 1 and 2, as follows: SO_2 = 0.38, 24-hour block average, based on CEMs; NO_X = 0.32, 30-day rolling average, based on CEMs; and SAM = 0.03, based on an initial Method 8A stack test (see Table 3-4).

Due to the conservative nature of formally projecting future emissions, Seminole is confident that there will actually be at least a ten percent reduction in SO_2, NO_X, SAM and mercury emissions even after Unit 3 comes online. Specifically, the projected future actual emissions from Units 1, 2 and 3 were calculated using the emission rates specified in Tables 2-2 and 3-4, and assuming that all three units will run continuously for 8,760 hours per year (i.e., one-hundred percent capacity factor). Historical capacity factors for Units 1 and 2 have never exceeded 90 percent, and this is expected for Unit 3 as well. In addition, emission rates will not continually be exactly at the maximum allowable level. Accordingly, the actual emissions of SO_2, NO_X, SAM and mercury from SGS after Unit 3 comes online should be at least ten percent less than baseline emissions.

TABLE 3-3
PSD NETTING ANALYSIS

Pollutant	Units 1 and 2 Baseline Actual Emissions (tpy)	Projected Actual Emissions from Units 1-2 Project (tpy)	Net Emissions Increase from Units 1-2 Project (tpy)	Unit 3 Project	Net Emissions Decrease from Units 1 and 2 with Unit 3 Project (tpy)	Net Emissions Increase with Unit 3 Project (tpy)	Significant Emission Rates (tpy)	PSD Review Required for Unit 3 Project?
SO_2	29,074	29,074	0.0	5,437	(5,437)	0	40	No
NOx	22,670	22,670	0.0	2,336	(2,336)	0	40	No
PM	822	846	24.4	519	NA	519	25	Yes
PM_{10}	822	836	14.4	511	NA	511	15	Yes
H_2SO_4	2,129	2,129	0.0	164	(164)	0	7	No
VOC	108	147	39.0	132	NA	132	40	Yes
CO	12,565	12,565	0.0	4,936	NA	4,936	100	Yes
Pb	NA	NA	NA	0.247	NA	0.247	1	No
HF	NA	NA	NA	7.5	NA	7.5	3	Yes
Hg	0.066	0.066	0	0.023	(0.023)	0.000	<0.1	No

* Units 1 and 2 baseline actual emissions are based on Tables B-4E through B-4S, supplied with Units 1 and 2 application.

Table 3-4. Proposed Emission Rates for SECI SGS Units 1 and 2.

Pollutant	Emission Unit	Proposed Emission Limits	Type of Emission Limit	Compliance Methods
NO_x	Units 1 and 2 Boilers	0.32 lb/MMBtu 20,334 TPY	PSD Netting	40 CFR Part 75 CEMS 30-day weighted rolling average (Units 1 and 2)
SO_2	Units 1 and 2 Boilers	0.38 lb/MMBtu 23,637 TPY	PSD Netting	40 CFR Part 75 CEMS weighted 24-hour block average (Units 1 and 2)
SAM	Units 1 and 2 Boilers	0.03 lb/MMBtu 1,965 TPY	PSD Netting	Initial: Method 8A Controlled Condensate (weighted average Units 1 and 2)
Mercury	Units 1, 2 & 3 Boilers	119 lb/yr	Proposed	40 CFR Part 75 CEMS annual average

Legend: BACT = Best Available Control Technology; PSD = Prevention of Significant Deterioration; COMS - Continuous Opacity Monitoring System; CEMS = Continuous Emission Monitoring System

* Based on 4/14/06 RAI response, CO BACT does not apply

F2. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION - ALLOWABLE EMISSIONS

Complete if the pollutant identified in Subsection F1 is or would be subject to a numerical emissions limitation.

Allowable Emissions Allowable Emissions 1 of 3

1. Basis for Allowable Emissions Code: **ESCPSD**	2. Future Effective Date of Allowable Emissions: **5/12**
3. Allowable Emissions and Units: **0.32 lb/MMBtu**	4. Equivalent Allowable Emissions: **4,642** lb/hour **20,334** tons/year
5. Method of Compliance: **Continuous Emissions Monitoring System (CEMS)**	
6. Allowable Emissions Comment (Description of Operating Method): **Allowable emissions are a weighted-average between Units 1 and 2.**	

Allowable Emissions Allowable Emissions 2 of 3

1. Basis for Allowable Emissions Code:	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units:	4. Equivalent Allowable Emissions: lb/hour tons/year
5. Method of Compliance:	
6. Allowable Emissions Comment (Description of Operating Method):	

Allowable Emissions Allowable Emissions 3 of 3

1. Basis for Allowable Emissions Code:	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units:	4. Equivalent Allowable Emissions: lb/hour tons/year
5. Method of Compliance:	
6. Allowable Emissions Comment (Description of Operating Method):	

F1. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION – POTENTIAL/ESTIMATED FUGITIVE EMISSIONS

(Optional for unregulated emissions units.)

Potential/Estimated Fugitive Emissions

Complete for each pollutant identified in Subsection E if applying for an air construction permit or concurrent processing of an air construction permit and a revised or renewal Title V permit. Complete for each emissions-limited pollutant identified in Subsection E if applying for an air operation permit.

1. Pollutant Emitted: **NOX**	2. Total Percent Efficiency of Control: **65 %**
3. Potential Emissions: **4,642** lb/hour **20,334** tons/year	4. Synthetically Limited? ☐ Yes ☒ No
5. Range of Estimated Fugitive Emissions (as applicable): to tons/year	
6. Emission Factor: **0.32 lb/MMBtu** Reference: **Proposed emissions**	7. Emissions Method Code: **0**

8. Calculation of Emissions:

The lb/hr and ton/yr emissions above are for Units 1 and 2 combined. The weighted-average emission rate of 0.32 lb/MMBtu equates to a no net increase in NOx emissions for the overall project, at a 100 percent capacity factor. The results of air quality modeling for the existing SGS facility indicate that at the allowable NOx emission rate, emissions from SGS, after Unit 3 comes online, result in no significant impact on regional haze.

9. Pollutant Potential/Estimated Fugitive Emissions Comment:

F1. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION – POTENTIAL/ESTIMATED FUGITIVE EMISSIONS

(Optional for unregulated emissions units.)

Potential/Estimated Fugitive Emissions

Complete for each pollutant identified in Subsection E if applying for an air construction permit or concurrent processing of an air construction permit and a revised or renewal Title V permit. Complete for each emissions-limited pollutant identified in Subsection E if applying for an air operation permit.

1. Pollutant Emitted: **NOX**	2. Total Percent Efficiency of Control: **65 %**
3. Potential Emissions: **4,642** lb/hour **20,334** tons/year	4. Synthetically Limited? ☐ Yes ☒ No
5. Range of Estimated Fugitive Emissions (as applicable): to tons/year	
6. Emission Factor: **0.32 lb/MMBtu** Reference: **Proposed emissions**	7. Emissions Method Code: **0**

8. Calculation of Emissions:

See PSD Report.

The lb/hr and ton/yr emissions above are for Units 1 and 2 combined. The weighted-average emission of 0.32 lb/MMBtu equates to no net increase in NOx emissions for the overall project, at a 100 percent capacity factor. The results of air quality modeling for the existing SGS facility indicated that, at the allowable NOx emission rate, emissions from SGS, after Unit 3 comes online, result in no significant impact on regional haze.

9. Pollutant Potential/Estimated Fugitive Emissions Comment:

F2. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION - ALLOWABLE EMISSIONS

Complete if the pollutant identified in Subsection F1 is or would be subject to a numerical emissions limitation.

Allowable Emissions Allowable Emissions 1 of 3

1. Basis for Allowable Emissions Code: **ESCPSD**	2. Future Effective Date of Allowable Emissions: **5/12**
3. Allowable Emissions and Units: **0.32 lb/MMBtu**	4. Equivalent Allowable Emissions: **4,642** lb/hour **20,334** tons/year
5. Method of Compliance: **Continuous Emissions Monitoring System (CEMS)**	
6. Allowable Emissions Comment (Description of Operating Method): **Allowable emissions are a weighted-average between Units 1 and 2.**	

Allowable Emissions Allowable Emissions 2 of 3

1. Basis for Allowable Emissions Code:	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units:	4. Equivalent Allowable Emissions: lb/hour tons/year
5. Method of Compliance:	
6. Allowable Emissions Comment (Description of Operating Method):	

Allowable Emissions Allowable Emissions 3 of 3

1. Basis for Allowable Emissions Code:	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units:	4. Equivalent Allowable Emissions: lb/hour tons/year
5. Method of Compliance:	
6. Allowable Emissions Comment (Description of Operating Method):	

SECTION 2.0

Division of Water Resource Management

The Division of Water Resource Management had the following comments:

1. **3.1, page 3-3: Paragraph 3 indicates that a new wastewater surge pond will be installed to accommodate the storage of wastewater during times when the ZLD is not in service. The Water Use Diagram, Figure 3.5.0-1, does not include the new surge pond (although the water use diagram does include an equalization basin). Please clarify.**

   The Water Use Diagram referenced above (Figure 3.5.0-1) has been revised (see Figure 2-1) to show that the existing landfill ponds will be used as surge ponds during times when the ZLD is not in service. During times when the capacity of the existing landfill ponds or the equalization basins may not be adequate, wastewater will be directed to the new wastewater surge pond. The wastewater from the new wastewater surge pond will be directed back to the equalization basins, the landfill ponds, the scrubbers or the proposed ZLD system for reuse.

2. **The hydraulic storage capacity of the new surge pond in terms of days of storage needs to be specified. Adequate storage capacity should be provided for periods of time when wastewater cannot be reused such as maintenance downtime. What alternate means of wastewater disposal are provided?**

   The capacity of the new wastewater surge pond will be sized for a minimum of 14 days of storage (6 million gallons) assuming one brine concentrator and spray dryer are out of service for maintenance plus an additional direct rainfall of 8 inches from a 25 year-24 hour storm event. Seminole is not proposing any other alternative means of wastewater disposal.

3. **Section 3.5.4, page 3-23: this section indicates that wastewater from Units 1, 2, and 3 will continue to be treated in the plant's wastewater treatment facility. The Water Use Diagram, Figure 3.5.0-1, does not include the plant's wastewater treatment facility (although the equalization basin is shown which is part of the plant's wastewaster treatment facility). The water use diagram should be revised as necessary.**

   Figure 3.5.0-1 has been revised (See Figure 2-1) to reflect the SGS Units 1, 2 and 3 plant wastewater treatment system. The existing wastewater treatment system will be utilized for Units 1, 2 and 3, as necessary, during operation of Units 1, 2 and 3. More specifically, solids contained in the wastewater will be settled in the equalization basins as currently conducted. The settled solids will be dewatered and disposed in the onsite landfill or shipped offsite to an approved landfill facility. Seminole anticipates the wastewater quality will be sufficient for reuse in most plant processes after solids settling and oil and grease removal. Seminole may maintain the existing pH adjustment and clarification tank in the event higher quality water is required for reuse. All process wastewater will be recycled and will not be discharged to the St. Johns River. The only wastewater to be discharged to the river will be the cooling tower blowdown which will be dechlorinated with the sodium bisulfite as currently operated and pumped to the surge tank at wastewater for final pumping to the River.

   Seminole will submit to the Department the final design which will integrate the existing wastewater treatment works and the proposed zero liquid discharge system once plans have been finalized.

4. **Section 3.5.4.4, page 3-24: This section refers to the gypsum dewatering and washing system. Please provide a brief description of the gypsum dewatering and washing system including wastewater streams that are generated. The Water Use Diagram, Figure 3.5.0.-1, should also include the gypsum dewatering and washing system.**

The gypsum dewatering system consists of primary and secondary dewatering. The purpose of the primary dewatering system is to reduce the volume and increase the solids concentration of the scrubber slurry before being processed by the secondary dewatering equipment. The primary dewatering equipment will consist of a thickener and hydrocyclones. The purpose of the secondary dewatering system is to reduce the moisture content of the scrubber (gypsum) solids to produce commercial quality gypsum. The secondary dewatering equipment will consist of horizontal belt vacuum filters. As part of the secondary dewatering system, a gypsum wash system is used to remove water soluble salts.

Figure 2-2 provides additional information regarding the gypsum dewatering and washing systems that are contained within the "Units 1 and 2 scrubber system" and "Unit 3 scrubber system" boxes in Figure 2-2. This figure clarifies which wastewater streams are generated during the dewatering and washing operations. All wastewater from the gypsum washwater waste stream will be recycled and reused. None of these waste streams will be discharged to the St. Johns River.

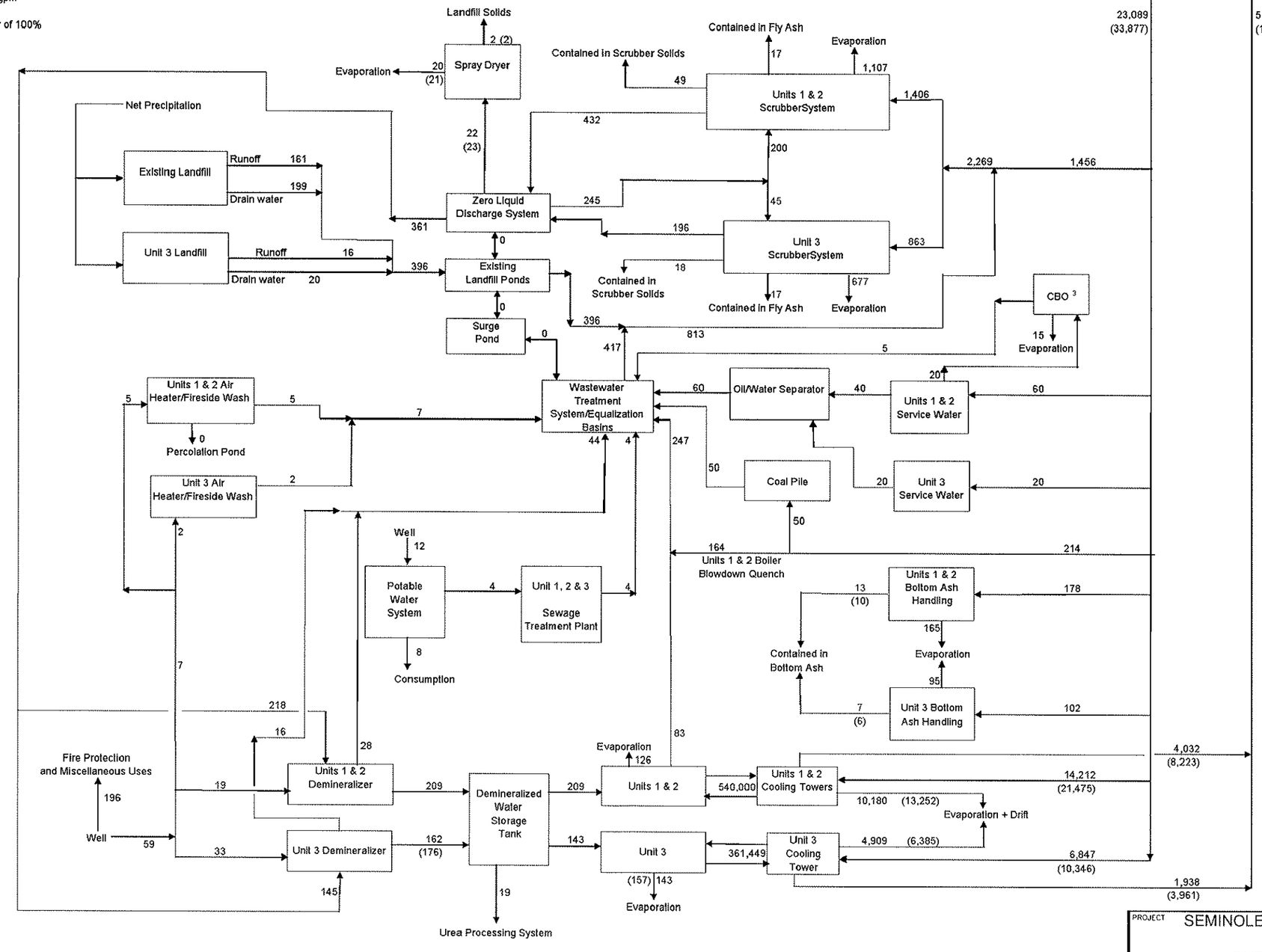
5. **Figure 3.5.0-1, Water Use Diagram: The diagram indicates cooling tower blowdown flow rates for Units 1 and 2 that are significantly greater than current permitted flow rates. Please explain reason for the significant increase in cooling water blowdown from Units 1 and 2.**

There are currently no permit flow rates limiting the volume of cooling tower blowdown (I-04A and B) or total surface water discharge (D-001) from the Units 1 and 2 cooling towers. However, Seminole represented in the original Site Certification Application (SCA) a maximum discharge of 7.46 mgd (5180 gpm) for the D-001 outfall. The SGS Water Balance (Figure 3.5.0-1) indicates cooling tower flow rates of 2000 gpm for each unit for a total of 4000 gpm for both at 100% capacity. This flow rate is well within the 7.46 mgd maximum discharge volume in the original SCA.

6. **General: The addition of Unit 3 to the Seminole Generating Station will require a substantial revision to the existing NPDES wastewater permit. Please note that the proposed Unit 3 addition may invoke Departments antidegradation requirements for new or expanded facilities that would need to be addressed as part of the permit revision.**

Seminole has submitted a fee to the DEP Siting Office and an NPDES permit revision application in the Site Certification Application and in person to the NPDES Industrial Wastewater Group on March 20, 2006 to support the addition of SGS Unit 3. The NPDES permit revision application which includes an antidegradation analysis is included with the SCA in Appendix 10.1.2, Volume II of III. Based on our understanding of the administrative process, this documentation satisfies the permit revision application requirements.

1 Average flows in gpm
2 Peak flows in parentheses in gpm
3 Carbon Burn Out System
4 Assumed plant capacity factor of 100%



PROJECT: SEMINOLE ELECTRIC COOPERATIVE INC
SGS UNIT 3
PUTNAM COUNTY, FLORIDA

TITLE

SGS UNIT 3 WATER-USE DIAGRAM

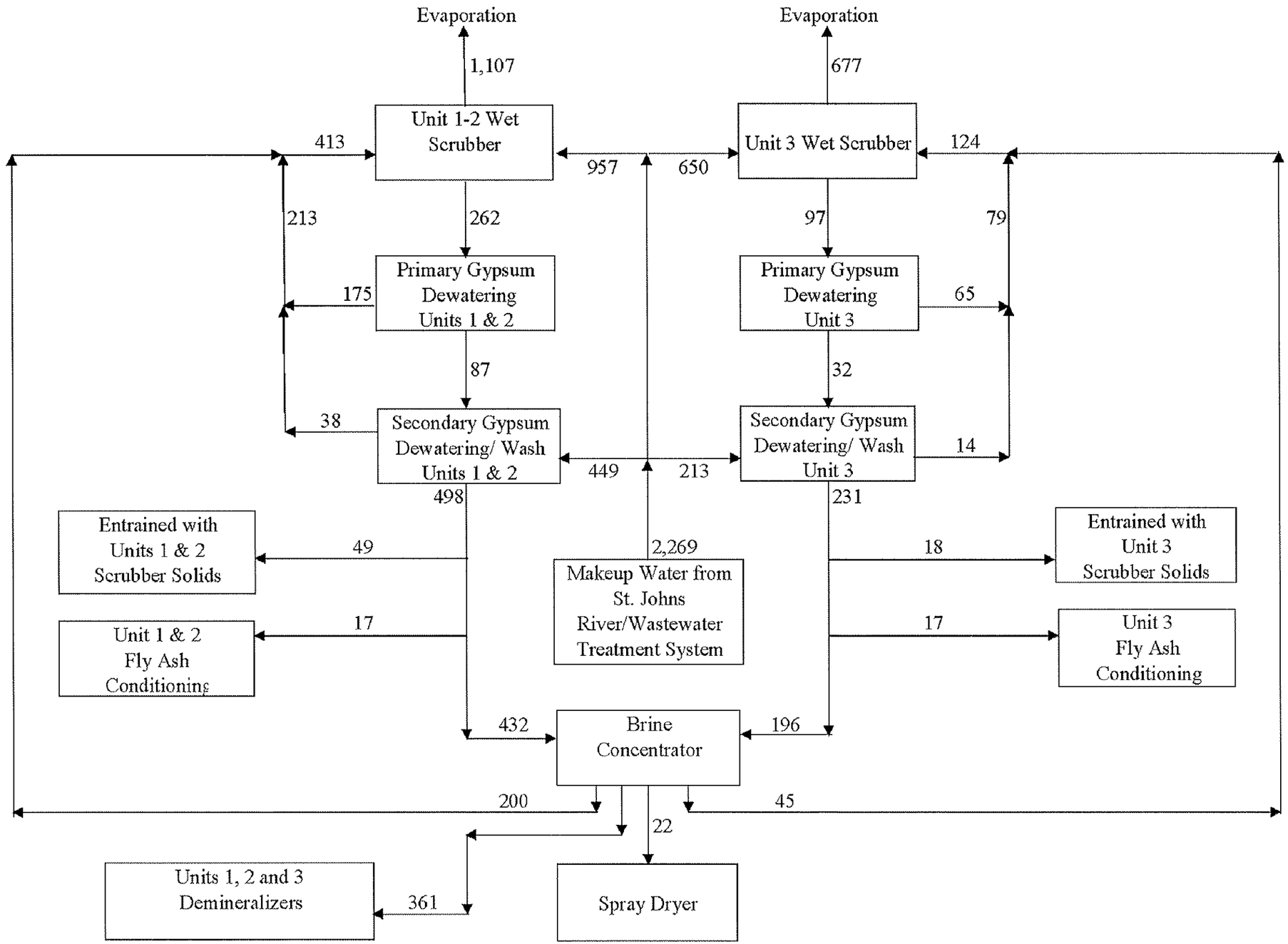
Golder Associates
Tampa, Florida

PROJECT No.		053-9540	FILE No.	0539540s002.dwg	
DESIGN	MEF	03/07/06	SCALE AS SHOWN	REV.	0
CADD	MEF	03/07/06			
CHECK	HF	03/07/06			
REVIEW	MM	03/07/06			

FIGURE 2-1

Drawing file: F:\PROJECTS\2005 PROJ\053-9540\Sufficiency Response\0539540s002.dwg Jun 20, 2006 - 3:13pm

1. Average flows in gpm
2. Peak flows in parentheses in gpm
3. Assumed plant capacity of 100%



PROJECT: SEMINOLE ELECTRIC COOPERATIVE INC
SGS UNIT 3
PUTNAM COUNTY, FLORIDA

TITLE: **SGS UNIT 3 WATER-USE DIAGRAM UNITS 1 AND 3 SCRUBBER SYSTEM GYPSUM/DEWATERING SYSTEM DETAILS**

Golder Associates Tampa, Florida

PROJECT No.	053-9540		FILE No.	0539540s003.dwg	
DESIGN	MEF	03/07/06	SCALE	AS SHOWN	REV. 0
CADD	MEF	03/07/06			
CHECK	MF	03/07/06			
REVIEW	MM	03/07/06			

FIGURE 2-2

Drawing file: F:\PROJECTS\2005 PROJ\053-9540\Sufficiency Response\0539540s003.dwg Jun 21, 2006 - 5:39pm

SECTION 3.0

Northeast District Solid Waste Office

The Northeast District Solid Waste Office had the following comments: The application indicates that wastes will either be disposed at an offsite permitted landfill or will be managed onsite with the installation of a composite or double-lined landfill with a leachate collection and removal system at the existing landfill area. However, it does not provide any details regarding the design, construction or operation of such a landfill. Therefore, the following information is needed:

1. **An indication of the precise location of the proposed lined landfill (e.g., will it be next to the existing landfill or on top of it.**

   The proposed landfill will be sited on top of the existing landfill and test cell area as depicted in Figure 3-1. Seminole will submit a landfill design and obtain Department approval prior to constructing any new landfill facilities within the test cell area. Seminole intends to construct a lined landfill system within the existing landfill area. Seminole will install liners in the appropriate areas prior to disposal of wastes from SGS Unit 3 operations.

2. **A layout of the landfill design, including the thickness and hydraulic conductivity of each layer and an analysis of the sufficiency of the design.**

   Seminole's proposal, as set forth in the Site Certification Application, is that all prospective landfilling in conjunction with Unit 3 will meet the applicable requirements of Chapter 62-701, F.A.C., including a double liner and leachate collection system. Detailed design specifications are not available at this time; nor are construction or operational details. It is proposed that additional design and construction details be provided pursuant to the Conditions of Certification.

3. **A geotechnical investigation of the adequacy of the landfill site.**

   As indicated above, all prospective on-site landfilling will occur within the landfill "footprint" originally approved for Units 1 and 2. Seminole proposes to conduct additional geotechnical analysis for submittal and approval under the Conditions of Certification.

4. **A specification of how the landfill will be constructed, including both the QA/QC of the project and the minimum experience of the individual in charge of the same.**

   See Response to Item 2 above.

5. **A landfill operations plan**

   See Response to Item 2 above.

6. **An indication of the expected life of the landfill and how it will be maintained after closing.**

   Based on Seminole's plans for recycling and reuse of coal combustion products, the projected life of the landfill is approximately 20 years. Seminole anticipates a Condition of Certification regarding verification of compliance with all closure and post-closure requirements of Chapter 62-701, F.A.C.

7. **An indication of how financial assurance for the closure and subsequent care of the landfill will be established.**

   Seminole proposes that a demonstration of financial assurance for closure in accordance with Chapter 62-701, F. A. C. be required as a Condition of Certification.



LEGEND

- Existing Structures
- Wetlands
- New Construction

0.1 0 0.1 Miles

N

REFERENCE

1. Site Plan, Burns & McDonnell
2. FDEP Jurisdictional Wetlands
3. 2004 aerial photography, USGS Digital Ortho Quarter Quadrangles (DOQQ)

PROJECT
SEMINOLE ELECTRIC COOPERATIVE INC.
SGS UNIT 3
PUTNUM COUNTY, FL

TITLE
LANDFILL WITH AERIAL PHOTOGRAPHY

Golder Associates
Tampa, Florida

PROJECT No. 053-9540			SCALE AS SHOWN	REV. 0
DESIGN	QY	12 June 2006		
GIS	QY	12 June 2006		
CHECK	MM	12 June 2006		
REVIEW	MM	12 June 2006		

FIGURE: 3-1

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SECTION 4.0

Northeast District Wastewater/Stormwater

Northwest District Wastewater and Stormwater has reviewed Section 10.9 Stormwater Management Calculations of the application and found that the following additional information may be necessary for a complete evaluation of the application:

1. **It appears that information provided in Table 10.9.0-1 are not consistent with the information provided in Wet Detention Pond Design Notes and Calculations. Please verify and provide updated information.**

   Tables 10.9.0-1 and 10.9.0-2 have been revised and are now consistent with the information provided in the Wet Detention Pond Design Notes and Calculations (See Tables 4-1 and 4-2).

2. **Rule 40C-42.026(4)(b) requires that outfall structures shall bleed down one-half of treatment volume with 24 to 30 hours. Design calculations of the proposed stormwater management system indicate that all wet detention ponds will recover one-half of the treatment volume in 48 hours. Please verify and revise each orifice design.**

   The stormwater calculations have been revised to reflect outfall structures with orifice designs that shall bleed down one-half of treatment volume within 24 to 30 hours. See Attachment 4-1.

3. **Please explain how seasonal high ground water elevations and average ground water elevations are determined. Please provide geotechnical report(s) with soil borings conducted at each proposed pond and swale location. At a minimum, the report(s) shall include soil profiles and estimated seasonal high ground water elevations. For swales, site specific permeability at proposed swale locations shall also be provided.**

   Seasonal high ground water elevations were determined through soil survey information (See Figure 4-1) and field evaluation of soil conditions within each proposed pond and swale location. Specifically, a backhoe was utilized to excavate an approximately 6' deep trench, and indicators of seasonal high groundwater were identified, including hydric soil indicators such as oxidized rhizospheres, redox conditions, gleyed/stripped matrices in sandy soils and the corresponding elevation below ground surface measured. Locations of each soil boring, approximate elevations, soil series, and seasonal high groundwater table estimates are provided below:

POND	LOCATION	BORING #	Coordinates		Approx Elev (ft)	SHGWT (bls)	Soil Type
1	parking lot near guard shack	1	N 29° 44' 13.1"	W 81° 38' 08.7"	73	23"	Tavares/Myakka
1	middle of parking lot	2	N 29° 44' 11.9"	W 81° 38' 04.9"	76.5	21"	Tavares/Myakka
2	south of landfill by NE Project corner	1	N 29° 44' 14.7"	W 81° 37' 41.2"	73	40"	Tavares
2	approx 100' from ditch	2	N 29° 44' 12.2"	W 81° 37' 46.5"	82	65"	Tavares
3	southwest of cooling towers	1	N 29° 43' 36.6"	W 81° 37' 43.3"	67.5	22"	Tavares/Myakka
3	slightly north of boring 1	2	N 29° 43' 37.7"	W 81° 37' 44.3"	69	32"	Tavares/Myakka
4	pipeline easement	1	N 29° 43' 22.7"	W 81° 38' 02.6"	59	28"	Centenary/Myakka
4	pipeline easement, further east	2	N 29° 43' 22.3"	W 81° 37' 58.3"	58.5	20"	Centenary/Myakka

SECTION 4.0

Northeast District Wastewater/Stormwater

POND	LOCATION	BORING #	Coordinates		Approx Elev (ft)	SHGWT (bls)	Soil Type
5	perc pond/borrow area	1	N 29° 43' 54.6"	W 81° 37' 27.9"	76	48"	Tavares
5	perc pond/borrow area	2	N 29° 43' 56.1"	W 81° 37' 28.3"	77.5	56"	Tavares

Stormwater pond #1 (located at existing parking lot near entrance road guard shack) is located along a gradient between Tavares and Myakka soils. Field measurements of seasonal high groundwater were 1.9 and 1.8 feet below the surface. An approximately 9" layer of fine sand was evident at approximately 6 inches below the surface, due to historical cut and fill operations in parking area during initial site development.

Location	Depth bls (inches)	Soil description
Pond 1 – Boring #1	0-5"	Dark black, high organic matter
	5-14"	White sand – fill material
	14-21"	Brown sand
	21-37"	Light brown sand with mottles, hydric streaking, gleyed colors
	>37"	Brown/yellow sand
Pond 1 – Boring #2	0-6"	Light brown sand
	6-7"	Clay layer
	7-23"	Light brown sand with mottles, hydric streaking, gleyed colors
	23-36"	Dark black peat soil – historical deposition of wetland dredge spoil
	>36"	Light brown sand

Stormwater pond #2 (south of existing landfill in NE corner of Project area) is located within an within an area of Tavares sand, which contains a seasonal high water table between 3.5-6 feet according to the attached Soil Survey of Putnam County Area (USDA 1990). Two field measurements at the location of the pond indicated seasonal high ground water elevations of 3.3 and 5.4 feet below surface:

Location	Depth bls (inches)	Soil description
Pond 2 – Boring #1	0-36"	Dark gray sand
	36-54"	Gray/yellow sand with dark mottles, gleyed colors
	>54"	Dark gray sand
Pond 2 – Boring #2	0-48"	Dark gray sand
	48 – 72"	Yellow/gray fine sand with redox features and mottling at 60"

Stormwater pond #3 (southwest of the existing cooling towers) is located on an area along a gradient between Tavares sand and Myakka fine sand. According to the soil survey, Tavares sand and Myakka fine sand contain a seasonal high water tables ranging from 3.5-6 feet and 0-1 foot, respectively, while field measurements of seasonal high ground water were 1.8 and 2.7 below the surface, indicative of the location along the gradient between the two soil types.

Location	Depth bls (inches)	Soil description
Pond 3 – Boring #1	0-5"	Black/brown sand with organic matter
	5-20"	Dark gray fine sand
	20-36"	Dark gray sand with mottles, redox features
	>36"	Dark gray sand
Pond 3 – Boring #2	0-5"	Dark black sand with organic matter
	5-27"	Brown sand
	27"-42"	Yellow/brown sand with gleyed colors, hydric streaking, redox features

Stormwater pond #4 (east of the existing pipeline easement) is also located upon Centenary fine sand, and the measured seasonal high groundwater table was 2.3 and 1.7 feet below the surface.

Location	**Depth bls (inches)**	**Soil description**
Pond 4 – Boring #1	0-18"	Gray sand
	19-25"	Dark black mixture of sand/organic matter
	25-36"	Gray sand with mottles
	>36"	Dark brown sand
Pond 4 – Boring #2	0-14"	Gray sand
	14-19"	Dark black mixture of sand/organic matter
	19-24"	Gray sand with mottles
	>24"	Dark brown sand

Stormwater pond #5 (northeast of the existing cooling towers) is located within an area of Tavares sand, which contains a seasonal high water table between 3.5-6 feet according to the attached Soil Survey of Putnam County Area (USDA 1990). Two field measurements at the location of the pond indicated seasonal high ground water elevations of 4.0 and 4.7 feet below surface, within the range described in the soil survey.

Location	**Depth bls (inches)**	**Soil description**
Pond 5 – Boring #1	0-5"	Dark gray sand
	5 – 72"	Yellow/gray fine sand with redox features and mottling at approx 40" bls
Pond 5 – Boring #2	0-6"	Dark gray sand
	6-60"	Yellow sand with dark mottles, gleyed colors at approx 56" bls
	>60"	Yellow sand

Site specific permeability tests were conducted at three representative locations along the entrance road swale via double-ring infiltrometer tests on May 23, 2006. The locations of each test are presented below (See Figure 4-2). Results of the permeability tests are provided in Tables 4-2 through 4-4.

Site 1 - closest to guard shack, across from Lafarge dome
Site 2 - near bend in access road
Site 3 - adjacent to site entrance road, south of Lafarge entrance

SECTION 4.0

Northeast District Wastewater/Stormwater

4. **For each pond, please provide a plan view, a typical cross section and control structure details. These drawings shall provide information of pond dimensions at top and bottom, pond elevations at top and bottom, weir and orifice elevations and pond slopes at various depths.**

   The stormwater calculations include a cross section of each pond with applicable elevations. A plan view of the ponds is shown on Attachment 4-1, Drawing DP-1. Detailed construction plans and drawings will be provided following issuance of the Conditions of Certification.

5. **For each swale, please provide a plan view, a typical cross section. These drawings shall provide information of swale dimensions a top and bottom, swale elevations at top and bottom, swale slops and elevations of 12" culverts. The invert elevations of each culvert shall be high enough so that treatment volume will be maintained in each swale.**

   The stormwater calculations include a typical cross section of the swale design and the depths of each swale. The elevations of each swale varies and will be shown on the detailed construction plans to be provided following issuance of the Conditions of Certification. A plan view of the swales is shown in Attachment 4-1, Drawing DP-2. The design of the swales is for percolation of 80 percent of the 3-year, one hour storm. Therefore, no additional treatment volume is required and the invert elevation of the culverts is at the bottom of each swale. Check dams have been included in the design to promote additional percolation of the runoff. Detailed construction plans and drawings will be provided following issuance of the Conditions of Certification.

6. **Please provide Tc calculations for all basins to support ponds and swales design.**

   The Tc calculations for each pond and swale are included in the revised stormwater calculations provided in Attachment 4-1.

7. **Will skimmers be provided for all ponds and swales? Please indicate each of them on drawing.**

   Skimmers will be provided for each pond as indicated in the stormwater calculations. The typical oil skimmer detail is shown in Figure 9-1 for each pond calculation.

8. **Please provide a plan of best management practices for erosion and sediment control during construction.**

   The Department's NPDES Generic Stormwater Permit requires that a Stormwater Pollution Prevention Plan (SWPPP) be prepared and onsite prior to construction. The SWPPP requires the development and implementation of a detailed best management practices plan for erosion and sediment control to ensure that measures are in place to minimize erosion and offsite runoff.

   The SWPPP will be submitted following the issuance of the Conditions of Certification and prior to construction, as required under the Generic Permit, Chapter 62-621, F.A.C. Seminole will prepare a SWPPP, as described in Section 3.8 of the SCA, following the issuance of the Conditions of Certification and prior to construction as required under Generic Permit, Chapter 62-621, F.A.C. The plan will address all best management practices (BMPs) that will be used for erosion and sediment control during construction. The FDEP publication

"Florida Development Manual: A Guide to Sound Land and Water Management", Chapter 6 Stormwater and Erosion and Sediment Control Best Management Practices for Developing Areas will be used as a reference in selecting and designing BMPs. BMPs may include, but not be limited to:

- Temporary gravel construction entrance;
- construction road stabilization;
- straw bale barriers;
- silt fences;
- brush barriers;
- storm drain inlet protection;
- temporary diversion dikes;
- temporary fill diversion;
- temporary right-of-way diversions;
- temporary sediment traps or basins;
- temporary slope drains;
- paved flumes;
- stormwater conveyance channels;
- outlet protection,
- riprap;
- check dams;
- waterway drop structures;
- level spreaders;
- subsurface drains;
- surface roughening;
- topsoiling;
- temporary seeding;
- permanent seeding;
- sodding;
- Bermuda grass establishment;
- mulching;
- trees, shrubs, vines, and ground covers;
- tree preservation and protection;
- dust control; and
- wet detention and/or retention.

9. **The design report provides two storage tables for Pond #1. It appears that pond size inputted into computer modeling is larger than pond size used for determine treatment volume. Please explain and indicate the final pond design.**

   Revised tables and calculations for Pond 1 are provided in Attachment 4-1.

10. **For Pond #4, please clarify impervious area at pre-development. Design Summary indicates 15 percent of the total basin area. But modeling input indicates 50 percent.**

The correct percent impervious area for pre-development is 50 percent. The stormwater calculations for Pond 4 reflect the revised calculations that coordinate the impervious area at pre-development with the modeling input (See Attachment 4-1).

11. **Will depths of swale #1, 2, 3, and 4 be 2.0 feet, swale #5 be 2.6 feet and swale #6 be 2.4 feet.**

    The depths of the swales are identified in the swale cross section table included in the revised stormwater calculations in Attachment 4-1. The depth of swale #1, 2, 3, 4 and 5a will be 2.0 feet; swale 5b will be 2.4 feet and swale #6 will be 1.4 feet.

12. **10.9.1 Stormwater Management and Calculation indicates that area within the coal pile railroad loop and area landfill/FGD effluent processing are not included within the Unit 3 stormwater management system because runoff from various portions of these basins which are impacted by the construction or operation of Unit 3 are reused. Please provide more information regarding location and acreage of the impacted areas, runoff collection and reuse.**

    Figure 4-3 provides an aerial view of the area within the coal pile railroad loop. The coal pile area is approximately 60 acres in size and is lined with an impervious liner. All runoff from the 60 acre basin is routed to and collected in a lined coal pile runoff pond. The new coal handling facility will be constructed on a lined area. All runoff will be directed to a new coal pile runoff pond. The new pond will retain a 25-year, 24-hour storm event. All collected water will be reused on site.

    Figure 3-1 provides an aerial view of the existing landfill area. The landfill area is approximately 100 acres in size. All runoff from the 100 acre basin is routed to and collected in lined landfill runoff ponds. All new landfilling associated with SGS Unit 3 will be conducted in lined areas. All runoff from active landfill areas will be directed to the landfill runoff ponds. All collected water will be reused on site.

TABLE 4-1
SGS UNIT 3 STORMWATER MANAGEMENT SYSTEM

	Basin 1	Basin 2	Basin 3	Basin 4	Basin 5	Swale System
Description	Unit 1 drainage area	Unit 2 and 3 drainage area	East laydown area	West laydown area	Borrow Area	Entrance Road
25-year design storm 24-hour precipitation (inches)	8	8	8	8	10 *	8
25-year pre-construction peak discharge (cfs)	105.75	145.86	86.7	177.79		12.68
pre-construction % impervious	75%	30%	15%	50%		15%
pre-construction runoff volume (acre-feet)	26.82	56.77	21.71	34.57		3.53
treatment volume (cubic feet)	338,840	795,399	450,175	523,932		20,851
permanent pool volume	466,528	1,160,831	610,178	710,149	343,339	
25-year post-construction peak discharge (cfs)	87.6	134.6	82.6	144.6		12.32
post-construction % impervious	85%	70%	90%	90%	22%	55%
post-construction runoff volume (acre-feet)	20.49	53.41	25.12	29.63	7.88 *	3.68
pervious area (sq mi)	0.010297	0.058688	0.0086	0.010	0.020	0.00328
impervious area (sq mi)	0.058344	0.136953	0.0775	0.090	0.000	0.00408
total area (sq miles)	0.068641	0.195641	0.0861	0.100	0.020	0.00736
pervious area (acres)	6.6	37.6	5.51	6.42	12.58	2.10
impervious area (acres)	37.3	87.7	49.61	57.73	0.00	2.61
total area (acres)	43.9	125.2	55.12	64.15	12.58	4.71
SCS curve number post-construction	82	79	85	85	80	68

* 100-year 24-hour storm

TABLE 4-2
ENTRANCE ROAD SWALE SYSTEM CHARACTERISTICS

	Entrance Road							
description	Total	Swale #1	Swale #2	Swale # 3	Swale # 4	Swale # 5A	Swale # 5B	Swale # 6
25-year design storm 24-hour precipitation (inches)	8	8	8	8	8	8	8	8
25-year pre-construction peak discharge (cfs)	12.68							
pre-construction % impervious	15%	15%	15%	15%	15%	15%	15%	15%
pre-construction runoff volume (acre-feet)	3.53							
treatment volume (cubic feet)	20,851	4,954	2,218	1,843	1,814	2,362	2,390	5,270
permanent pool volume								
25-year post-construction peak discharge (cfs)	12.32	1.72	0.77	0.64	0.63	0.82	0.83	1.83
post-construction % impervious	55%	55%	55%	55%	55%	55%	55%	55%
post-construction runoff volume (acre-feet)	3.68							
pervious area (sq mi)	0.00328	0.00078	0.00034	0.00030	0.00028	0.00038	0.00038	0.00083
impervious area (sq mi)	0.00408	0.00097	0.00044	0.00036	0.00036	0.00045	0.00047	0.00103
total area (sq miles)	0.00736	0.00175	0.00078	0.00066	0.00064	0.00083	0.00084	0.00186
pervious area (acres)	2.10	0.50	0.22	0.19	0.18	0.24	0.24	0.53
impervious area (acres)	2.61	0.62	0.28	0.23	0.23	0.29	0.30	0.66
total area (acres)	4.71	1.12	0.50	0.42	0.41	0.53	0.54	1.19
SCS curve number post-construction	68	68	68	68	68	68	68	68

TABLE 4-3
DOUBLE-RING INFILTRATION TEST
SGS UNIT 3
PALATKA, FL

Location:	DRI #1
Date Performed:	5/23/2006
Test Depth:	1.0 feet below ground surface
Procedure:	ASTM D-3385-75
Inner Ring Diameter [in]:	12
Head [in]:	12
Test Duration [hours]:	4

$V_{IR} = (V_{IR\,2} - V_{IR\,1}) / [A_{IR} * (t_2 - t_1)]$

$A_{IR} = 3.14*(d/2)^2$

Inner Ring		
d_i =	Diameter of inner ring [in]	12
A_{IR} =	Area of inner ring [cm^2]	729.66

Time Incr. [Minutes]	Infiltration [Inches]	Infiltration [cm]	V_{IR} [cm/h]
15	3	7.62	30.48
15	2.5	6.35	25.4
15	2.5	6.35	25.4
15	2	5.08	20.32
30	4	10.16	20.32
30	4	10.16	20.32
30	4	10.16	20.32
30	4	10.16	20.32
30	4	10.16	20.32
30	4	10.16	20.32

V_{IR} [cm/h]	**20.32**

TABLE 4-4
DOUBLE RING INFILTRATION TEST
SGS UNIT 3
PALATKA, FL

Location:	DRI #2
Date Performed:	5/23/2006
Test Depth:	1.0 feet below ground surface
Procedure:	ASTM D-3385-75
Inner Ring Diameter [in]:	12
Head [in]:	12
Test Duration [hours]:	4

$V_{IR} = (V_{IR\,2} - V_{IR\,1}) / [A_{IR} * (t_2 - t_1)]$

$A_{IR} = 3.14*(d/2)^2$

Inner Ring		
d_i =	Diameter of inner ring [in]	12
A_{IR} =	Area of inner ring [cm^2]	729.66

Time Incr. [Minutes]	Infiltration [Inches]	Infiltration [cm]	V_{IR} [cm/h]
15	8	20.32	81.28
15	7.5	19.05	76.2
15	7.5	19.05	76.2
15	7	17.78	71.12
30	12.5	31.75	63.5
30	10	25.4	50.8
30	8.25	20.955	41.91
30	7	17.78	35.56
30	7	17.78	35.56
30	6.25	15.875	31.75

V_{IR} [cm/h]	**31.75**

TABLE 4-5
DOUBLE-RING INFILTRATION TEST
SGS UNIT 3
PALATKA, FL

Location:	DRI #3
Date Performed:	5/23/2006
Test Depth:	1.0 feet below ground surface
Procedure:	ASTM D-3385-75
Inner Ring Diameter [in]:	12
Head [in]:	12
Test Duration [hours]:	4

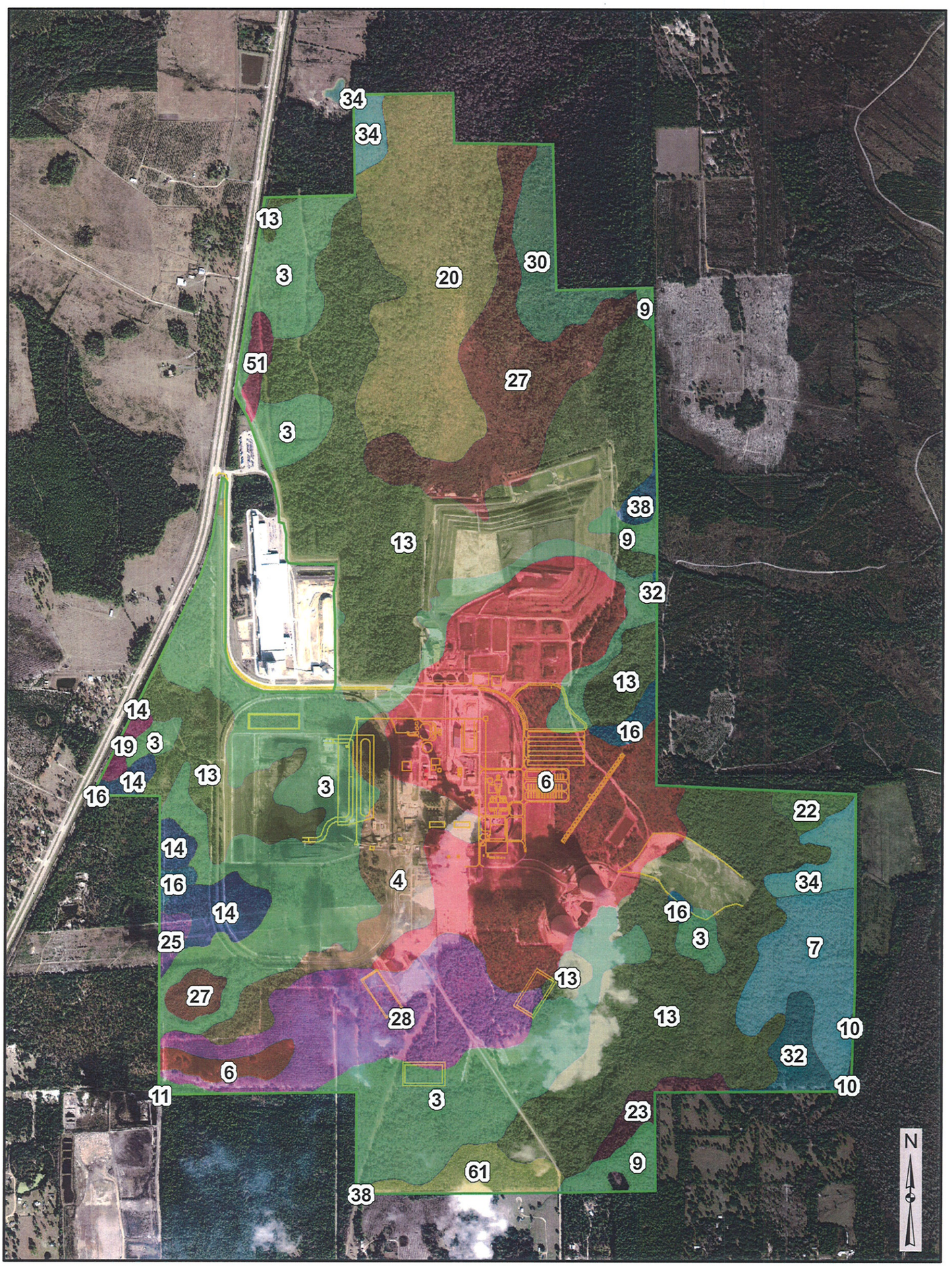
$V_{IR} = (V_{IR\,2} - V_{IR\,1}) / [A_{IR} * (t_2 - t_1)]$

$A_{IR} = 3.14*(d/2)^2$

Inner Ring		
d_I =	Diameter of inner ring [in]	12
A_{IR} =	Area of inner ring [cm^2]	729.66

Time Incr. [Minutes]	Infiltration [Inches]	Infiltration [cm]	V_{IR} [cm/h]
15	4.5	11.43	45.72
15	3.5	8.89	35.56
15	3.5	8.89	35.56
15	3	7.62	30.48
30	6	15.24	30.48
30	6	15.24	30.48
30	6	15.24	30.48
30	6	15.24	30.48
30	6	15.24	30.48
30	6	15.24	30.48

V_{IR} [cm/h]	**30.48**



LEGEND

Legend

- Site Plan
- Property Boundary

SOILS

- ADAMSVILLE, 16
- BLUFF, 20
- CASSIA, 14
- CENTENARY, 28
- HOLOPAW, 38
- HONTOON, 30
- IMMOKALEE, 7
- MYAKKA, 3
- NARCOOSSEE, 25
- NEWNAN, 61
- PALMETTO, 23
- POMONA, 19
- POMONA, 9
- POMPANO, 10
- RIVIERA, 34
- SAMSULA, 27
- SPARR, 32
- ST. JOHNS, 13
- SURRENCY, 51
- TAVARES, 6
- TOMOKA, 22
- UDORTHENTS, 11
- ZOLFO, 4

REFERENCE

1. Soils, Soil Survey (USDA SCS)
2. 2004 aerial photography, USGS Digital Ortho Quarter Quadrangles (DOQQ)

0.3 0 0.3 Miles

SEMINOLE ELECTRIC COOPERATIVE INC.
SGS UNIT 3
PUTNUM COUNTY, FL

TITLE

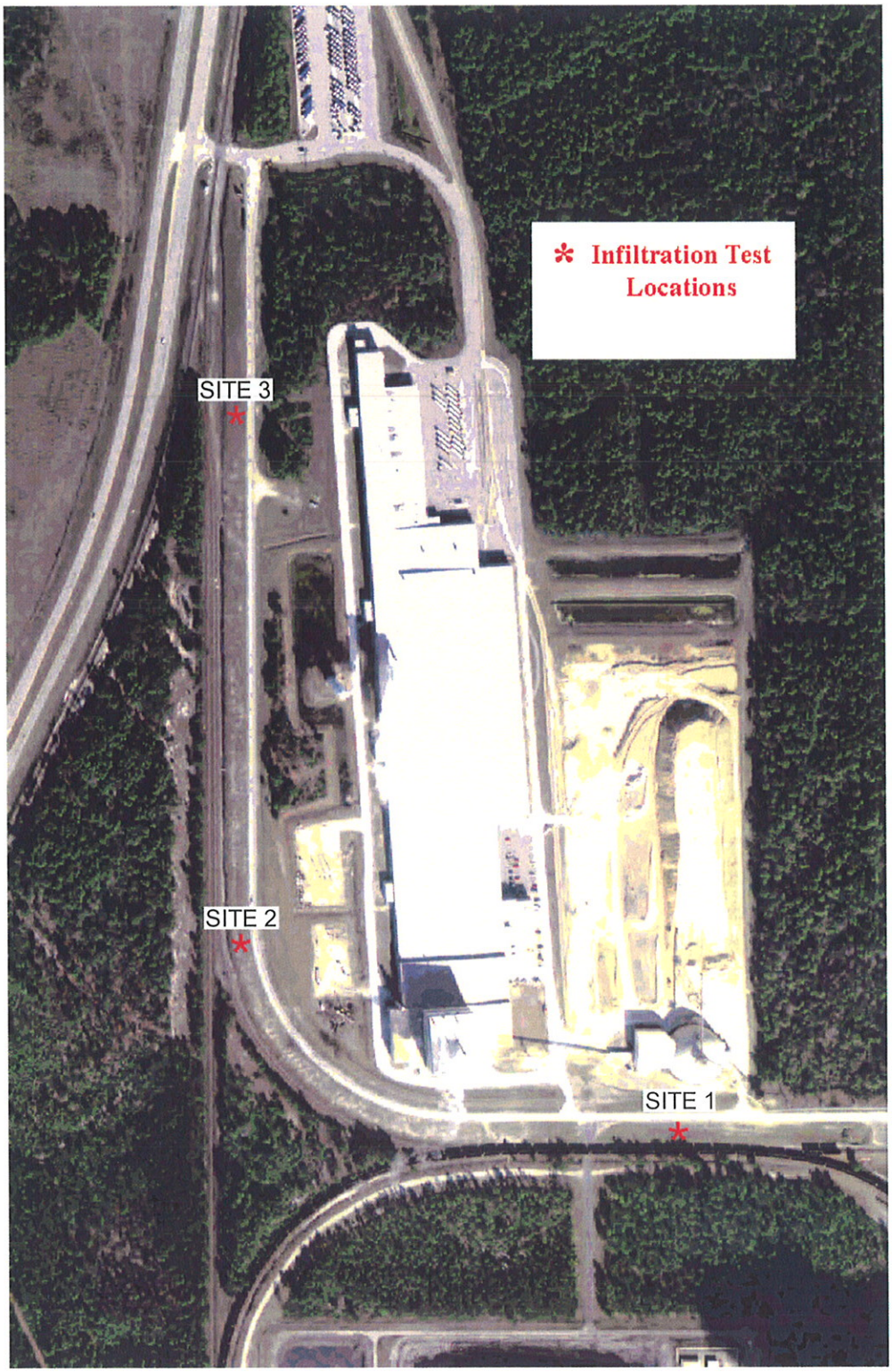
SOILS

Golder Associates
Tampa, Florida

PROJECT No. 053-9540			SCALE AS SHOWN	REV. 0
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GIS	QY	12 June 2006	
CHECK	MM	12 June 2006	
REVIEW	MM	12 June 2006	

FIGURE: 4-1

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REV	DATE	DES	REVISION DESCRIPTION	CADD	CHK	RVW
0	-	XXX	REV_DESC	XXX		

PROJECT

SEMINOLE ELECTRIC COOPERATIVE, INC.
PUTNAM COUNTY, FLORIDA

TITLE

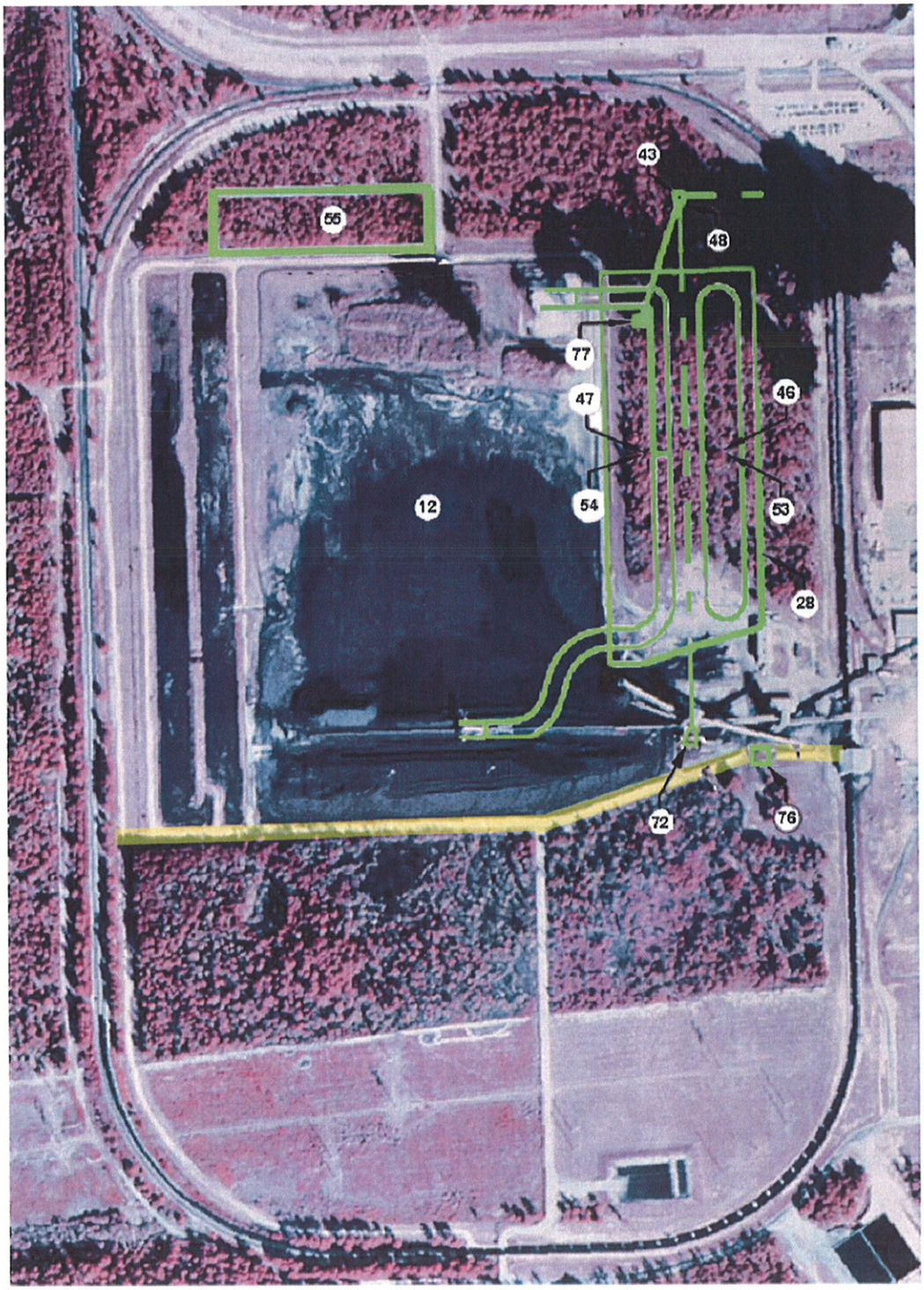
STORMWATER MANAGEMENT / SWALES PERMEABILITY TEST LOCATIONS

Golder Associates
Tampa, Florida

PROJECT No.		053-9540	FILE No. 0539540M005.dwg	
DESIGN	MM	6/12/06	SCALE N.T.S.	REV. 0
CADD	KT	6/13/06		
CHECK	MM	6/13/06	4-2	
REVIEW				

SOURCE: GOLDER, 2006.

Drawing file: F:\PROJECTS\2005 PROJ\053-9540\0539540M005.dwg Jun 22, 2006 - 11:33am



LEGEND

ROAD AT SOUTH EDGE OF COAL PROCESSING AREA

55 SGS UNIT 3 FACILITIES

SOURCE: GOLDER, 2006.

REV	DATE	DES	REVISION DESCRIPTION	CADD	CHK	RVW
1	-	XXX	REV_DESC	XXX		

PROJECT

SEMINOLE ELECTRIC COOPERATIVE, INC.
PUTNAM COUNTY, FLORIDA

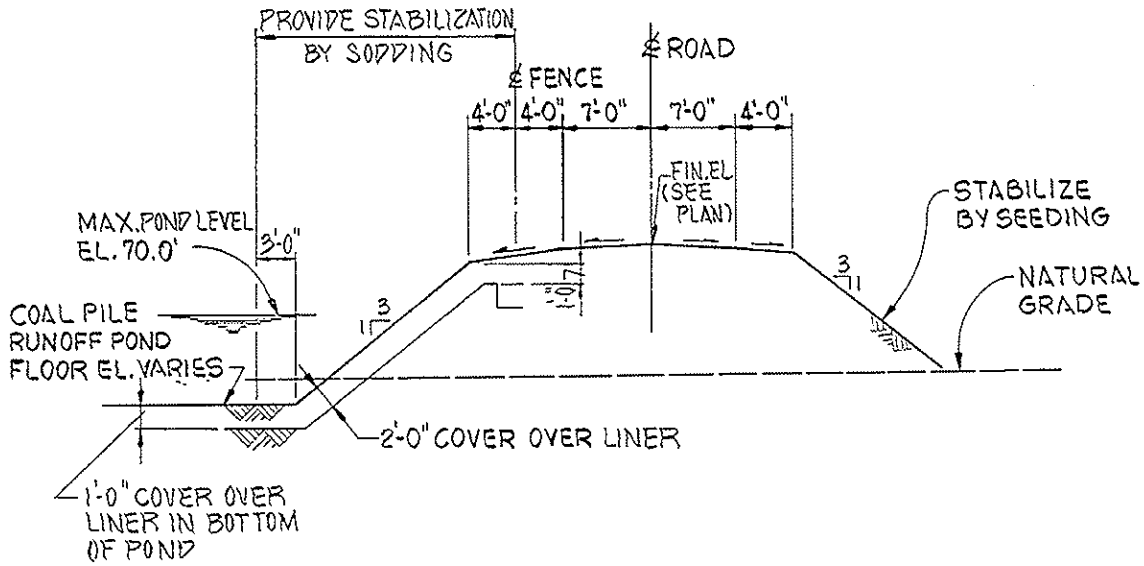
TITLE

SGS UNIT 3 COAL PROCESSING AREA

Golder Associates
Tampa, Florida

PROJECT No.		053-9540	FILE No. 053954M001.dwg	
DESIGN	-	-	SCALE N.T.S.	REV 0
CADD	KT	6/12/06	**FIGURE 4-3**	
CHECK	MM	6/12/06		
REVIEW				

Drawing file: 053954M001.dwg Jun 12, 2006 - 11:33am



SOURCE: GOLDER, 2006.

REV	DATE	DES	REVISION DESCRIPTION	CADD	CHK	RVW
-		XXX	REV_DESC	XXX		

PROJECT

SEMINOLE ELECTRIC COOPERATIVE, INC.
PUTNAM COUNTY, FLORIDA

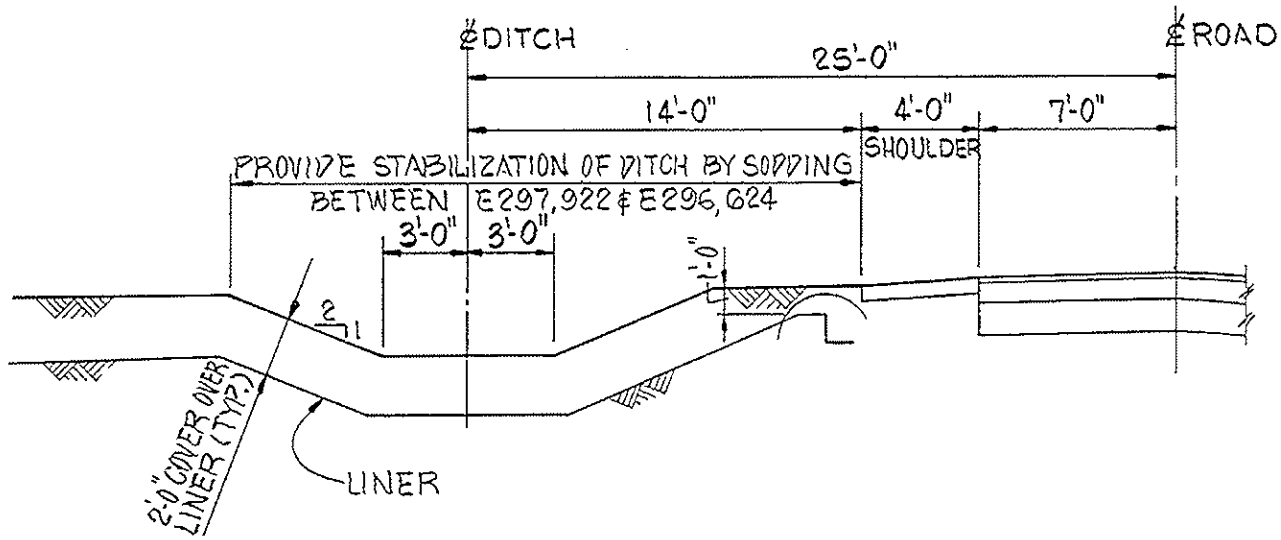
TITLE

TYPICAL SECTION THROUGH COAL PILE RUNOFF POND BERM

Golder Associates
TAMPA, FLORIDA

PROJECT No.		053-9540	FILE No. 053954M003.dwg	
DESIGN	MM	6/12/06	SCALE AS SHOWN	REV 0
CADD	KT	6/12/06		
CHECK	MM	6/12/06		
REVIEW				

FIGURE 4-4



SOURCE: GOLDER, 2006.

REV	DATE	DES	REVISION DESCRIPTION	CADD	CHK	RVW
-	XXX		REV_DESC	XXX		

PROJECT

SEMINOLE ELECTRIC COOPERATIVE, INC.
PUTNAM COUNTY, FLORIDA

TITLE

TYPICAL SECTION THROUGH COAL PILE RUNOFF COLLECTOR DITCH

Golder Associates
TAMPA, FLORIDA

PROJECT No.		053-9540	FILE No. 053954M004.dwg	
DESIGN	MM	6/12/06	SCALE AS SHOWN	REV 0
CADD	KT	6/12/06		
CHECK	MM	6/12/06		
REVIEW				

FIGURE 4-5

ATTACHMENT 4-1

Seminole Electric Cooperative, Inc.
Seminole Generation Station - Unit 1, 2, and 3
B&McD Project No. 41262
Wet Detention Pond Design Notes and Calculations

INDEX

DESCRIPTION	NUMBER OF PAGES
Wet Detention Pond #1 - Design Summary	1
Required Treatment Volume, Permanent Pool Volume, and Orifice Design Calculations	3
Bleeddown Orifice and Broad-Crested Weir Discharge Calculations	1
HEC-HMS Seminole Meteorological Model	1
HEC-HMS Seminole Pre - Construction Input	1
HEC-HMS Seminole Post - Construction Input	2
HEC-HMS Seminole Pre - Construction Output	3
HEC-HMS Seminole Post - Construction Output	4
Time of Concentration Calculation	1
Sketches of Pond and Details of Outlet	3
References	2
Wet Detention Pond #2 - Design Summary	1
Required Treatment Volume, Permanent Pool Volume, and Orifice Design Calculations	3
Bleeddown Orifice and Broad-Crested Weir Discharge Calculations	1
HEC-HMS Seminole Meteorological Model	1
HEC-HMS Seminole Pre - Construction Input	1
HEC-HMS Seminole Post - Construction Input	2
HEC-HMS Seminole Pre - Construction Output	3
HEC-HMS Seminole Post - Construction Output	4
Time of Concentration Calculation	1
Sketches of Pond and Details of Outlet	3
References	2
Site Drainage Plan	1

Burns & McDonnell
since 1898

9400 Ward Parkway
Kansas City, MO 64114
Phone: (816) 333-9400

Seminole Electric – Wet Detention Pond #1 - Design Summary

Using HEC-HMS (Hydraulic Modeling Software) the 25 year storm was modeled for pre and post-construction conditions. For basin 1, located on the western portion of the affected area (see attached site drainage plan), the pre-construction conditions were determined to be 75% impervious and post-construction conditions were determined to be 85% impervious. A wet detention pond was designed for post construction conditions for the 25 year 24 hour rain event. Storm water is carried to the pond through ditches. For the 25 year event, the post-construction peak outflow was less than the pre-construction peak outflow.

The invert elevation of the bleeddown orifice was set at an approximate elevation of 72 to provide the permanent pool volume of 10.7 acre-feet. The overflow weir was set at an approximate elevation of 75 to provide the required treatment volume of 338,840 cubic feet. The 8" diameter bleeddown orifice will be used to drain half of the treatment volume in 24 hours as required by the SJRWMD. Below is a summary of pre and post-construction results.

	Pre-Construction	Post-Construction
Storm Return Period	25 year	25 year
Storm Duration	24 hours	24 hours
% Impervious	75	85
Peak Discharge (ft^3/s)	105.75	87.60
Volume of Runoff (acre-ft)	26.82	20.49

Required Treatment Volume	338,840 ft^3 – Half of this volume will be drained by an 8" diameter orifice in 24 hours as required by the SJRWMD.
Required Permanent Pool Volume	466,528 ft^3

Industrial Development Drainage Area		1,913,451	SF
		43.93	Acres
Impervious Area	85%	1,626,433	SF
		37.34	Acres
Offsite Drainage Area		0	Acres

Assumptions:

Wet Detention

Time of Concentration is approx 1.7 hrs

Basin Bottom Elevation =	67	ft
Seasonal High Ground Water Elevation =	73	ft
Average Ground Water Elevation (approx) =	72	ft
Irregular Detention Basin, Bottom Area =	81,351	SF
Average Basin Length =	300	ft
Average Basin Width =	275	ft

Detention Pond Stage-Storage Table

Elevation	Area (SF)	Storage (CF)
67	81,351	0
67.5	83,297	41,162
68	85,219	83,291
68.5	87,187	126,393
69	89,170	170,482
69.5	91,166	215,566
70	93,177	261,652
70.5	95,202	308,746
71	97,274	356,865
71.5	99,294	406,007
72	101,361	456,171
72.5	103,442	507,372
73	105,538	559,617
73.5	107,648	612,913
74	109,771	667,268
74.5	111,909	722,688
75	114,061	779,181
75.5	116,227	836,753
76	118,408	895,411
76.5	120,606	955,165
77	122,811	1,016,019

Step 1: Determine Required Treatment Volume:

For wet detention, the rule requires detention of 1" of runoff or 2.5" from the impervious area, whichever is larger

1) 1" of runoff from the development area = 159,454 CF

2) 2.5" of runoff from the impervious area = 338,840 CF

Treatment Volume = **338,840 CF**

Step 2: Calculate the minimum permanent pool volume that will provide the required residence time

For non-littoral zone option, the permanent pool must be sized to provide a residence time (RT) of at least 21 days during the wet season (June-October)

Length of wet season (WS) = 153 days

From Figure 29-1, the wet season rainfall depth (R) for Palatka = 31 inches

The runoff coefficient (C) for the drainage area to the wet detention pond is:

From Table 24-1, based on a flat slope, the following land uses, sandy soils, and a 25-year storm, the runoff coefficient falls between:

Land Use	Max	Min		
Commercial/Industrial	1	0.55	→	0.78
Pasture, grass, farmland	0.17	0.22	→	0.19

Weighted runoff coefficient, based on:
85% Impervious → 0.69

Equation 29-4 gives the Permanent Pool Volume (PPV):

$$PPV = \frac{((Area)(C)(R)(RT))}{\left((WS)\left(12\frac{in}{ft}\right)\right)}$$

PPV = 10.71 acre - ft = 466,528 CF

Step 3: Determine the height of the permanent pool volume and the treatment volume:

Interpolate from the stage-storage table

Permanent Pool Volume =	466,528	→	Elevation	**72.10**
Treatment Volume + PPV =	805,368	→	Elevation	**75.23**

Place the bleeddown orifice at the top of the PPV, EL = 72.10
Place the overflow at the top of the treatment volume, EL = 75.23

Step 4: Size a the bleeddown orifice to recover one half of the treatment volume in 24 hours

Since the size of the orifice has yet to be determined, use the invert elevation of the orifice as an approximation of the flow line (center) of the orifice. After calculating the orifice size, adjust the flow line elevation and calculate the orifice size again.

Treatment Volume depth (h_1)=	3.13	ft
Half of treatment volume =	169,420	CF
Stage at half the treatment volume =	73.66	ft
Half the treatment volume depth (h_2) =	1.56	ft

The average flow rate required to draw down half of the treatment volume in 24 hours is:

$Q =$ 1.96 cfs

The area of a circular orifice is determined by:

$$A = Q / 0.6(\sqrt{2gh})$$

Trial #1:

$h = (h_1 + h_2) / 2 =$ 2.34 ft

$A =$ 0.27 SF

Orifice Diameter = $\sqrt{(4A/\pi)} =$ 0.58 ft

Trial #2:

Adjusted flow line = 72.10 + 1/2 (0.58 ft) = 72.39

h_1 = height of treatment volume - adjusted flow line = 2.84

h_2 = half of treatment volume - adjusted flow line = 1.27

$h = (h_1 + h_2) / 2 =$ 2.05 ft

$A =$ 0.28 SF

Orifice Diameter = $\sqrt{(4A/\pi)} =$ 0.60 ft

Adjusted flow line = 72.10 + 1/2 (0.6 ft) = 72.40

Use orifice diameter of 8" with an invert elevation of 72.10'

Bleeddown Pipe Orifice Calculations
Pond #1

Place Invert Elevation of Bleeddown Pipe @ 72.10

Flow through pipe =	Q		
Orifice discharge coefficient =	C	C =	0.6
Bleeddown Pipe Diameter =	D	D =	8 in
Bleeddown Pipe Area =	A	A =	0.35 ft^2
Headwater height above centroid =	H		

$Q = (C)(A)(2gH)^{1/2}$

Broad-crested Weir Calculations
Pond #1

Place Invert Elevation of Weir @ 75.23

Flow over the weir =	Q		
Width of weir =	b	b =	15
Height of water flowing over the weir =		H	

$Q = C_s(b)(H)^{3/2}$ $C_s = 3.33\ ft^{0.5}/s$

Overall Pond Stage-Discharge Table
Pond #1

Stage (ft)	Orifice Discharge (cfs)	Weir Discharge (cfs)	Total Discharge (cfs)
67.00	0.00	0.00	0.00
67.50	0.00	0.00	0.00
68.00	0.00	0.00	0.00
68.50	0.00	0.00	0.00
69.00	0.00	0.00	0.00
69.50	0.00	0.00	0.00
70.00	0.00	0.00	0.00
70.50	0.00	0.00	0.00
71.00	0.00	0.00	0.00
71.50	0.00	0.00	0.00
72.00	0.00	0.00	0.00
72.50	0.43	0.00	0.43
73.00	1.26	0.00	1.26
73.50	1.73	0.00	1.73
74.00	2.10	0.00	2.10
74.50	2.42	0.00	2.42
75.00	2.69	0.00	2.69
75.50	2.94	7.11	10.05
76.00	3.17	33.92	37.09
76.50	3.39	71.71	75.10
77.00	3.59	117.88	121.47

HEC-HMS Palatka Area Meteorological Model

25 year - 24 hour storm

Exceedance Probability	4% (25 year)
Max Intensity Duration	5 min
Storm Distribution	24 hour
Peak Center	50%

Duration min	Duration hr	Depth * inches	Intensity Inches/Hr
5	0.08	1	12.00
15	0.25	2	8.00
60	1.00	3.4	3.40
120	2.00	4.3	2.15
180	3.00	5	1.67
360	6.00	6	1.00
720	12.00	7.2	0.60
1440	24.00	8	0.33

* Source TP-40

HEC-HMS Seminole Pre-Construction Input
Wet Detention Pond #1

	Existing Impervious Area	Remaining Area	Total Area
Method			SCS Curve No.
Area (sq. mi.)	0.0515	0.0172	0.0686
Initial Loss (in)			0.5
% Impervious	100	0	75
SCS Curve No.	85	65	80
SCS Lag (min)			65
			No Baseflow

HEC-HMS Seminole Post-Construction Input
Wet Detention Pond #1

Method	SCS Curve No.
Area (sq. mi.)	0.0686
Initial Loss (in)	0.44
% Impervious	85
SCS Curve No.	82
SCS Lag (min)	61
No Baseflow	

HEC-HMS Seminole Post-Construction Input

Wet Detention Pond #1 - Stage Area Discharge Table

Initial Pond Elevation set at = 72.10 (Top of Permanent Pool Volume)

Stage	Area	Incremental Volume	Total Volume	Area acres	Discharge
ft	ft2	ft3	ft3		cfs
67.00	81,351			**1.868**	**0.00**
67.50	83,297	41,162	41,162	**1.912**	**0.00**
68.00	85,219	42,129	83,291	**1.956**	**0.00**
68.50	87,187	43,102	126,393	**2.002**	**0.00**
69.00	89,170	44,089	170,482	**2.047**	**0.00**
69.50	91,166	45,084	215,566	**2.093**	**0.00**
70.00	93,177	46,086	261,652	**2.139**	**0.00**
70.50	95,202	47,095	308,746	**2.186**	**0.00**
71.00	97,274	48,119	356,865	**2.233**	**0.00**
71.50	99,294	49,142	406,007	**2.279**	**0.00**
72.00	101,361	50,164	456,171	**2.327**	**0.00**
72.50	103,442	51,201	507,372	**2.375**	**0.43**
73.00	105,538	52,245	559,617	**2.423**	**1.26**
73.50	107,648	53,297	612,913	**2.471**	**1.73**
74.00	109,771	54,355	667,268	**2.520**	**2.10**
74.50	111,909	55,420	722,688	**2.569**	**2.42**
75.00	114,061	56,493	779,181	**2.618**	**2.69**
75.50	116,227	57,572	836,753	**2.668**	**10.05**
76.00	118,408	58,659	895,411	**2.718**	**37.09**
76.50	120,606	59,754	955,165	**2.769**	**75.10**
77.00	122,811	60,854	1,016,019	**2.819**	**121.47**

See the bleeddown pipe and broad-crested weir calculations for the discharge amounts


Seminole_Pre

HMS * Summary of Results for Seminole_Pre

Project : Seminole_Pond_1 Run Name : 25 yr Pre

Start of Run	: 01Jan07 0800	Basin Model	: Seminole_Pre_Const
End of Run	: 02Jan07 0800	Met. Model	: 25 Year
Execution Time	: 01Jun06 0925	Control Specs	: 24 Hour

Computed Results

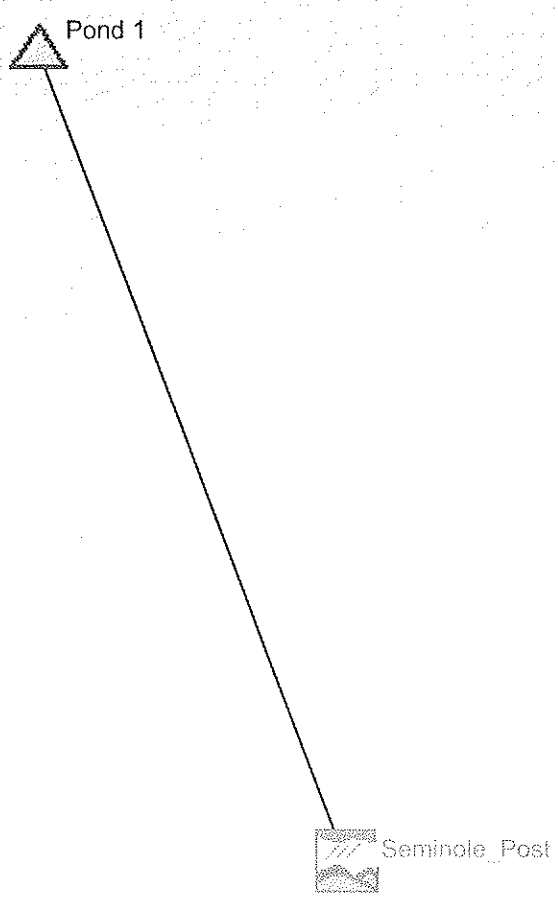
Peak Discharge	: 105.75 (cfs)	Date/Time of Peak Discharge	: 01 Jan 07 2108
Total Precipitation	: 8.00 (in)	Total Direct Runoff	: 7.33 (in)
Total Loss	: 0.59 (in)	Total Baseflow	: 0.00 (in)
Total Excess	: 7.41 (in)	Total Discharge	: 7.33 (in)

HMS * Summary of Results

Project : Seminole_Pond_1 Run Name : 25 yr Pre

Start of Run : 01Jan07 0800 Basin Model : Seminole_Pre_Const
End of Run : 02Jan07 0800 Met. Model : 25 Year
Execution Time : 01Jun06 0925 Control Specs : 24 Hour

Hydrologic Element	Discharge Peak (cfs)	Time of Peak	Volume (ac ft)	Drainage Area (sq mi)
Seminole_Pre	105.75	01 Jan 07 2108	26.820	0.069


Pond 1
Seminole_Post

HMS * Summary of Results for Seminole_Post

Project : Seminole_Pond_1 Run Name : 25 yr Post

Start of Run	: 01Jan07 0800	Basin Model	: Seminole_Post_Const
End of Run	: 02Jan07 0800	Met. Model	: 25 Year
Execution Time	: 07Jun06 1551	Control Specs	: 24 Hour

Computed Results

Peak Discharge	: 113.14 (cfs)	Date/Time of Peak Discharge	: 01 Jan 07 2103
Total Precipitation	: 8.00 (in)	Total Direct Runoff	: 7.61 (in)
Total Loss	: 0.32 (in)	Total Baseflow	: 0.00 (in)
Total Excess	: 7.68 (in)	Total Discharge	: 7.61 (in)

HMS * Summary of Results for Pond 1

Project : Seminole_Pond_1 Run Name : 25 yr Post

Start of Run	: 01Jan07 0800	Basin Model	: Seminole_Post_Const
End of Run	: 02Jan07 0800	Met. Model	: 25 Year
Execution Time	: 07Jun06 1551	Control Specs	: 24 Hour

Computed Results

Peak Inflow	: 113.14 (cfs)	Date/Time of Peak Inflow	: 01 Jan 07 2103
Peak Outflow	: 87.604 (cfs)	Date/Time of Peak Outflow	: 01 Jan 07 2135
Total Inflow	: 7.61 (in)	Peak Storage	: 22.304(ac-ft)
Total Outflow	: 5.60 (in)	Peak Elevation	: 76.635(ft)

HMS * Summary of Results

Project : Seminole_Pond_1 Run Name : 25 yr Post

Start of Run : 01Jan07 0800 Basin Model : Seminole_Post_Const
End of Run : 02Jan07 0800 Met. Model : 25 Year
Execution Time : 07Jun06 1551 Control Specs : 24 Hour

Hydrologic Element	Discharge Peak (cfs)	Time of Peak	Volume (ac ft)	Drainage Area (sq mi)
Seminole_Post	113.14	01 Jan 07 2103	27.833	0.069
Pond 1	87.604	01 Jan 07 2135	20.491	0.069

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SINCE 1898

011200 Form GCO-29

Client SEMINOLE Page ____ of ____

Project 39736 Date 5/31/06 Made By JCE

TIME OF CONCENTRATION Checked By ____

POND #1 Preliminary ← Final ____

THE LONGEST FLOW PATH IN THE AREA = 2200'

THE AVERAGE SLOPE IS: $\frac{6' \text{ DROP}}{2200'} = 0.003$ ft/ft

CURVE # = 80 (PRE)
82 (POST)

THE TIME OF CONCENTRATION CAN BE CALCULATED USING THE SCS EQUATION:

$$t_c = 0.00526\, L^{0.8} \left(\frac{1000}{CN} - 9\right)^{0.7} S^{-0.5}$$

THE LAG TIME IS:
$t_L = 0.6\, t_c$

PRE-CONSTRUCTION

$t_c = 0.00526 (2200)^{0.8} \left(\frac{1000}{80} - 9\right)^{0.7} 0.003^{-0.5}$

$t_c = 109$ min

$t_L = 65$ min

POST-CONSTRUCTION

$t_c = 0.00526 (2200)^{0.8} \left(\frac{1000}{82} - 9\right)^{0.7} 0.003^{-0.5}$

$t_c = 102$ min

$t_L = 61$ min

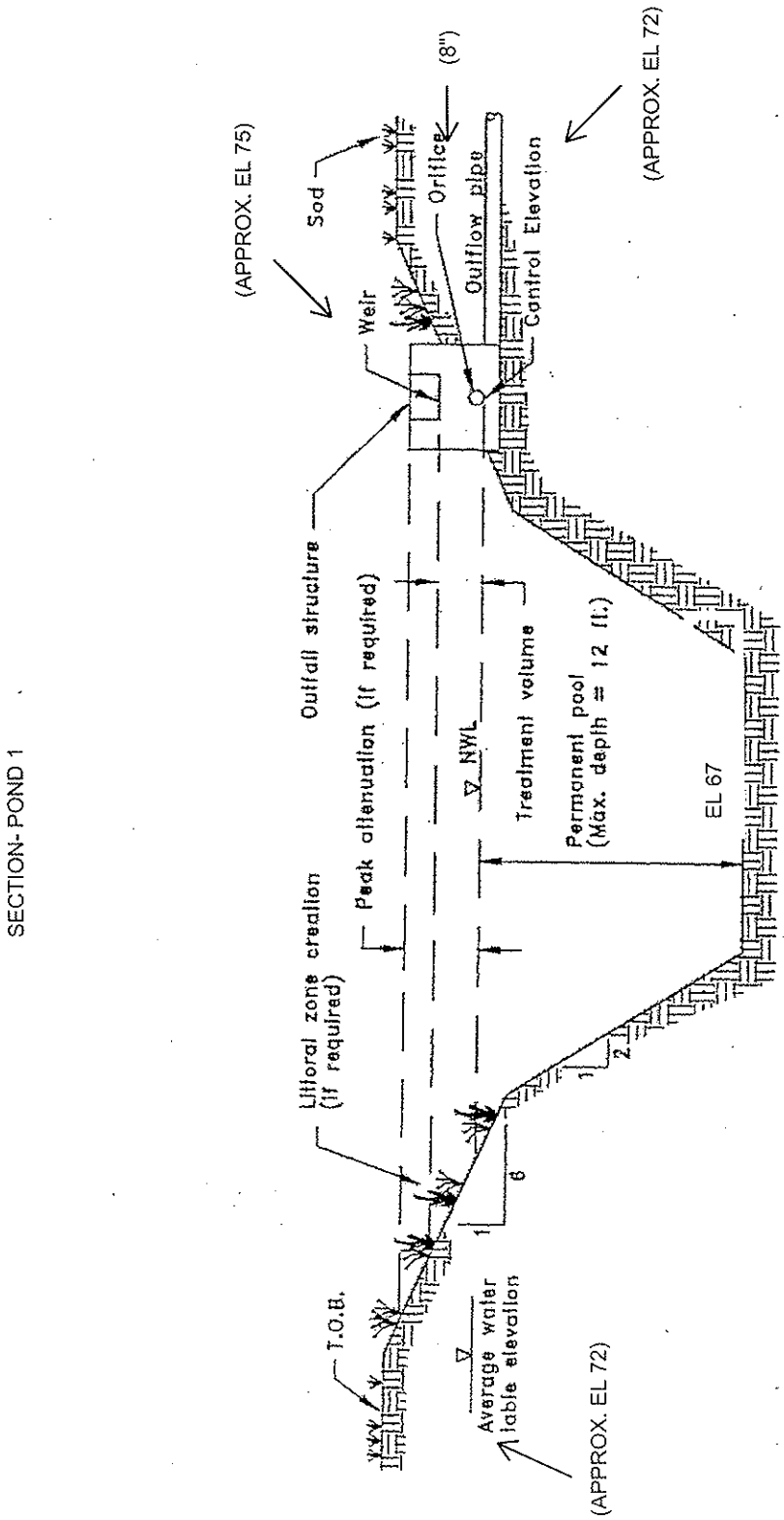


Figure 14-1. Wet detention (N.T.S.)

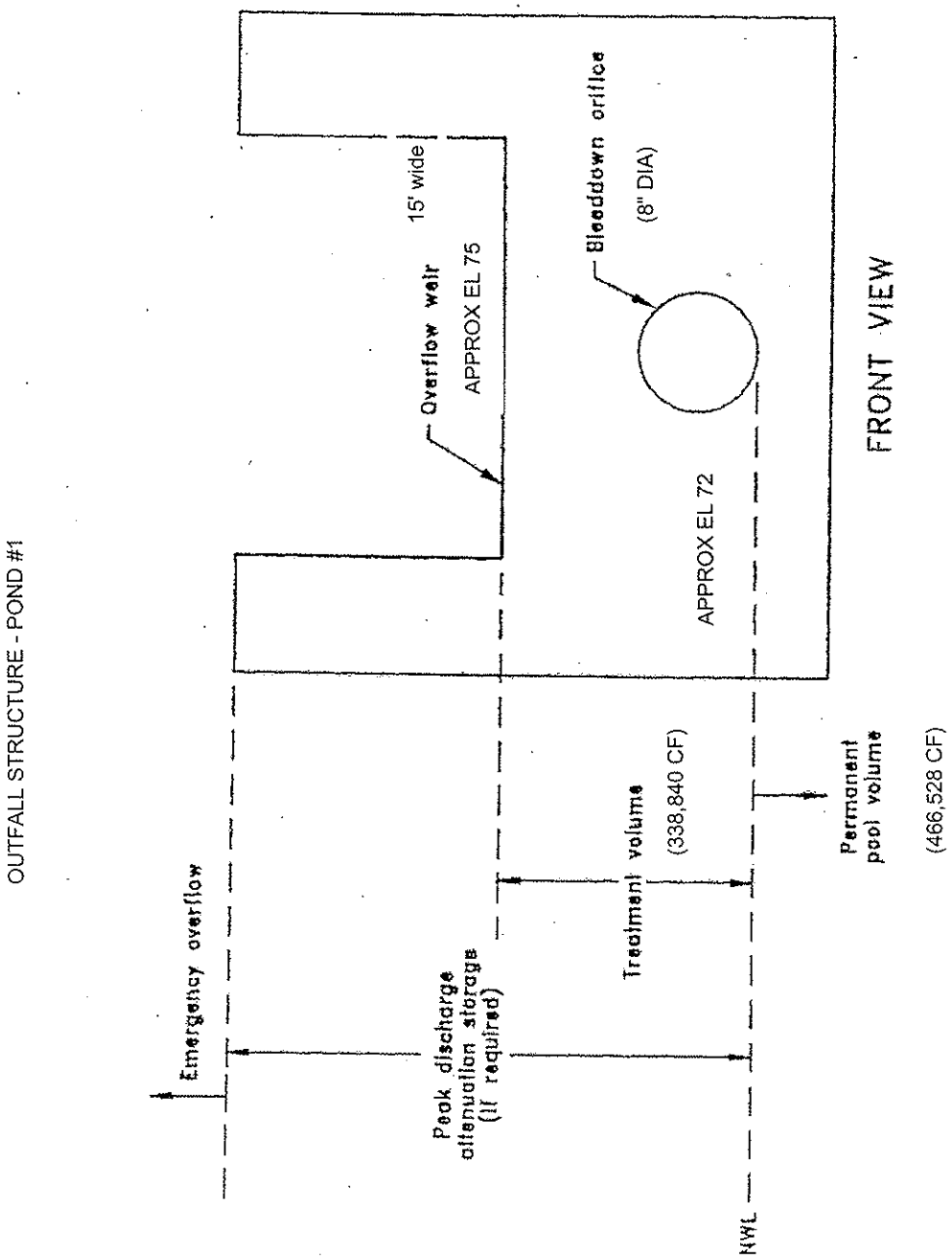


Figure 14-2. Typical wet detention outfall structure (N.T.S.)

OUTLET DETAIL - POND #1

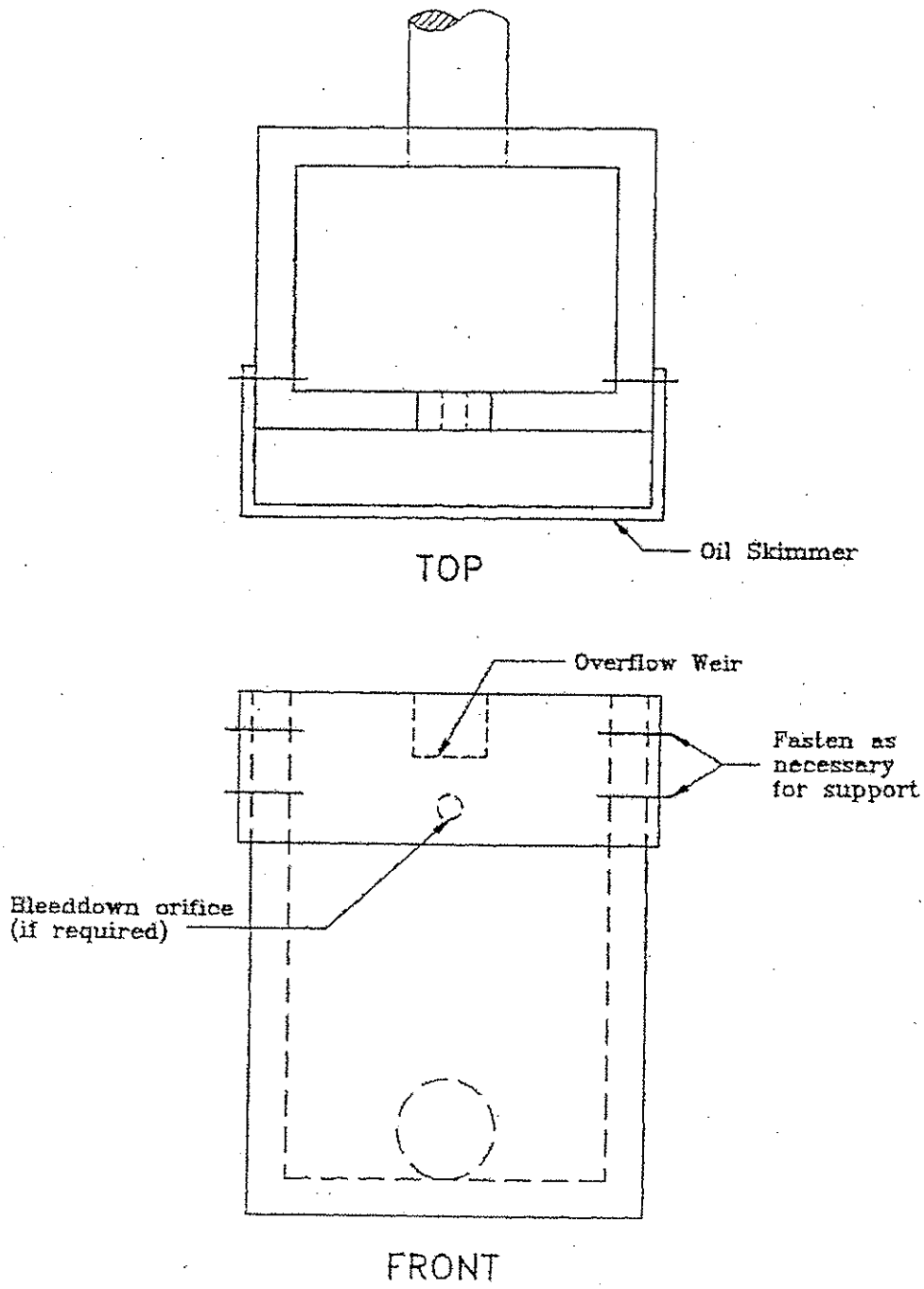


Figure 9-1. Oil skimmer detail for a typical outfall structure (N.T.S.)

Table 24-1. Runoff Coefficients (C) for a Design Storm Return Period of Ten Years or Less[1]

Slope	Land Use	Sandy Soils Min.	Sandy Soils Max.	Clay Soils Min.	Clay Soils Max.
Flat (0-2%)	Lawns	0.05	0.10	0.13	0.17
	Rooftops and pavement	0.95	0.95	0.95	0.95
	Pervious pavements[2]	0.75	0.95	0.90	0.95
	Woodlands	0.10	0.15	0.15	0.20
	Pasture, grass, and farmland[3]	0.15	0.20	0.20	0.25
	Residential				
	SFR: 1/2 acre lots and larger	0.30	0.35	0.35	0.45
	SFR: smaller lots and duplexes	0.35	0.45	0.40	0.50
	MFR: apartments, condominiums	0.45	0.60	0.50	0.70
	Commercial and Industrial	0.50	0.95	0.50	0.95
Rolling (2-7%)	Lawns	0.10	0.15	0.18	0.22
	Rooftops and pavements	0.95	0.95	0.95	0.95
	Pervious pavements[2]	0.80	0.95	0.90	0.95
	Woodlands	0.15	0.20	0.20	0.25
	Pasture, grass, and farmland[3]	0.20	0.25	0.25	0.30
	Residential				
	SFR: 1/2 acre lots and larger	0.35	0.50	0.40	0.55
	SFR: smaller lots and duplexes	0.40	0.55	0.45	0.60
	MFR: apartments, condominiums	0.50	0.70	0.60	0.80
	Commercial and Industrial	0.50	0.95	0.60	0.95
Steep (>7%)	Lawns	0.15	0.20	0.25	0.35
	Rooftops and pavements	0.95	0.95	0.95	0.95
	Pervious pavements[2]	0.85	0.95	0.90	0.95
	Woodlands	0.20	0.25	0.25	0.30
	Pasture, grass, and farmland[3]	0.25	0.35	0.30	0.40
	Residential				
	SFR: 1/2 acre lots and larger	0.40	0.55	0.50	0.65
	SFR: smaller lots and duplexes	0.45	0.60	0.55	0.70
	MFR: apartments, condominiums	0.60	0.75	0.65	0.85
	Commercial and Industrial	0.60	0.95	0.65	0.95

Sources: Florida Department of Transportation, 1987; Wanielista, 1990

[1]For 25- to 100-yr recurrence intervals, multiply coefficient by 1.1 and 1.25, respectively, and the product cannot exceed 1.0.

[2]Coefficients assume good ground cover and conservation treatment.

[3]Depends on depth and degree of permeability of underlying strata.

Note: SFR = Single Family Residential;
MFR = Multi-Family Residential

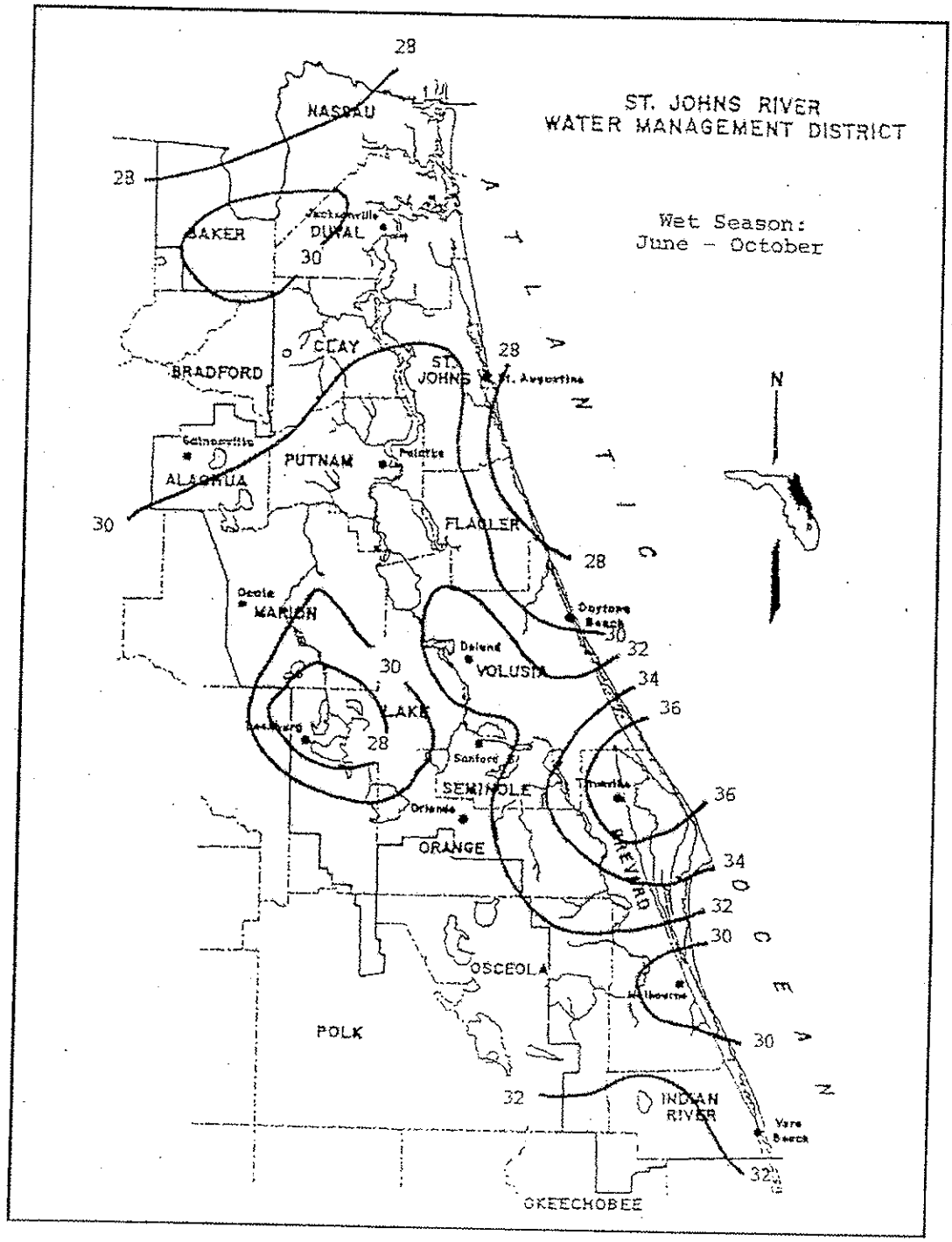


Figure 29-1. Wet Season Normal Rainfall, inches (Source: Rao, et al., 1990)

Seminole Electric – Wet Detention Pond #2 - Design Summary

Using HEC-HMS (Hydraulic Modeling Software) the 25 year storm was modeled for pre and post-construction conditions. For basin 2, located on the eastern portion of the affected area (see attached site drainage plan), the pre-construction conditions were determined to be 30% impervious and post-construction conditions were determined to be 70% impervious. A wet detention pond was designed for post construction conditions for the 25 year 24 hour rain event. Storm water is carried to the pond through ditches. For the 25 year event, the post-construction peak outflow was less than the pre-construction peak outflow.

The invert elevation of the bleeddown orifice was set at an approximate elevation of 72 to provide a permanent pool volume of 26.7 acre-feet. The overflow weir was set at an approximate elevation of 75 to provide the required treatment volume of 795,399 cubic feet. The 12" diameter bleeddown orifice will be used to drain half of the treatment volume in 24 hours as required by the SJRWMD. Below is a summary of pre and post-construction results.

	Pre-Construction	Post-Construction
Storm Return Period	25 year	25 year
Storm Duration	24 hours	24 hours
% Impervious	30	70
Peak Discharge (ft^3/s)	145.86	134.60
Volume of Runoff (acre-ft)	56.77	53.41

Required Treatment Volume	795,399 ft^3 – Half of this volume will be drained by a 12" diameter orifice in 24 hours as required by the SJRWMD.
Required Permanent Pool Volume	1,160,831 ft^3

Industrial Development Drainage Area		5,454,166	SF
		125.21	Acres
Impervious Area	70%	3,817,916	SF
		87.65	Acres
Offsite Drainage Area		0	Acres

Assumptions:

Wet Detention

Time of Concentration is approx 3 hrs

Basin Bottom Elevation =	68.5	ft
Seasonal High Ground Water Elevation =	73.2	ft
Average Ground Water Elevation (approx) =	72.2	ft
Irregular Detention Basin, Bottom Area =	295,109	SF
Average Basin Length =	540	ft
Average Basin Width =	475	ft

Detention Pond Stage-Storage Table

Elevation	Area (SF)	Storage (CF)
68.5	295,109	0
69	298,289	148,350
69.5	301,483	296,699
70	304,691	446,642
70.5	307,913	598,186
71	311,149	751,337
71.5	314,400	906,102
72	317,664	1,062,489
72.5	320,943	1,220,505
73	324,236	1,380,157
73.5	327,543	1,541,452
74	330,864	1,704,397
74.5	334,199	1,868,998
75	337,548	2,035,264
75.5	340,912	2,203,201
76	344,290	2,372,816
76.5	347,682	2,544,116
77	351,087	2,717,109
77.5	354,507	2,891,802

Step 1: Determine Required Treatment Volume

For wet detention, the rule requires detention of 1" of runoff or 2.5" from the impervious area, whichever is larger

1) 1" of runoff from the development area = 454,514 CF

2) 2.5" of runoff from the impervious area = 795,399 CF

Treatment Volume = **795,399 CF**

Step 2: Calculate the minimum permanent pool volume that will provide the required residence time

For non-littoral zone option, the permanent pool must be sized to provide a residence time (RT) of at least 21 days during the wet season (June-October)

Length of wet season (WS) = 153 days

From Figure 29-1, the wet season rainfall depth (R) for Palatka = 31 inches

The runoff coefficient (C) for the drainage area to the wet detention pond is:

From Table 24-1, based on a flat slope, the following land uses, sandy soils, and a 25-year storm, the runoff coefficient falls between:

Land Use	Max	Min		
Commercial/Industrial	1	0.55	→	0.78
Pasture, grass, farmland	0.17	0.22	→	0.19

Weighted runoff coefficient, based on:
70% Impervious → 0.60

Equation 29-4 gives the Permanent Pool Volume (PPV):

$$PPV = \frac{((Area)(C)(R)(RT))}{\left((WS)\left(12\frac{in}{ft}\right)\right)}$$

PPV = 26.65 acre - ft = 1,160,831 CF

Step 3: Determine the height of the permanent pool volume and the treatment volume

Interpolate from the stage-storage table

Permanent Pool Volume =	1,160,831	→	Elevation	**72.31**
Treatment Volume + PPV =	1,956,230	→	Elevation	**74.76**

Place the bleeddown orifice at the top of the PPV, EL = 72.31
Place the overflow at the top of the treatment volume, EL = 74.76

Step 4: Size the bleeddown orifice to recover one half of the treatment volume in 24 hours

Since the size of the orifice has yet to be determined, use the invert elevation of the orifice as an approximation of the flow line (center) of the orifice. After calculating the orifice size, adjust the flow line elevation and calculate the orifice size again.

Treatment Volume depth (h_1)=	2.45	ft
Half of treatment volume =	397,700	CF
Stage at half the treatment volume =	73.54	ft
Half the treatment volume depth (h_2) =	1.23	ft

The average flow rate required to draw down half of the treatment volume in 24 hours is:

$Q =$ 4.60 cfs

The area of a circular orifice is determined by:

$$A = Q / 0.6(\sqrt{2gh})$$

Trial #1:

$h = (h_1 + h_2) / 2 =$ 1.84 ft

$A =$ 0.71 SF

Orifice Diameter = $\sqrt{(4A/\pi)} =$ 0.95 ft

Trial #2:

Adjusted flow line = 72.32 + 1/2 (0.95 ft) = 72.78

h_1 = height of treatment volume - adjusted flow line = 1.98

h_2 = half of treatment volume - adjusted flow line = 0.75

$h = (h_1 + h_2) / 2 =$ 1.36 ft

$A =$ 0.82 SF

Orifice Diameter = $\sqrt{(4A/\pi)} =$ 1.02 ft

Adjusted flow line = 72.32 + 1/2 (1.02 ft) = 72.82

Use orifice diameter of 12" with an invert elevation of 72.31'

Bleeddown Pipe Orifice Calculations
Pond #2

Place Invert Elevation of Bleeddown Pipe @ 72.31

Flow through pipe =	Q		
Orifice discharge coefficient =	C	C =	0.6
Bleeddown Pipe Diameter =	D	D =	12 in
Bleeddown Pipe Area =	A	A =	0.79 ft^2
Headwater height above centroid =	H		

$Q = (C)(A)(2gH)^{1/2}$

Broad-crested Weir Calculations
Pond #2

Place Invert Elevation of Weir @ 74.76

Flow over the weir =	Q		
Width of weir =	b	b =	12
Height of water flowing over the weir =		H	

$Q = C_s(b)(H)^{3/2}$ $C_s = 3.33\ ft^{0.5}/s$

Overall Pond Stage-Discharge Table
Pond #2

Stage (ft)	Orifice Discharge (cfs)	Weir Discharge (cfs)	Total Discharge (cfs)
68.50	0.00	0.00	0.00
69.00	0.00	0.00	0.00
69.50	0.00	0.00	0.00
70.00	0.00	0.00	0.00
70.50	0.00	0.00	0.00
71.00	0.00	0.00	0.00
71.50	0.00	0.00	0.00
72.00	0.00	0.00	0.00
72.50	0.00	0.00	0.00
73.00	1.64	0.00	1.64
73.50	3.14	0.00	3.14
74.00	4.12	0.00	4.12
74.50	4.91	0.00	4.91
75.00	5.59	4.63	10.23
75.50	6.20	25.32	31.52
76.00	6.75	55.02	61.77
76.50	7.26	91.53	98.80
77.00	7.74	133.76	141.50
77.50	8.19	181.01	189.20

Palatka Area Meorological Model

25 year - 24 hour storm

Exceedance Probability	4% (25 year)
Max Intensity Duration	5 min
Storm Distribution	24 hour
Peak Center	50%

Duration min	Duration hr	Depth * inches	Intensity Inches/Hr
5	0.08	1	12.00
15	0.25	2	8.00
60	1.00	3.4	3.40
120	2.00	4.3	2.15
180	3.00	5	1.67
360	6.00	6	1.00
720	12.00	7.2	0.60
1440	24.00	8	0.33

* Source TP-40

⊟-■ Seimole Pre-Construction hput
Wet Detention Pond #2

	Existing Impervious Area	Remaining Area	Total Area
Method			SCS Curve No.
Area (sq. mi.)	0.0587	0.1369	0.1956
Initial Loss (in)			0.82
% Impervious	100	0	30
SCS Curve No.	85	65	71
SCS Lag (min)			134
			No Baseflow

Seinole Post-Construction hput
Wet Detention Pond #2

Method	SCS Curve No.
Area (sq. mi.)	0.1956
Initial Loss (in)	0.53
% Impervious	70
SCS Curve No.	79
SCS Lag (min)	107
No Baseflow	

B-5 Seimole Post-Construction hput

Wet Detention Pond #2 - Stage Area Discharge Table

Initial Pond Elevation set at = 72.31 (Top of Permanent Pool Volume)

Stage	Area	Incremental Volume	Total Volume	Area acres	Discharge
ft	ft2	ft3	ft3		cfs
68.50	295,109			**6.775**	**0.00**
69.00	298,289	148,350	148,350	**6.848**	**0.00**
69.50	301,483	149,943	298,293	**6.921**	**0.00**
70.00	304,691	151,544	449,836	**6.995**	**0.00**
70.50	307,913	153,151	602,987	**7.069**	**0.00**
71.00	311,149	154,766	757,753	**7.143**	**0.00**
71.50	314,400	156,387	914,140	**7.218**	**0.00**
72.00	317,664	158,016	1,072,156	**7.293**	**0.00**
72.50	320,943	159,652	1,231,808	**7.368**	**0.00**
73.00	324,236	161,295	1,393,102	**7.443**	**1.64**
73.50	327,543	162,945	1,556,047	**7.519**	**3.14**
74.00	330,864	164,602	1,720,649	**7.596**	**4.12**
74.50	334,199	166,266	1,886,915	**7.672**	**4.91**
75.00	337,548	167,937	2,054,851	**7.749**	**10.23**
75.50	340,912	169,615	2,224,466	**7.826**	**31.52**
76.00	344,290	171,301	2,395,767	**7.904**	**61.77**
76.50	347,682	172,993	2,568,760	**7.982**	**98.80**
77.00	351,087	174,692	2,743,452	**8.060**	**141.50**
77.50	354,507	176,399	2,919,851	**8.138**	**189.20**

See the bleeddown pipe and broad-crested weir calculations for the discharge amounts


Seminole_Pre

HMS * Summary of Results for Seminole_Pre

Project : Seminole_Pond_2 Run Name : 25 yr Pre

Start of Run	: 01Jan07 0800	Basin Model	: Seminole_Pre_Const
End of Run	: 02Jan07 0800	Met. Model	: 25 Year
Execution Time	: 31May06 1432	Control Specs	: 24 Hours

Computed Results

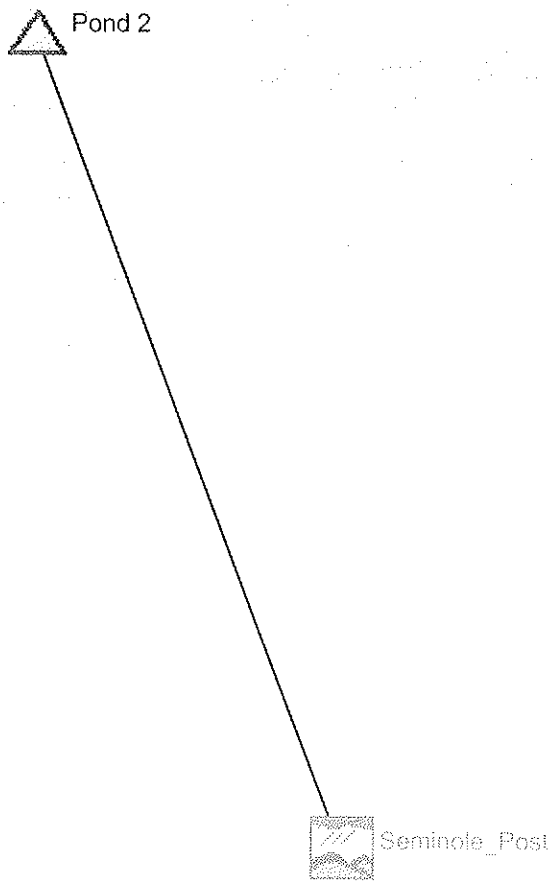
Peak Discharge	: 145.86 (cfs)	Date/Time of Peak Discharge	: 01 Jan 07 2226
Total Precipitation	: 8.00 (in)	Total Direct Runoff	: 5.44 (in)
Total Loss	: 2.40 (in)	Total Baseflow	: 0.00 (in)
Total Excess	: 5.60 (in)	Total Discharge	: 5.44 (in)

HMS * Summary of Results

Project : Seminole_Pond_2 Run Name : 25 yr Pre

Start of Run : 01Jan07 0800 Basin Model : Seminole_Pre_Const
End of Run : 02Jan07 0800 Met. Model : 25 Year
Execution Time : 31May06 1432 Control Specs : 24 Hours

Hydrologic Element	Discharge Peak (cfs)	Time of Peak	Volume (ac ft)	Drainage Area (sq mi)
Seminole_Pre	145.86	01 Jan 07 2226	56.770	0.196


Pond 2
Seminole_Post

HMS * Summary of Results for Seminole_Post

Project : Seminole_Pond_2 Run Name : 25 yr Post

Start of Run	: 01Jan07 0800	Basin Model	: Seminole_Post_Const
End of Run	: 02Jan07 0800	Met. Model	: 25 Year
Execution Time	: 31May06 1435	Control Specs	: 24 Hours

Computed Results

Peak Discharge	: 212.80 (cfs)	Date/Time of Peak Discharge	: 01 Jan 07 2153
Total Precipitation	: 8.00 (in)	Total Direct Runoff	: 7.12 (in)
Total Loss	: 0.75 (in)	Total Baseflow	: 0.00 (in)
Total Excess	: 7.25 (in)	Total Discharge	: 7.12 (in)

HMS * Summary of Results for Pond 2

Project : Seminole_Pond_2 Run Name : 25 yr Post

Start of Run	: 01Jan07 0800	Basin Model	: Seminole_Post_Const
End of Run	: 02Jan07 0800	Met. Model	: 25 Year
Execution Time	: 31May06 1435	Control Specs	: 24 Hours

Computed Results

Peak Inflow	: 212.80 (cfs)	Date/Time of Peak Inflow	: 01 Jan 07 2153
Peak Outflow	: 134.60 (cfs)	Date/Time of Peak Outflow	: 01 Jan 07 2306
Total Inflow	: 7.12 (in)	Peak Storage	: 62.335(acft)
Total Outflow	: 5.12 (in)	Peak Elevation	: 76.919(ft)

HMS * Summary of Results

Project : Seminole_Pond_2 Run Name : 25 yr Post

Start of Run : 01Jan07 0800 Basin Model : Seminole_Post_Const
End of Run : 02Jan07 0800 Met. Model : 25 Year
Execution Time : 31May06 1435 Control Specs : 24 Hours

Hydrologic Element	Discharge Peak (cfs)	Time of Peak	Volume (ac ft)	Drainage Area (sq mi)
Seminole_Post	212.80	01 Jan 07 2153	74.282	0.196
Pond 2	134.60	01 Jan 07 2306	53.407	0.196

Burns & McDonnell
SINCE 1898

011200 Form GCO-29

Client SEMINOLE Page ____ of ____

Project 39736 Date 5/31/06 Made By JCE

TIME OF CONCENTRATION Checked By ____

POND #2 Preliminary ___ Final ____

THE LONGEST FLOW PATH IN THE AREA = 3025'

THE AVERAGE SLOPE IS: $\frac{6' \text{ DROP}}{3025'} = 0.002$ ft/ft

CURVE # = 71 (PRE)
79 (POST)

THE TIME OF CONCENTRATION CAN BE DETERMINED USING THE SCS EQUATION:

$$t_c = 0.00526\, L^{0.8} \left(\frac{1000}{CN} - 9\right)^{0.7} S^{-0.5}$$

THE LAG TIME = $t_L = 0.6\, t_c$

PRE-CONSTRUCTION

$t_c = 0.00526 (3025)^{0.8} \left(\frac{1000}{71} - 9\right)^{0.7} 0.002^{-0.5}$

t_c = 224 min

t_L = 134 min

POST-CONSTRUCTION

$t_c = 0.00526 (3025)^{0.8} \left(\frac{1000}{79} - 9\right)^{0.7} 0.002^{-0.5}$

t_c = 178 min

t_L = 107 min

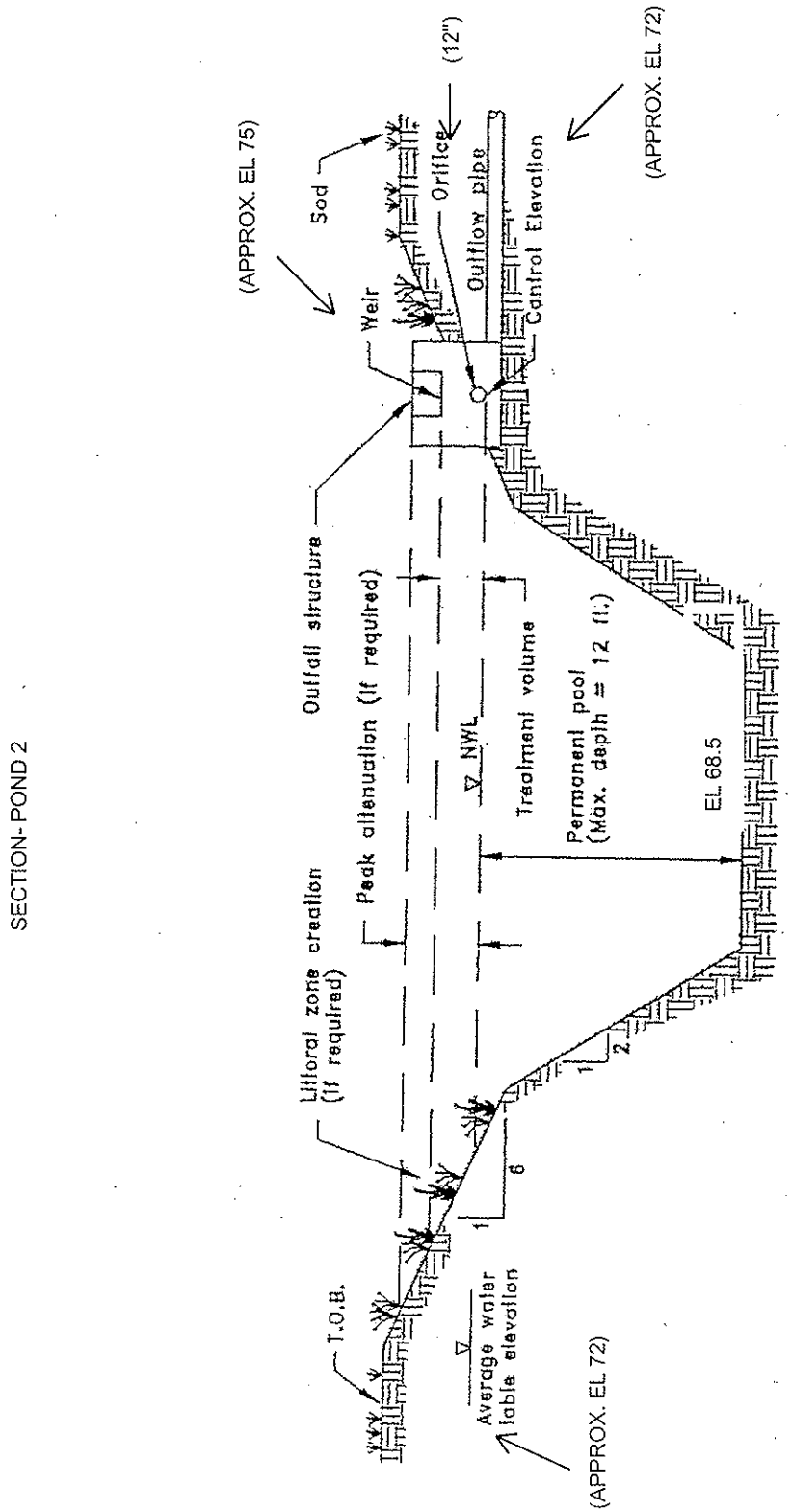


Figure 14-1. Wet detention (N.T.S.)

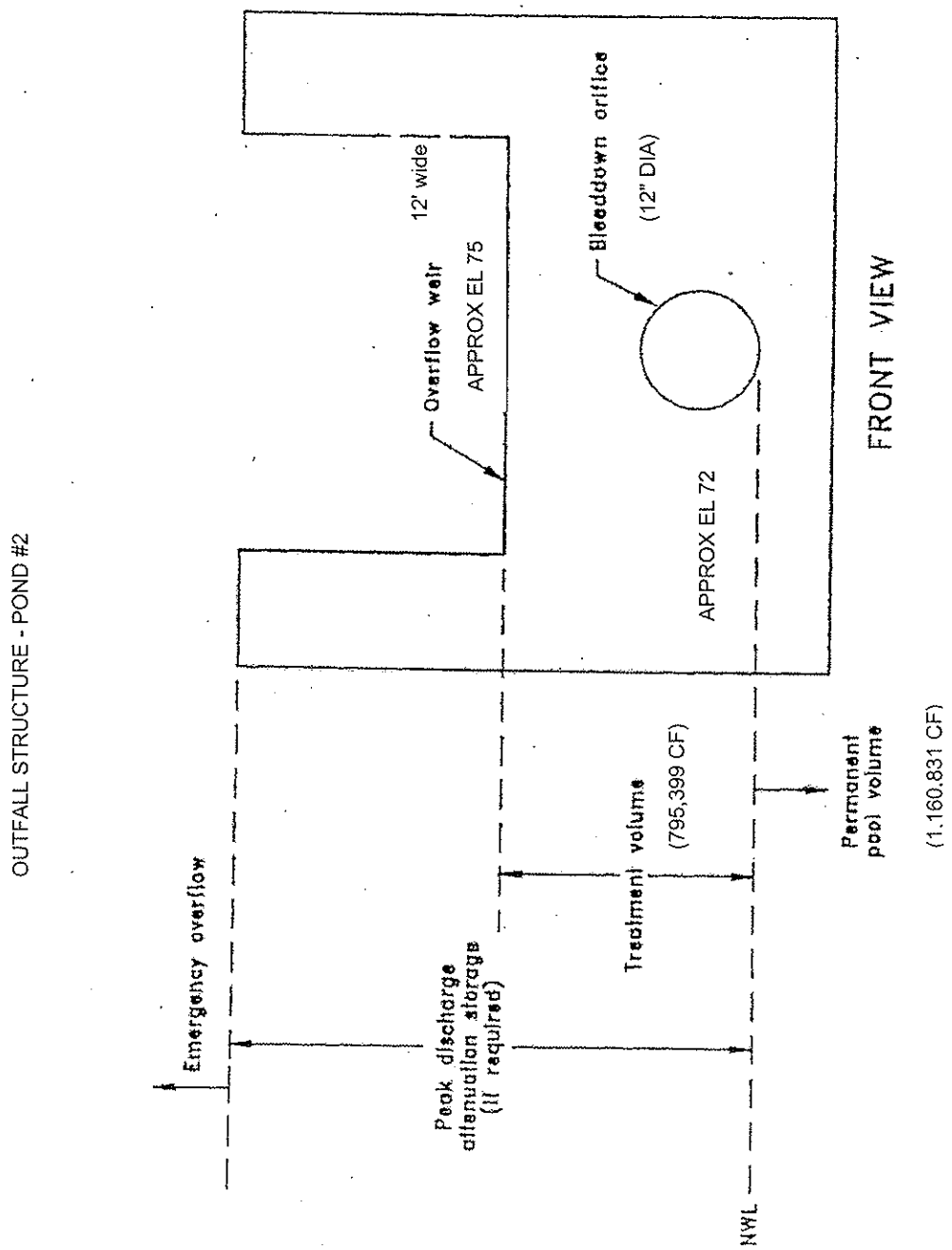


Figure 14-2. Typical wet detention outfall structure (N.T.S.)

OUTLET DETAIL - POND #2

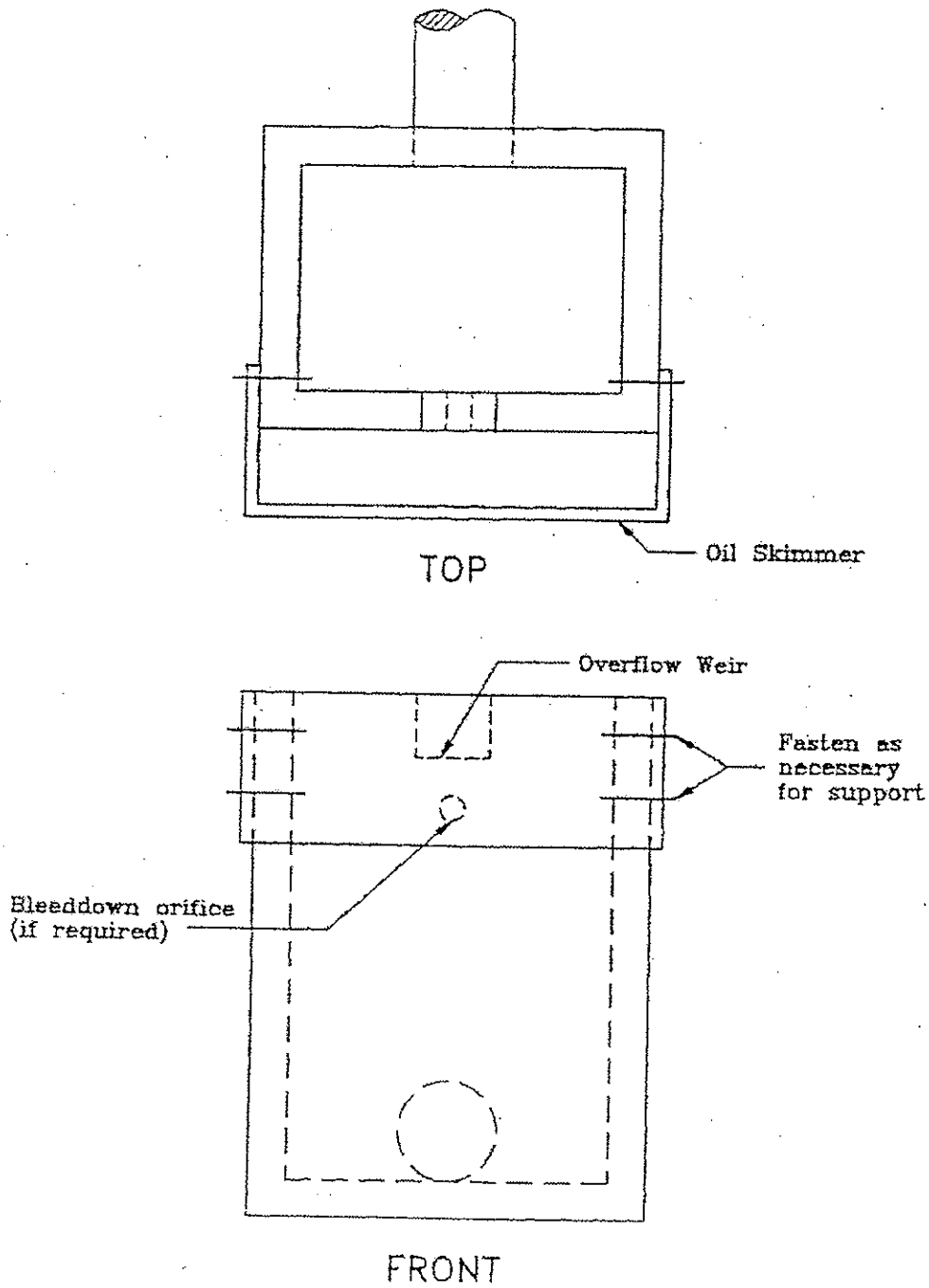


Figure 9-1. Oil skimmer detail for a typical outfall structure (N.T.S.)

Table 24-1. Runoff Coefficients (*C*) for a Design Storm Return Period of Ten Years or Less[1]

Slope	Land Use	Sandy Soils Min.	Sandy Soils Max.	Clay Soils Min.	Clay Soils Max.
Flat (0-2%)	Lawns	0.05	0.10	0.13	0.17
	Rooftops and pavement	0.95	0.95	0.95	0.95
	Pervious pavements[2]	0.75	0.95	0.90	0.95
	Woodlands	0.10	0.15	0.15	0.20
	Pasture, grass, and farmland[3]	0.15	0.20	0.20	0.25
	Residential				
	SFR: 1/2 acre lots and larger	0.30	0.35	0.35	0.45
	SFR: smaller lots and duplexes	0.35	0.45	0.40	0.50
	MFR: apartments, condominiums	0.45	0.60	0.50	0.70
	Commercial and Industrial	0.50	0.95	0.50	0.95
Rolling (2-7%)	Lawns	0.10	0.15	0.18	0.22
	Rooftops and pavements	0.95	0.95	0.95	0.95
	Pervious pavements[2]	0.80	0.95	0.90	0.95
	Woodlands	0.15	0.20	0.20	0.25
	Pasture, grass, and farmland[3]	0.20	0.25	0.25	0.30
	Residential				
	SFR: 1/2 acre lots and larger	0.35	0.50	0.40	0.55
	SFR: smaller lots and duplexes	0.40	0.55	0.45	0.60
	MFR: apartments, condominiums	0.50	0.70	0.60	0.80
	Commercial and Industrial	0.50	0.95	0.60	0.95
Steep (>7%)	Lawns	0.15	0.20	0.25	0.35
	Rooftops and pavements	0.95	0.95	0.95	0.95
	Pervious pavements[2]	0.85	0.95	0.90	0.95
	Woodlands	0.20	0.25	0.25	0.30
	Pasture, grass, and farmland[3]	0.25	0.35	0.30	0.40
	Residential				
	SFR: 1/2 acre lots and larger	0.40	0.55	0.50	0.65
	SFR: smaller lots and duplexes	0.45	0.60	0.55	0.70
	MFR: apartments, condominiums	0.60	0.75	0.65	0.85
	Commercial and Industrial	0.60	0.95	0.65	0.95

Sources: Florida Department of Transportation, 1987; Wanielista, 1990

[1]For 25- to 100-yr recurrence intervals, multiply coefficient by 1.1 and 1.25, respectively, and the product cannot exceed 1.0.

[2]Coefficients assume good ground cover and conservation treatment.

[3]Depends on depth and degree of permeability of underlying strata.

Note: SFR = Single Family Residential;
MFR = Multi-Family Residential

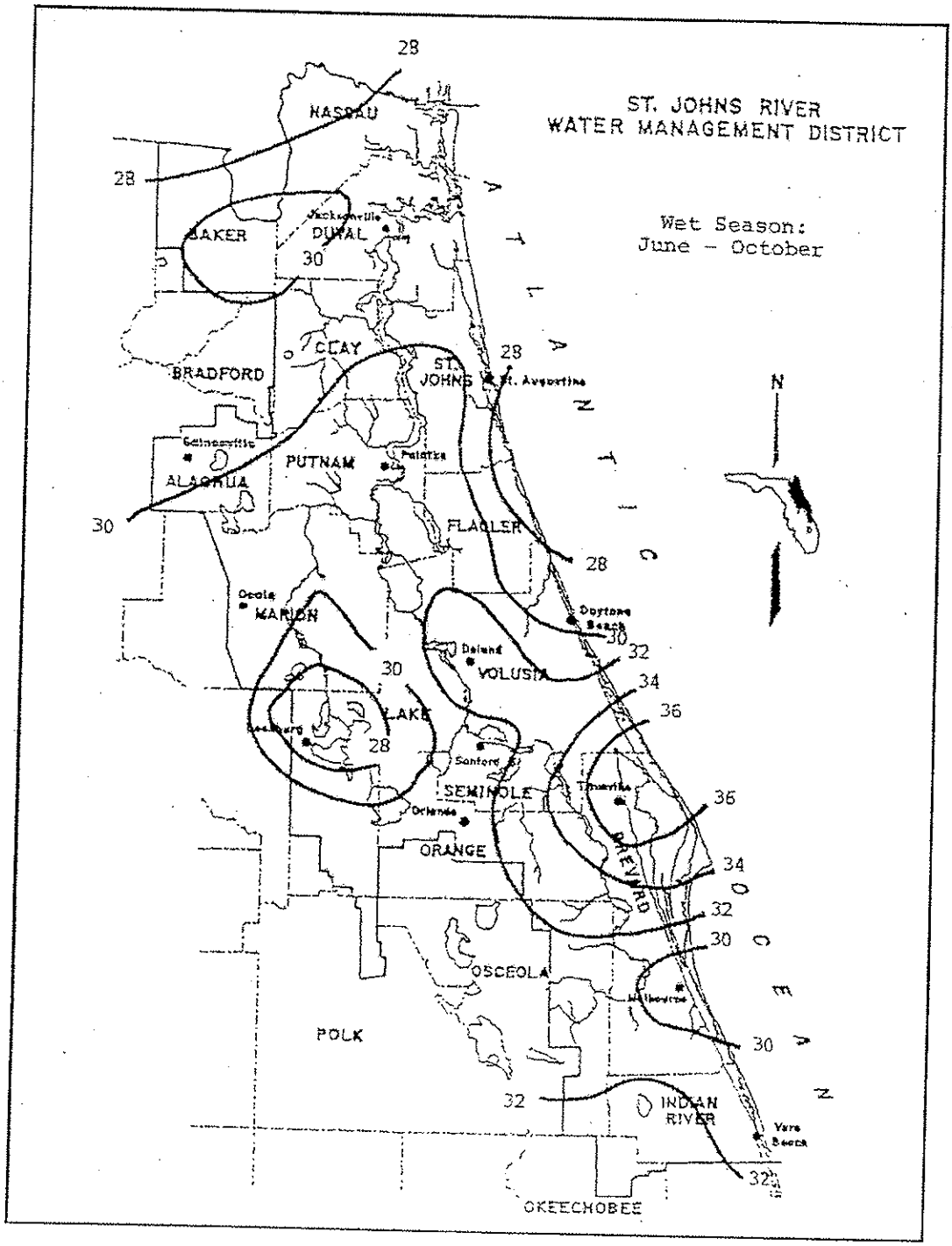


Figure 29-1. Wet Season Normal Rainfall, inches (Source: Rao, et al., 1990)

Seminole Electric Cooperative, Inc.
Seminole Generation Station - Unit 3
B&McD Project No. 39736
Wet Detention Pond Design Notes and Calculations

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Seminole Electric – Pond #3 - Design Summary

Using HEC-HMS (Hydraulic Modeling Software) the 25 year storm was modeled for pre and post-construction conditions. For basin 3, located on the eastern portion of the affected area (see attached site drainage plan), the pre-construction conditions were determined to be 15% impervious and post-construction conditions were determined to be 90% impervious. A wet detention pond was designed for post construction conditions for the 25 year 24 hour rain event. Storm water is carried to the pond through ditches. For the 25 year event, the post-construction peak outflow was less than the pre-construction peak outflow.

The invert elevation of the bleeddown orifice was set at an approximate elevation of 65 to provide the permanent pool volume of 14.0 acre-feet. The overflow weir was set at an approximate elevation of 68 to provide the required treatment volume of 450,175 cubic feet. The 10" diameter bleeddown orifice will be used to drain half of the treatment volume in 24 hours as required by the SJRWMD. Below is a summary of pre and post-construction results.

	Pre-Construction	Post-Construction
Storm Return Period	25 year	25 year
Storm Duration	24 hours	24 hours
% Impervious	15	90
Peak Discharge (ft^3/s)	86.70	82.57
Volume of Runoff (acre-ft)	21.71	25.12

Required Treatment Volume	450,175 ft^3 – Half of this volume will be drained by a 10" diameter orifice in 24 hours as required by the SJRWMD.
Required Permanent Pool Volume	610,178 ft^3

Industrial Development Drainage Area		2,400,934	SF
		55.12	Acres
Impervious Area	90%	2,160,841	SF
		49.61	Acres
Offsite Drainage Area		0	Acres

Assumptions:

Wet Detention Pond, 3:1 Side Slopes		
Time of Concentration is approx 1.2 hrs		
Basin Bottom Elevation =	60.5	ft
Seasonal High Ground Water Elevation =	66	ft
Average Ground Water Elevation (approx) =	65	ft
Rectangular Detention Basin, Bottom Area =	125,000	SF
Average Basin Length =	500	ft
Average Basin Width =	250	ft

Detention Pond Stage-Storage Table

Elevation	Area (SF)	Storage (CF)
60.5	125,000	0
61	127,259	63,065
61.5	129,536	127,264
62	131,831	192,605
62.5	134,144	259,099
63	136,475	326,754
63.5	138,824	395,579
64	141,191	465,582
64.5	143,576	536,774
65	145,979	609,163
65.5	148,400	682,758
66	150,839	757,567
66.5	153,296	833,601
67	155,771	910,868
67.5	158,264	989,377
68	160,775	1,069,136
68.5	163,304	1,150,156
69	165,851	1,232,445
69.5	168,416	1,316,012
70	170,999	1,400,865
70.5	173,600	1,487,015

Step 1: Determine Required Treatment Volume:

For wet detention, the rule requires detention of 1" of runoff or 2.5" from the impervious area, whichever is larger

1) 1" of runoff from the development area = 200,078 CF

2) 2.5" of runoff from the impervious area = 450,175 CF

Treatment Volume = **450,175 CF**

Step 2: Calculate the minimum permanent pool volume that will provide the required residence time

For non-littoral zone option, the permanent pool must be sized to provide a residence time (RT) of at least 21 days during the wet season (June-October)

Length of wet season (WS) = 153 days

From Figure 29-1, the wet season rainfall depth (R) for Palatka = 31 inches

The runoff coefficient (C) for the drainage area to the wet detention pond is:

From Table 24-1, based on a flat slope, the following land uses, sandy soils, and a 25-year storm, the runoff coefficient falls between:

Land Use	Max	Min		
Commercial/Industrial	1	0.55	→	0.78
Pasture, grass, farmland	0.17	0.22	→	0.19

Weighted runoff coefficient, based on:
90% Impervious → 0.72

Equation 29-4 gives the Permanent Pool Volume (PPV):

$$PPV = \frac{((Area)(C)(R)(RT))}{\left((WS)\left(12\frac{in}{ft}\right)\right)}$$

PPV = 14.01 acre - ft = 610,178 CF

Step 3: Determine the height of the permanent pool volume and the treatment volume:

Interpolate from the stage-storage table

Permanent Pool Volume =	610,178	→	Elevation	**65.01**
Treatment Volume + PPV =	1,060,353	→	Elevation	**67.94**

Place the bleeddown orifice at the top of the PPV, EL = 65.01
Place the overflow at the top of the treatment volume, EL = 67.94

Step 4: Size a the bleeddown orifice to recover one half of the treatment volume in 24 hours

Since the size of the orifice has yet to be determined, use the invert elevation of the orifice as an approximation of the flow line (center) of the orifice. After calculating the orifice size, adjust the flow line elevation and calculate the orifice size again.

Treatment Volume depth (h_1)=	2.94	ft
Half of treatment volume =	225,088	CF
Stage at half the treatment volume =	66.48	ft
Half the treatment volume depth (h_2) =	1.47	ft

The average flow rate required to draw down half of the treatment volume in 24 hours is:

$Q =$ 2.61 cfs

The area of a circular orifice is determined by:

$$A = Q / 0.6(\sqrt{2gh})$$

Trial #1:

$h = (h_1 + h_2) / 2 =$ 2.20 ft

$A =$ 0.36 SF

Orifice Diameter = $\sqrt{(4A/\pi)} =$ 0.68 ft

Trial #2:

Adjusted flow line = 65.01 + 1/2 (0.68 ft) = 65.35

h_1 = height of treatment volume - adjusted flow line = 2.60

h_2 = half of treatment volume - adjusted flow line = 1.13

$h = (h_1 + h_2) / 2 =$ 1.86 ft

$A =$ 0.40 SF

Orifice Diameter = $\sqrt{(4A/\pi)} =$ 0.71 ft

Adjusted flow line = 65.01 + 1/2 (0.71 ft) = 65.36

Use an orifice diameter of 10" with an invert elevation of 65.01'

Bleeddown Pipe Orifice Calculations
Pond #3

Place Invert Elevation of Bleeddown Pipe @ 65.01

Flow through pipe =	Q		
Orifice discharge coefficient =	C	C =	0.6
Bleeddown Pipe Diameter =	D	D =	10 in
Bleeddown Pipe Area =	A	A =	0.55 ft^2
Headwater height above centroid =	H		

$Q = (C)(A)(2gH)^{1/2}$

Broad-crested Weir Calculations
Pond #3

Place Invert Elevation of Weir @ 67.94

Flow over the weir =	Q		
Width of weir =	b	b =	7
Height of water flowing over the weir =		H	

$Q = C_s(b)(H)^{3/2}$ $C_s = 3.33\ ft^{0.5}/s$

Overall Pond Stage-Discharge Table
Pond #3

Stage (ft)	Orifice Discharge (cfs)	Weir Discharge (cfs)	Total Discharge (cfs)
60.50	0.00	0.00	0.00
61.00	0.00	0.00	0.00
61.50	0.00	0.00	0.00
62.00	0.00	0.00	0.00
62.50	0.00	0.00	0.00
63.00	0.00	0.00	0.00
63.50	0.00	0.00	0.00
64.00	0.00	0.00	0.00
64.50	0.00	0.00	0.00
65.00	0.00	0.00	0.00
65.50	0.73	0.00	0.73
66.00	1.99	0.00	1.99
66.50	2.72	0.00	2.72
67.00	3.30	0.00	3.30
67.50	3.78	0.00	3.78
68.00	4.22	0.30	4.52
68.50	4.61	9.64	14.25
69.00	4.97	25.26	30.23
69.50	5.30	45.20	50.50
70.00	5.62	68.67	74.29
70.50	5.92	95.20	101.12

HEC-HMS Palatka Area Meteorological Model

25 year - 24 hour storm

Exceedance Probability	4% (25 year)
Max Intensity Duration	5 min
Storm Distribution	24 hour
Peak Center	50%

Duration min	Duration hr	Depth * inches	Intensity Inches/Hr
5	0.08	1	12.00
15	0.25	2	8.00
60	1.00	3.4	3.40
120	2.00	4.3	2.15
180	3.00	5	1.67
360	6.00	6	1.00
720	12.00	7.2	0.60
1440	24.00	8	0.33

* Source TP-40

HEC-HMS Seminole Pre-Construction Input
Pond #3

	Existing Impervious Area	Remaining Area	Total Area
Method			SCS Curve No.
Area (sq. mi.)	0.0129	0.0732	0.0861
Initial Loss (in)			0.94
% Impervious	100	0	15
SCS Curve No.	85	65	68
SCS Lag (min)			71
			No Baseflow

HEC-HMS Seminole Post-Construction Input
Pond #3

Method	SCS Curve No.
Area (sq. mi.)	0.0861
Initial Loss (in)	0.4
% Impervious	90
SCS Curve No.	85
SCS Lag (min)	43
No Baseflow	

HEC-HMS Seminole Post-Construction Input

Pond #3 - Stage Area Discharge Table

Initial Pond Elevation set at = 65.01 (Top of Permanent Pool Volume)

Stage	Area	Incremental Volume	Total Volume	Area acres	Discharge
ft	ft2	ft3	ft3		cfs
60.50	125,000			**2.870**	**0.00**
61.00	127,259	63,065	63,065	**2.921**	**0.00**
61.50	129,536	64,199	127,264	**2.974**	**0.00**
62.00	131,831	65,342	192,605	**3.026**	**0.00**
62.50	134,144	66,494	259,099	**3.080**	**0.00**
63.00	136,475	67,655	326,754	**3.133**	**0.00**
63.50	138,824	68,825	395,579	**3.187**	**0.00**
64.00	141,191	70,004	465,582	**3.241**	**0.00**
64.50	143,576	71,192	536,774	**3.296**	**0.00**
65.00	145,979	72,389	609,163	**3.351**	**0.00**
65.50	148,400	73,595	682,758	**3.407**	**0.73**
66.00	150,839	74,810	757,567	**3.463**	**1.99**
66.50	153,296	76,034	833,601	**3.519**	**2.72**
67.00	155,771	77,267	910,868	**3.576**	**3.30**
67.50	158,264	78,509	989,377	**3.633**	**3.78**
68.00	160,775	79,760	1,069,136	**3.691**	**4.52**
68.50	163,304	81,020	1,150,156	**3.749**	**14.25**
69.00	165,851	82,289	1,232,445	**3.807**	**30.23**
69.50	168,416	83,567	1,316,012	**3.866**	**50.50**
70.00	170,999	84,854	1,400,865	**3.926**	**74.29**
70.50	173,600	86,150	1,487,015	**3.985**	**101.12**

See the bleeddown pipe and broad-crested weir calculations for the discharge amounts


Laydown_East_Pre

HMS * Summary of Results for

Laydown_East_Pre

Project : Seminole_Pond_3 Run Name : 25 yr Pre

Start of Run	: 01Jan07 0800	Basin Model	: Laydown_East_Pre
End of Run	: 02Jan07 0800	Met. Model	: 25 Year
Execution Time	: 30May06 1503	Control Specs	: Control 1

Computed Results

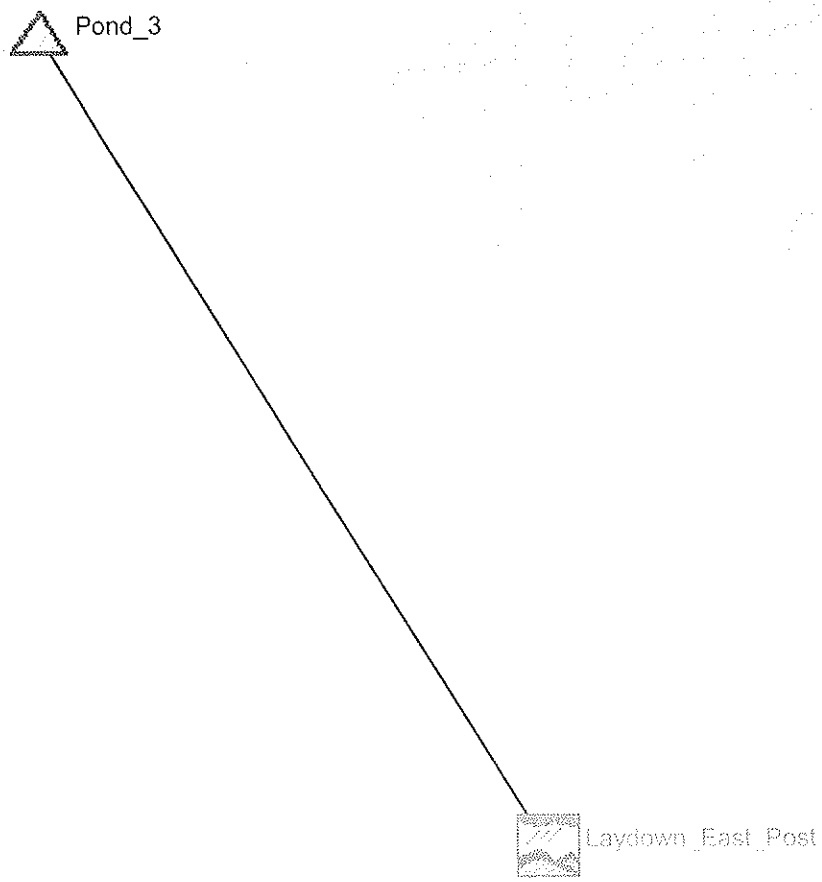
Peak Discharge	: 86.695 (cfs)	Date/Time of Peak Discharge	: 01 Jan 07 2118
Total Precipitation	: 8.00 (in)	Total Direct Runoff	: 4.73 (in)
Total Loss	: 3.20 (in)	Total Baseflow	: 0.00 (in)
Total Excess	: 4.80 (in)	Total Discharge	: 4.73 (in)

HMS * Summary of Results

Project : Seminole_Pond_3 Run Name : 25 yr Pre

Start of Run : 01Jan07 0800 Basin Model : Laydown_East_Pre
End of Run : 02Jan07 0800 Met. Model : 25 Year
Execution Time : 30May06 1503 Control Specs : Control 1

Hydrologic Element	Discharge Peak (cfs)	Time of Peak	Volume (ac ft)	Drainage Area (sqmi)
Laydown_East_Pre	86.695	01 Jan 07 2118	21.710	0.086


Pond_3
Laydown_East_Post

HMS * Summary of Results for

Laydown_East_Post

Project : Seminole_Pond_3 Run Name : 25 yr Post

Start of Run	: 01Jan07 0800	Basin Model	: Laydown_East_Post
End of Run	: 02Jan07 0800	Met. Model	: 25 Year
Execution Time	: 30May06 1507	Control Specs	: Control 1

Computed Results

Peak Discharge	: 180.34 (cfs)	Date/Time of Peak Discharge	: 01 Jan 07 2045
Total Precipitation	: 8.00 (in)	Total Direct Runoff	: 7.77 (in)
Total Loss	: 0.18 (in)	Total Baseflow	: 0.00 (in)
Total Excess	: 7.82 (in)	Total Discharge	: 7.77 (in)

HMS * Summary of Results for Pond_3

Project : Seminole_Pond_3 Run Name : 25 yr Post

Start of Run	: 01Jan07 0800	Basin Model	: Laydown_East_Post
End of Run	: 02Jan07 0800	Met. Model	: 25 Year
Execution Time	: 30May06 1507	Control Specs	: Control 1

Computed Results

Peak Inflow	: 180.34 (cfs)	Date/Time of Peak Inflow	: 01 Jan 07 2045
Peak Outflow	: 82.572 (cfs)	Date/Time of Peak Outflow	: 01 Jan 07 2132
Total Inflow	: 7.77 (in)	Peak Storage	: 32.769(acft)
Total Outflow	: 5.47 (in)	Peak Elevation	: 70.154(ft)

HMS * Summary of Results

Project : Seminole_Pond_3 Run Name : 25 yr Post

Start of Run : 01Jan07 0800 Basin Model : Laydown_East_Post
End of Run : 02Jan07 0800 Met. Model : 25 Year
Execution Time : 30May06 1507 Control Specs : Control 1

Hydrologic Element	Discharge Peak (cfs)	Time of Peak	Volume (ac ft)	Drainage Area (sq mi)
Laydown_East_Post	180.34	01 Jan 07 2045	35.665	0.086
Pond_3	82.572	01 Jan 07 2132	25.119	0.086

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Project 39736 Date 5/18/06 Made By JCE

TIME OF CONCENTRATION CALCULATION Checked By ____

POND #3 Preliminary ✓ Final ____

THE LONGEST FLOW PATH IN THE AREA = 2200'

THE AVERAGE SLOPE IS: $\frac{11' \text{ OF DROP}}{2200'} = 0.005 \text{ ft/ft}$

CURVE # = 68 (PRE)
85 (POST)

THE TIME OF CONCENTRATION CAN BE DETERMINED USING THE SCS EQUATION:

$$t_c = 0.00526\, L^{0.8} \left(\frac{1000}{CN} - 9\right)^{0.7} S^{-0.5}$$

THE LAG TIME = $t_L = 0.6\, t_c$

PRE-CONSTRUCTION	POST-CONSTRUCTION
$t_c = 0.00526\,(2200)^{0.8}\left(\frac{1000}{68} - 9\right)^{0.7} 0.005^{-0.5}$	$t_c = 0.00526\,(2200)^{0.8}\left(\frac{1000}{85} - 9\right)^{0.7} 0.005^{-0.5}$
$t_c = 119$ min	$t_c = 72$ min
$t_L = 0.6\, t_c = 71$ min	$t_L = 43$ min

SECTION- POND 3

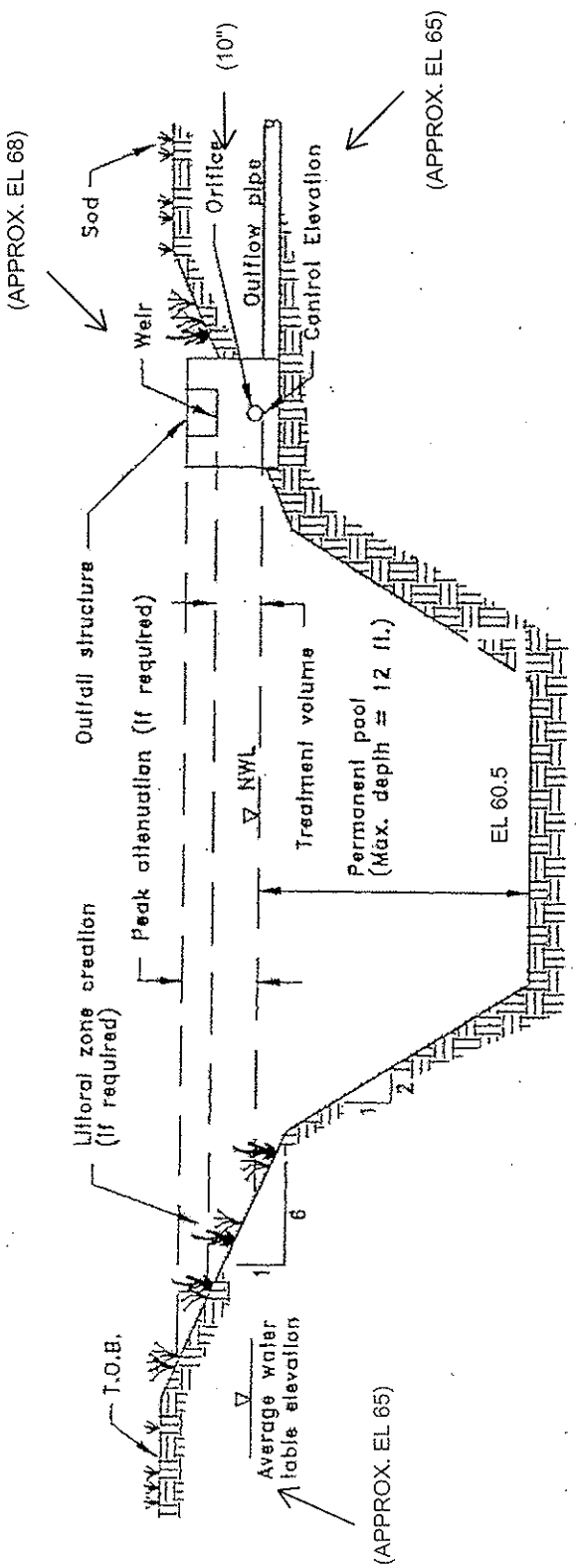


Figure 14-1. Wet detention (N.T.S.)

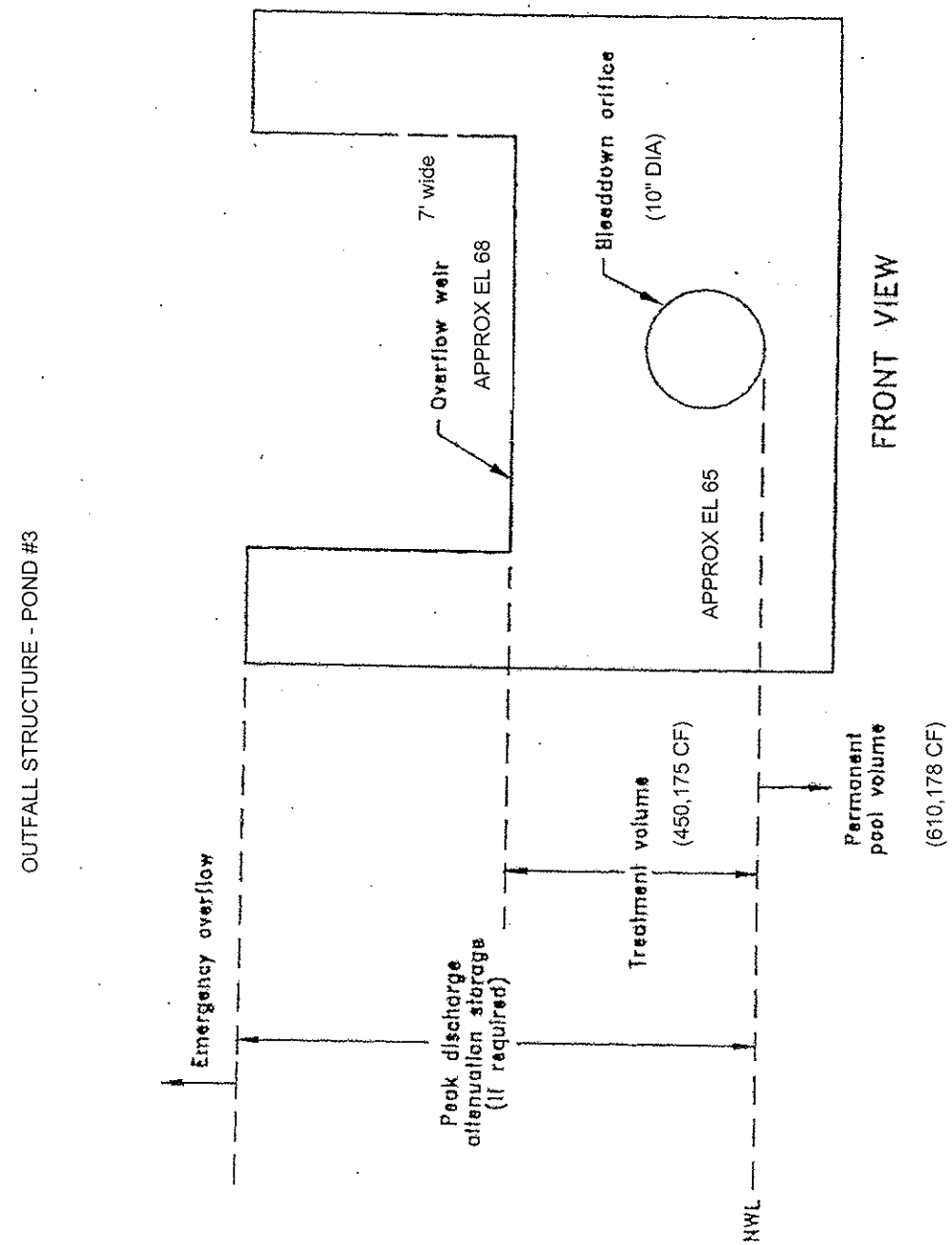


Figure 14-2. Typical wet detention outfall structure (N.T.S.)

OUTLET DETAIL - POND #3

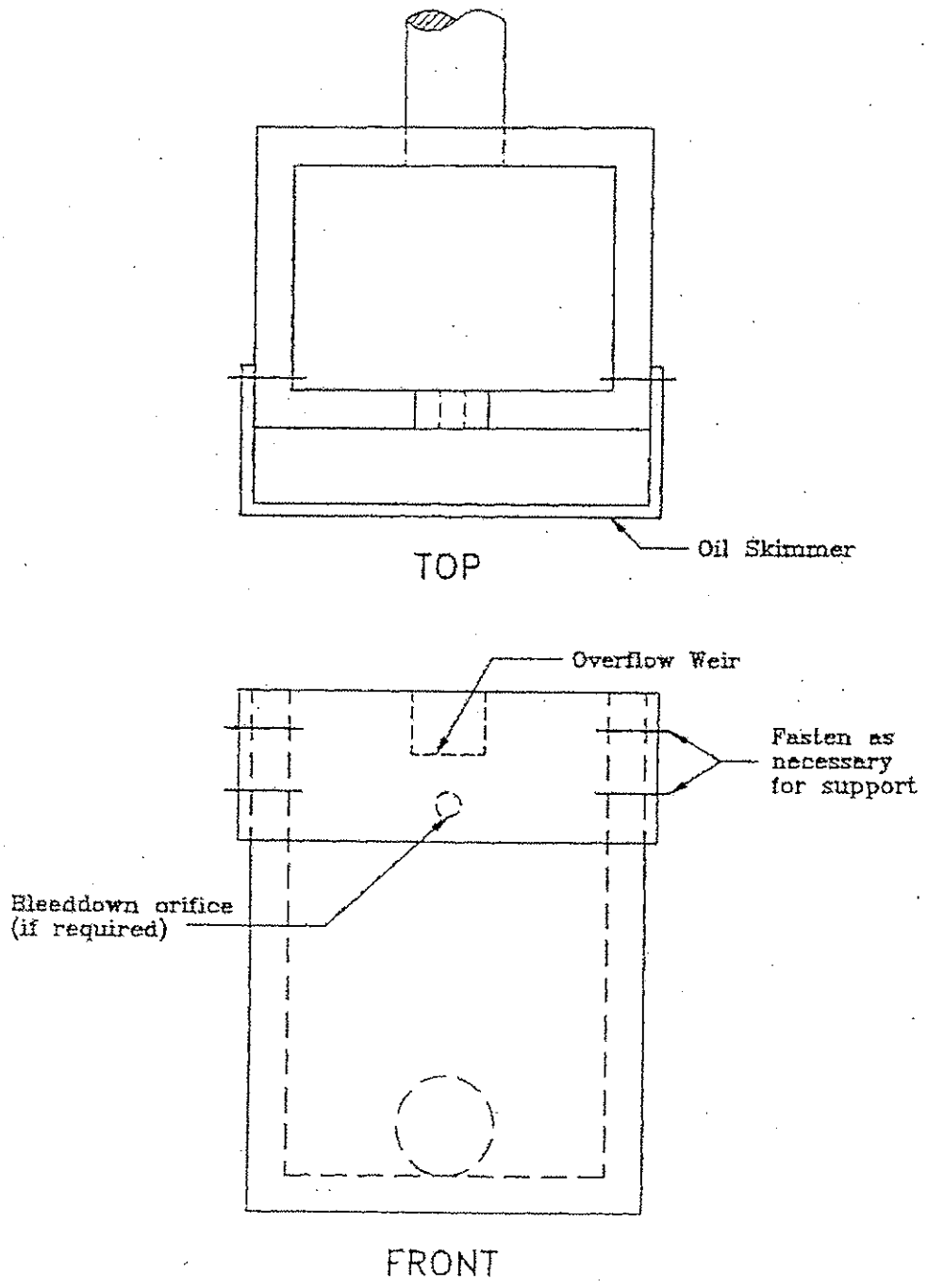


Figure 9-1. Oil skimmer detail for a typical outfall structure (N.T.S.)

Table 24-1. Runoff Coefficients (C) for a Design Storm Return Period of Ten Years or Less[1]

Slope	Land Use	Sandy Soils Min.	Sandy Soils Max.	Clay Soils Min.	Clay Soils Max.
Flat (0-2%)	Lawns	0.05	0.10	0.13	0.17
	Rooftops and pavement	0.95	0.95	0.95	0.95
	Pervious pavements[2]	0.75	0.95	0.90	0.95
	Woodlands	0.10	0.15	0.15	0.20
	Pasture, grass, and farmland[3]	0.15	0.20	0.20	0.25
	Residential				
	SFR: 1/2 acre lots and larger	0.30	0.35	0.35	0.45
	SFR: smaller lots and duplexes	0.35	0.45	0.40	0.50
	MFR: apartments, condominiums	0.45	0.60	0.50	0.70
	Commercial and Industrial	0.50	0.95	0.50	0.95
Rolling (2-7%)	Lawns	0.10	0.15	0.18	0.22
	Rooftops and pavements	0.95	0.95	0.95	0.95
	Pervious pavements[2]	0.80	0.95	0.90	0.95
	Woodlands	0.15	0.20	0.20	0.25
	Pasture, grass, and farmland[3]	0.20	0.25	0.25	0.30
	Residential				
	SFR: 1/2 acre lots and larger	0.35	0.50	0.40	0.55
	SFR: smaller lots and duplexes	0.40	0.55	0.45	0.60
	MFR: apartments, condominiums	0.50	0.70	0.60	0.80
	Commercial and Industrial	0.50	0.95	0.60	0.95
Steep (>7%)	Lawns	0.15	0.20	0.25	0.35
	Rooftops and pavements	0.95	0.95	0.95	0.95
	Pervious pavements[2]	0.85	0.95	0.90	0.95
	Woodlands	0.20	0.25	0.25	0.30
	Pasture, grass, and farmland[3]	0.25	0.35	0.30	0.40
	Residential				
	SFR: 1/2 acre lots and larger	0.40	0.55	0.50	0.65
	SFR: smaller lots and duplexes	0.45	0.60	0.55	0.70
	MFR: apartments, condominiums	0.60	0.75	0.65	0.85
	Commercial and Industrial	0.60	0.95	0.65	0.95

Sources: Florida Department of Transportation, 1987; Wanielista, 1990

[1]For 25- to 100-yr recurrence intervals, multiply coefficient by 1.1 and 1.25, respectively, and the product cannot exceed 1.0.

[2]Coefficients assume good ground cover and conservation treatment.

[3]Depends on depth and degree of permeability of underlying strata.

Note: SFR = Single Family Residential;
MFR = Multi-Family Residential

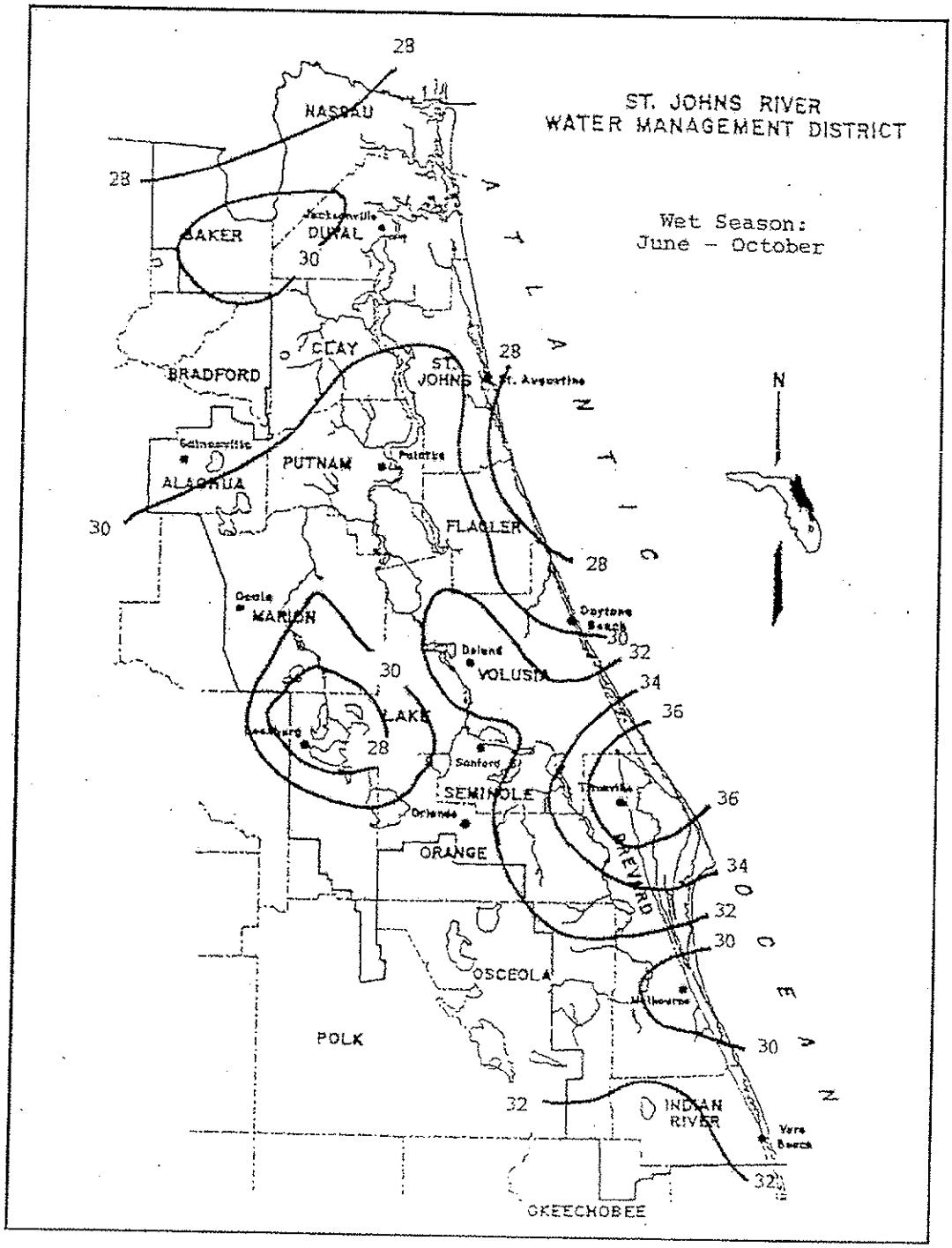


Figure 29-1. Wet Season Normal Rainfall, inches (Source: Rao, et al., 1990)

Seminole Electric – Pond #4 - Design Summary

Using HEC-HMS (Hydraulic Modeling Software) the 25 year storm was modeled for pre and post-construction conditions. For basin 4, located on the western portion of the affected area (see attached site drainage plan), the pre-construction conditions were determined to be 50% impervious and post-construction conditions were determined to be 90% impervious. A wet detention pond was designed for post construction conditions for the 25 year 24 hour rain event. Storm water is carried to the pond through ditches. For the 25 year event, the post-construction peak outflow was less than the pre-construction peak outflow.

The invert elevation of the bleeddown orifice was set at an approximate elevation of 55.7 to provide the permanent pool volume of 16.3 acre-feet. The overflow weir was set at an approximate elevation of 59 to provide the required treatment volume of 523,932 cubic feet. The 10" diameter bleeddown orifice will be used to drain half of the treatment volume in 24 hours as required by the SJRWMD. Below is a summary of pre and post-construction results.

	Pre-Construction	Post-Construction
Storm Return Period	25 year	25 year
Storm Duration	24 hours	24 hours
% Impervious	50	90
Peak Discharge (ft^3/s)	177.79	144.64
Volume of Runoff (acre-ft)	34.57	29.63

Required Treatment Volume	523,932 ft^3 – Half of this volume will be drained by a 6" diameter orifice in 48 hours as required by the SJRWMD.
Required Permanent Pool Volume	710,149 ft^3

Industrial Development Drainage Area		2,794,303	SF
		64.15	Acres
Impervious Area	90%	2,514,873	SF
		57.73	Acres
Offsite Drainage Area		0	Acres

Assumptions:

Wet Detention Pond, 3:1 Side Slopes
Time of Concentration is approx 1 hour

Basin Bottom Elevation =	50.5	ft
Seasonal High Ground Water Elevation =	56.7	ft
Average Ground Water Elevation (approx) =	55.7	ft
Rectangular Detention Basin, Bottom Area =	125,000	SF
Average Basin Length =	500	ft
Average Basin Width =	250	ft

Detention Pond Stage-Storage Table

Elevation	Area (SF)	Storage (CF)
50.5	125,000	0
51	127,259	63,065
51.5	129,536	127,264
52	131,831	192,605
52.5	134,144	259,099
53	136,475	326,754
53.5	138,824	395,579
54	141,191	465,582
54.5	143,576	536,774
55	145,979	609,163
55.5	148,400	682,758
56	150,839	757,567
56.5	153,296	833,601
57	155,771	910,868
57.5	158,264	989,377
58	160,775	1,069,136
58.5	163,304	1,150,156
59	165,851	1,232,445
59.5	168,416	1,316,012
60	170,999	1,400,865
60.5	173,600	1,487,015
61	176,219	1,574,470

Step 1: Determine Required Treatment Volume:

For wet detention, the rule requires detention of 1" of runoff or 2.5" from the impervious area, whichever is larger

1) 1" of runoff from the development area = 232,859 CF

2) 2.5" of runoff from the impervious area = 523,932 CF

Treatment Volume = **523,932 CF**

Step 2: Calculate the minimum permanent pool volume that will provide the required residence time

For non-littoral zone option, the permanent pool must be sized to provide a residence time (RT) of at least 21 days during the wet season (June-October)

Length of wet season (WS) = 153 days

From Figure 29-1, the wet season rainfall depth (R) for Palatka = 31 inches

The runoff coefficient (C) for the drainage area to the wet detention pond is:

From Table 24-1, based on a flat slope, the following land uses, sandy soils, and a 25-year storm, the runoff coefficient falls between:

Land Use	Max	Min		
Commercial/Industrial	1	0.55	→	0.78
Pasture, grass, farmland	0.17	0.22	→	0.19

Weighted runoff coefficient, based on:
90% Impervious → 0.72

Equation 29-4 gives the Permanent Pool Volume (PPV):

$$PPV = \frac{((Area)(C)(R)(RT))}{\left((WS)\left(12\frac{in}{ft}\right)\right)}$$

PPV = 16.30 acre - ft = 710,149 CF

Step 3: Determine the height of the permanent pool volume and the treatment volume:

Interpolate from the stage-storage table

Permanent Pool Volume =	710,149	→	Elevation	**55.68**
Treatment Volume + PPV =	1,234,081	→	Elevation	**59.01**

Place the bleeddown orifice at the top of the PPV, EL = 55.68
Place the overflow at the top of the treatment volume, EL = 59.01

Step 4: Size a the bleeddown orifice to recover one half of the treatment volume in 24 hours

Since the size of the orifice has yet to be determined, use the invert elevation of the orifice as an approximation of the flow line (center) of the orifice. After calculating the orifice size, adjust the flow line elevation and calculate the orifice size again.

Treatment Volume depth (h_1)=	3.33	ft
Half of treatment volume =	261,966	CF
Stage at half the treatment volume =	57.35	ft
Half the treatment volume depth (h_2) =	1.66	ft

The average flow rate required to draw down half of the treatment volume in 24 hours is:

$Q =$ 3.03 cfs

The area of a circular orifice is determined by:

$$A = Q / 0.6(\sqrt{2gh})$$

Trial #1:

$h = (h_1 + h_2) / 2 =$ 2.50 ft
$A =$ 0.40 SF
Orifice Diameter = $\sqrt{(4A/\pi)} =$ 0.71 ft

Trial #2:

Adjusted flow line = 55.68 + 1/2 (0.71 ft) = 56.04
h_1 = height of treatment volume - adjusted flow line = 2.97
h_2 = half of treatment volume - adjusted flow line = 1.31
$h = (h_1 + h_2) / 2 =$ 2.14 ft
$A =$ 0.43 SF
Orifice Diameter = $\sqrt{(4A/\pi)} =$ 0.74 ft

Adjusted flow line = 55.68 + 1/2 (0.74 ft) = 56.05

Use an orifice diameter of 10" with an invert elevation of 55.68'

Bleeddown Pipe Orifice Calculations
Pond #4

Place Invert Elevation of Bleeddown Pipe @ 55.68

Flow through pipe =	Q		
Orifice discharge coefficient =	C	C =	0.6
Bleeddown Pipe Diameter =	D	D =	10 in
Bleeddown Pipe Area =	A	A =	0.55 ft^2
Headwater height above centroid =	H		

$Q = (C)(A)(2gH)^{1/2}$

Broad-crested Weir Calculations
Pond #4

Place Invert Elevation of Weir @ 59.01

Flow over the weir =	Q		
Width of weir =	b	b =	15
Height of water flowing over the weir =		H	

$Q = C_s(b)(H)^{3/2}$ $C_s = 3.33\ ft^{0.5}/s$

Overall Pond Stage-Discharge Table
Pond #4

Stage (ft)	Orifice Discharge (cfs)	Weir Discharge (cfs)	Total Discharge (cfs)
50.50	0.00	0.00	0.00
51.00	0.00	0.00	0.00
51.50	0.00	0.00	0.00
52.00	0.00	0.00	0.00
52.50	0.00	0.00	0.00
53.00	0.00	0.00	0.00
53.50	0.00	0.00	0.00
54.00	0.00	0.00	0.00
54.50	0.00	0.00	0.00
55.00	0.00	0.00	0.00
55.50	0.00	0.00	0.00
56.00	0.00	0.00	0.00
56.50	1.66	0.00	1.66
57.00	2.49	0.00	2.49
57.50	3.11	0.00	3.11
58.00	3.62	0.00	3.62
58.50	4.07	0.00	4.07
59.00	4.47	0.00	4.47
59.50	4.84	17.14	21.99
60.00	5.19	49.22	54.40
60.50	5.51	90.87	96.38
61.00	5.81	140.24	146.06

HEC-HMS Palatka Area Meteorological Model

25 year - 24 hour storm

Exceedance Probability	4% (25 year)
Max Intensity Duration	5 min
Storm Distribution	24 hour
Peak Center	50%

Duration min	Duration hr	Depth * inches	Intensity Inches/Hr
5	0.08	1	12.00
15	0.25	2	8.00
60	1.00	3.4	3.40
120	2.00	4.3	2.15
180	3.00	5	1.67
360	6.00	6	1.00
720	12.00	7.2	0.60
1440	24.00	8	0.33

* Source TP-40

HEC-HMS Seminole Pre-Construction Input
Pond #4

	Existing Impervious Area	Remaining Area	Total Area
Method			SCS Curve No.
Area (sq. mi.)	0.0501	0.0501	0.1002
Initial Loss (in)			0.67
% Impervious	100	0	50
SCS Curve No.	85	65	75
SCS Lag (min)			45
			No Baseflow

HEC-HMS Seminole Post-Construction Input
Pond #4

Method	SCS Curve No.
Area (sq. mi.)	0.1002
Initial Loss (in)	0.4
% Impervious	90
SCS Curve No.	85
SCS Lag (min)	33

No Baseflow

HEC-HMS Seminole Post-Construction Input

Pond #4 - Stage Area Discharge Table

Initial Pond Elevation set at = 55.68 (Top of Permanent Pool Volume)

Stage	Area	Incremental Volume	Total Volume	Area acres	Discharge
ft	ft2	ft3	ft3		cfs
50.50	125,000			**2.870**	**0.00**
51.00	127,259	63,065	63,065	**2.921**	**0.00**
51.50	129,536	64,199	127,264	**2.974**	**0.00**
52.00	131,831	65,342	192,605	**3.026**	**0.00**
52.50	134,144	66,494	259,099	**3.080**	**0.00**
53.00	136,475	67,655	326,754	**3.133**	**0.00**
53.50	138,824	68,825	395,579	**3.187**	**0.00**
54.00	141,191	70,004	465,582	**3.241**	**0.00**
54.50	143,576	71,192	536,774	**3.296**	**0.00**
55.00	145,979	72,389	609,163	**3.351**	**0.00**
55.50	148,400	73,595	682,758	**3.407**	**0.00**
56.00	150,839	74,810	757,567	**3.463**	**0.00**
56.50	153,296	76,034	833,601	**3.519**	**1.66**
57.00	155,771	77,267	910,868	**3.576**	**2.49**
57.50	158,264	78,509	989,377	**3.633**	**3.11**
58.00	160,775	79,760	1,069,136	**3.691**	**3.62**
58.50	163,304	81,020	1,150,156	**3.749**	**4.07**
59.00	165,851	82,289	1,232,445	**3.807**	**4.47**
59.50	168,416	83,567	1,316,012	**3.866**	**21.99**
60.00	170,999	84,854	1,400,865	**3.926**	**54.40**
60.50	173,600	86,150	1,487,015	**3.985**	**96.38**
61.00	176,219	87,455	1,574,470	**4.045**	**146.06**

See the bleeddown pipe and broad-crested weir calculations for the discharge amounts


Laydown_West_Pre

HMS * Summary of Results for

Laydown_West_Pre

Project : Seminole_Pond_4 Run Name : 25 yr Pre

Start of Run	: 01Jan07 0800	Basin Model	: Laydown_West_Pre
End of Run	: 02Jan07 0800	Met. Model	: 25 Year
Execution Time	: 30May06 1633	Control Specs	: Control 1

Computed Results

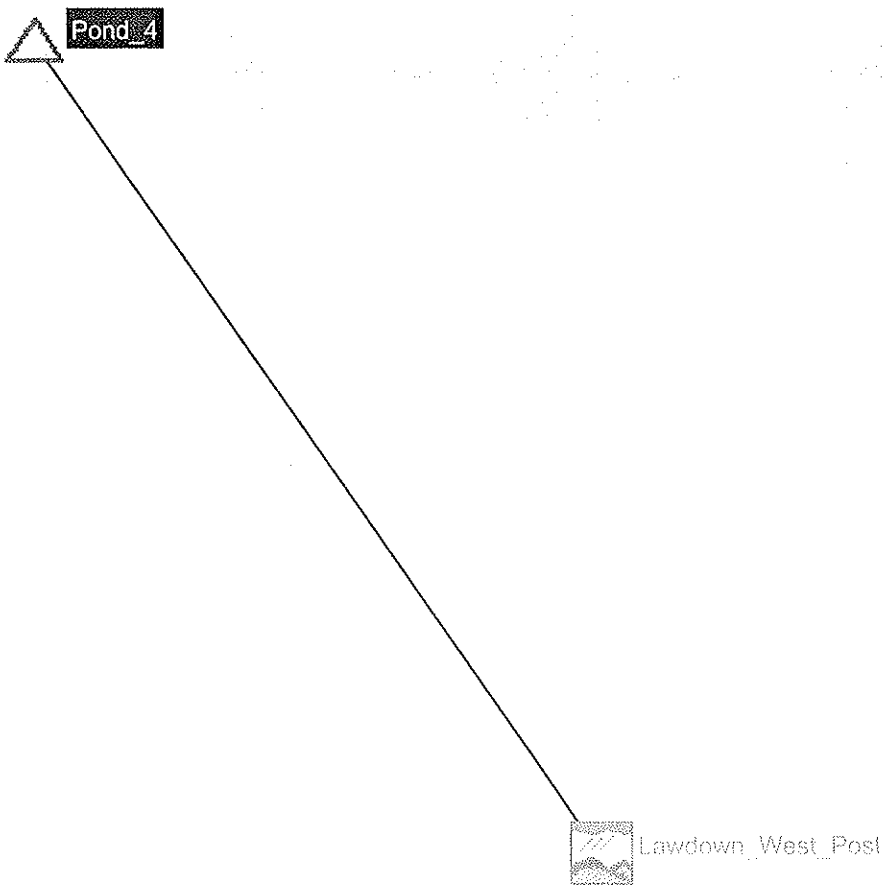
Peak Discharge	: 177.79 (cfs)	Date/Time of Peak Discharge	: 01 Jan 07 2048
Total Precipitation	: 8.00 (in)	Total Direct Runoff	: 6.47 (in)
Total Loss	: 1.48 (in)	Total Baseflow	: 0.00 (in)
Total Excess	: 6.52 (in)	Total Discharge	: 6.47 (in)

HMS * Summary of Results

Project : Seminole_Pond_4 Run Name : 25 yr Pre

Start of Run : 01Jan07 0800 Basin Model : Laydown_West_Pre
End of Run : 02Jan07 0800 Met. Model : 25 Year
Execution Time : 30May06 1633 Control Specs : Control 1

Hydrologic Element	Discharge Peak (cfs)	Time of Peak	Volume (ac ft)	Drainage Area (sq mi)
Laydown_West_Pre	177.79	01 Jan 07 2048	34.572	0.100


Pond_4
Lawdown_West_Post

HMS * Summary of Results for

Lawdown_West_Post

Project : Seminole_Pond_4 Run Name : 25 yr Post

Start of Run	: 01Jan07 0800	Basin Model	: Laydown_West_Post
End of Run	: 02Jan07 0800	Met. Model	: 25 Year
Execution Time	: 30May06 1638	Control Specs	: Control 1

Computed Results

Peak Discharge	: 247.95 (cfs)	Date/Time of Peak Discharge	: 01 Jan 07 2034
Total Precipitation	: 8.00 (in)	Total Direct Runoff	: 7.78 (in)
Total Loss	: 0.18 (in)	Total Baseflow	: 0.00 (in)
Total Excess	: 7.82 (in)	Total Discharge	: 7.78 (in)

HMS * Summary of Results for Pond_4

Project : Seminole_Pond_4 Run Name : 25 yr Post

Start of Run	: 01Jan07 0800	Basin Model	: Laydown_West_Post
End of Run	: 02Jan07 0800	Met. Model	: 25 Year
Execution Time	: 30May06 1638	Control Specs	: Control 1

Computed Results

Peak Inflow	: 247.95 (cfs)	Date/Time of Peak Inflow	: 01 Jan 07 2034
Peak Outflow	: 144.64 (cfs)	Date/Time of Peak Outflow	: 01 Jan 07 2102
Total Inflow	: 7.78 (in)	Peak Storage	: 36.086(acft)
Total Outflow	: 5.55 (in)	Peak Elevation	: 60.986(ft)

HMS * Summary of Results

Project : Seminole_Pond_4 Run Name : 25 yr Post

Start of Run : 01Jan07 0800 Basin Model : Laydown_West_Post
End of Run : 02Jan07 0800 Met. Model : 25 Year
Execution Time : 30May06 1638 Control Specs : Control 1

Hydrologic Element	Discharge Peak (cfs)	Time of Peak	Volume (ac ft)	Drainage Area (sq mi)
Lawdown_West_Post	247.95	01 Jan 07 2034	41.568	0.100
Pond_4	144.64	01 Jan 07 2102	29.634	0.100

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Project 39736 Date 5/18/06 Made By JCE

TIME OF CONCENTRATION CALCULATION Checked By

POND #4 Preliminary ✓ Final

THE LONGEST FLOW PATH IN THE DRAINAGE AREA → 2100'

THE AVERAGE SLOPE OF THE FLOW PATH IS:

$$\frac{17' \text{ OF DROP}}{2100'} \rightarrow 0.008 \text{ ft/ft}$$

CURVE NUMBER FOR THE AREA → 75 (PRE)
85 (POST)

THE TIME OF CONCENTRATION CAN BE DETERMINED USING THE SCS EQUATION:

$$t_c = 0.00526 \; L^{0.8} \left(\frac{1000}{CN} - 9\right)^{0.7} S^{-0.5}$$

THE LAG TIME = $t_L = 0.6\, t_c$

PRE - CONSTRUCTION

$t_c = 0.00526\,(2100)^{0.8}\left(\frac{1000}{75} - 9\right)^{0.7} 0.008^{-0.5}$

$t_c = 75$ min

$t_L = 0.6\, t_c = 45$ min

POST - CONSTRUCTION

$t_c = 0.00526\,(2100)^{0.8}\left(\frac{1000}{85} - 9\right)^{0.7} 0.008^{-0.5}$

$t_c = 55$ min

$t_L = 0.6\, t_c = 33$ min

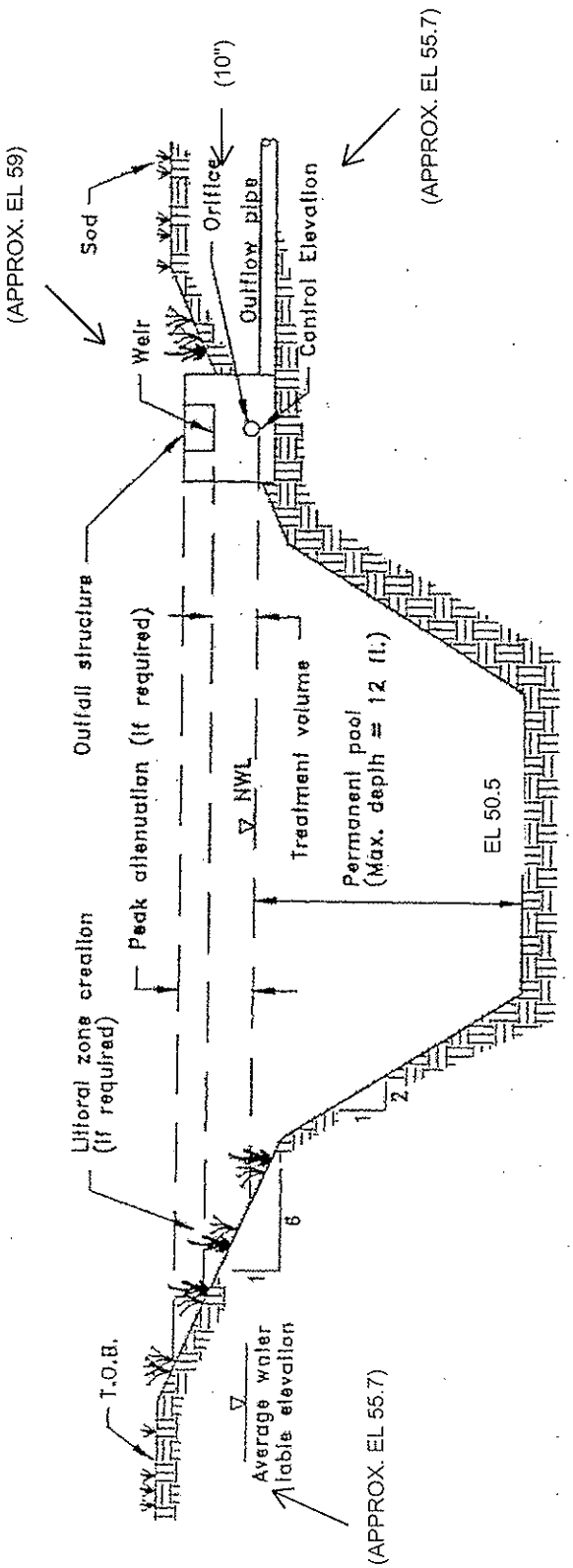


Figure 14-1. Wet detention (N.T.S.)

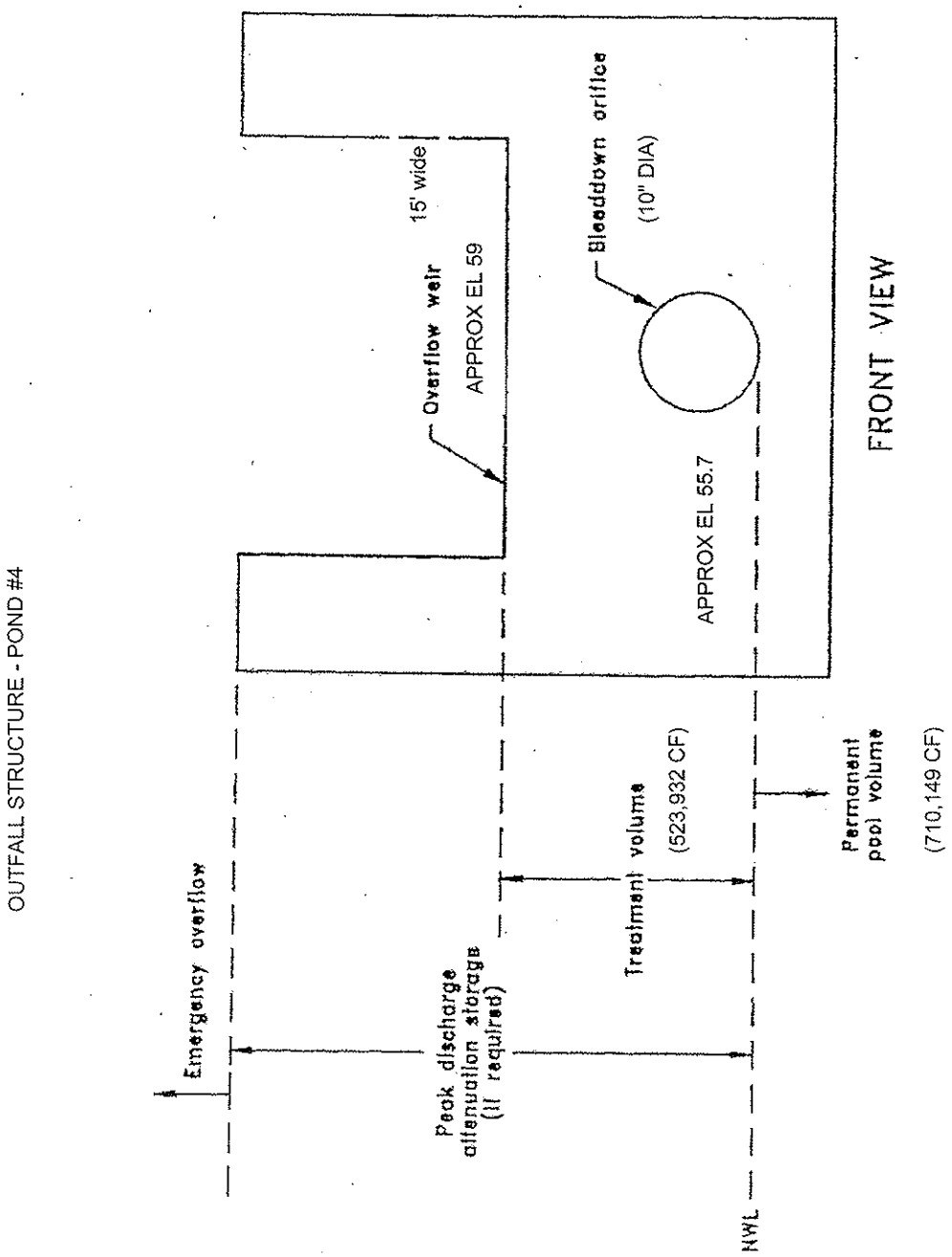


Figure 14-2. Typical wet detention outfall structure (N.T.S.)

OUTLET DETAIL - POND #4

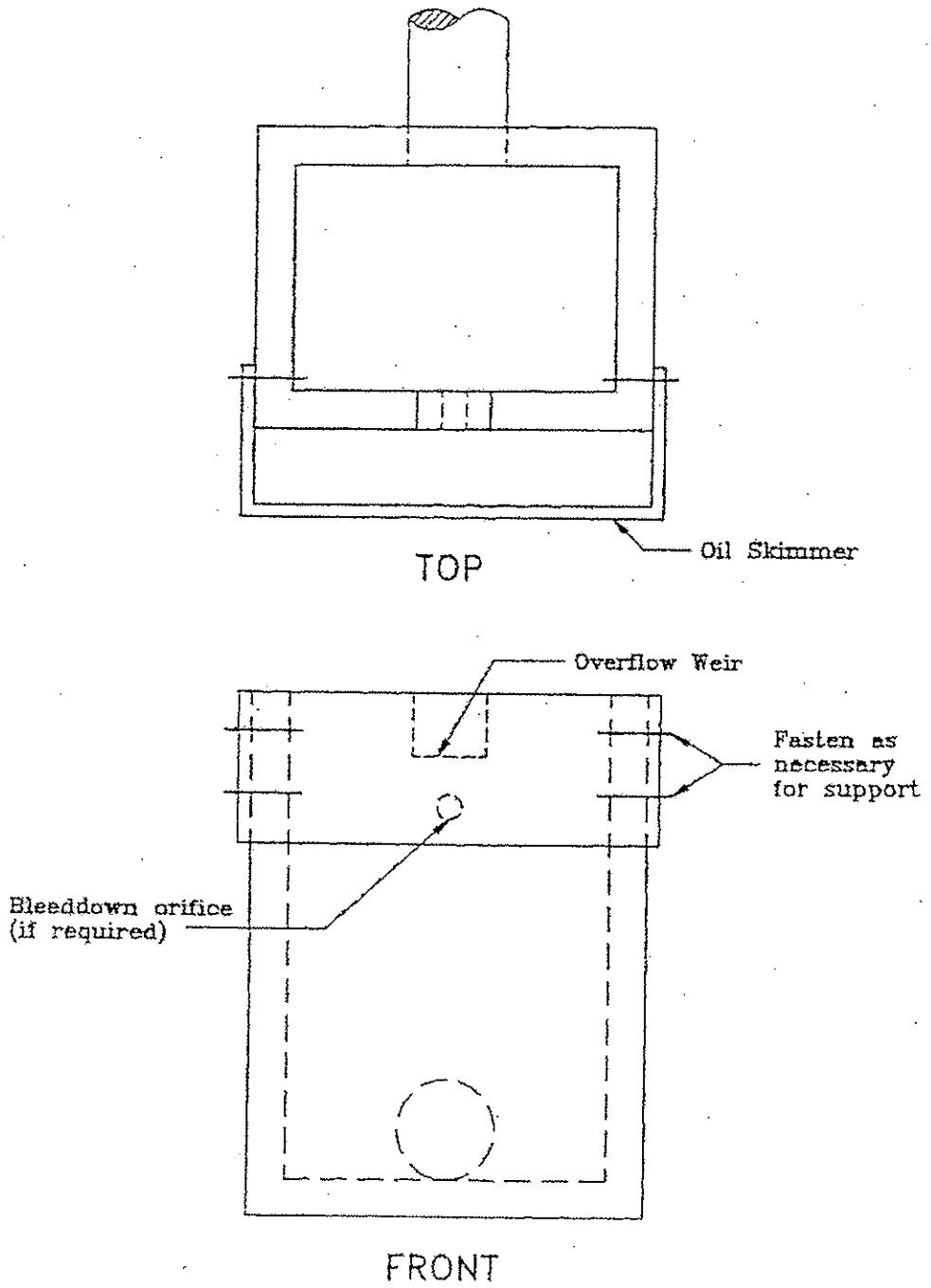


Figure 9-1. Oil skimmer detail for a typical outfall structure (N.T.S.)

Table 24-1. Runoff Coefficients (*C*) for a Design Storm Return Period of Ten Years or Less[1]

Slope	Land Use	Sandy Soils Min.	Sandy Soils Max.	Clay Soils Min.	Clay Soils Max.
Flat (0-2%)	Lawns	0.05	0.10	0.13	0.17
	Rooftops and pavement	0.95	0.95	0.95	0.95
	Pervious pavements[2]	0.75	0.95	0.90	0.95
	Woodlands	0.10	0.15	0.15	0.20
	Pasture, grass, and farmland[3]	0.15	0.20	0.20	0.25
	Residential				
	SFR: 1/2 acre lots and larger	0.30	0.35	0.35	0.45
	SFR: smaller lots and duplexes	0.35	0.45	0.40	0.50
	MFR: apartments, condominiums	0.45	0.60	0.50	0.70
	Commercial and Industrial	0.50	0.95	0.50	0.95
Rolling (2-7%)	Lawns	0.10	0.15	0.18	0.22
	Rooftops and pavements	0.95	0.95	0.95	0.95
	Pervious pavements[2]	0.80	0.95	0.90	0.95
	Woodlands	0.15	0.20	0.20	0.25
	Pasture, grass, and farmland[3]	0.20	0.25	0.25	0.30
	Residential				
	SFR: 1/2 acre lots and larger	0.35	0.50	0.40	0.55
	SFR: smaller lots and duplexes	0.40	0.55	0.45	0.60
	MFR: apartments, condominiums	0.50	0.70	0.60	0.80
	Commercial and Industrial	0.50	0.95	0.60	0.95
Steep (>7%)	Lawns	0.15	0.20	0.25	0.35
	Rooftops and pavements	0.95	0.95	0.95	0.95
	Pervious pavements[2]	0.85	0.95	0.90	0.95
	Woodlands	0.20	0.25	0.25	0.30
	Pasture, grass, and farmland[3]	0.25	0.35	0.30	0.40
	Residential				
	SFR: 1/2 acre lots and larger	0.40	0.55	0.50	0.65
	SFR: smaller lots and duplexes	0.45	0.60	0.55	0.70
	MFR: apartments, condominiums	0.60	0.75	0.65	0.85
	Commercial and Industrial	0.60	0.95	0.65	0.95

Sources: Florida Department of Transportation, 1987; Wanielista, 1990

[1]For 25- to 100-yr recurrence intervals, multiply coefficient by 1.1 and 1.25, respectively, and the product cannot exceed 1.0.

[2]Coefficients assume good ground cover and conservation treatment.

[3]Depends on depth and degree of permeability of underlying strata.

Note: SFR = Single Family Residential;
MFR = Multi-Family Residential

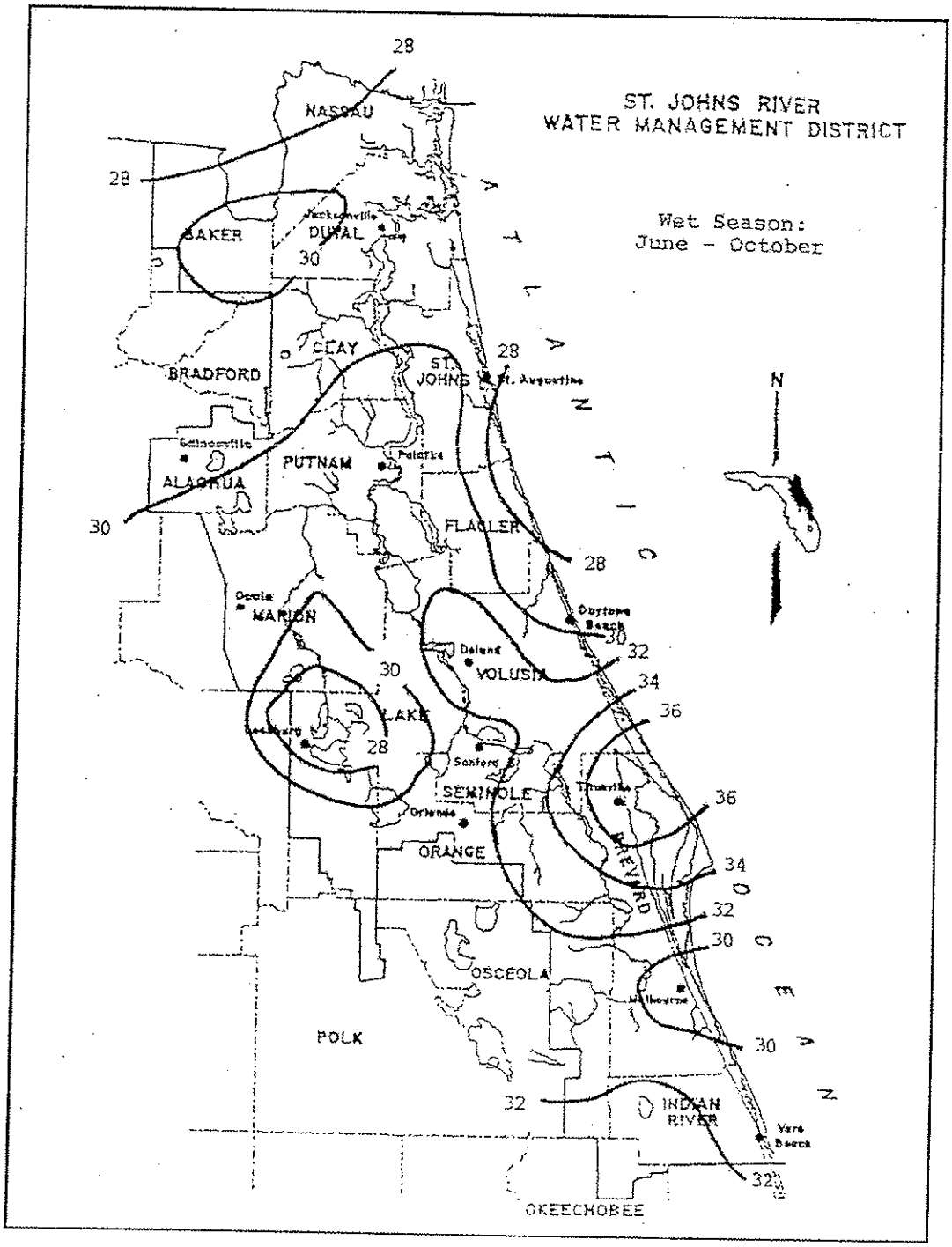


Figure 29-1. Wet Season Normal Rainfall, inches (Source: Rao, et al., 1990)

Seminole Electric Cooperative, Inc.
Seminole Generation Station - Unit 3
B&McD Project No. 39736
Entrance Road Swales - Design Notes and Calculations

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Seminole Electric – Entrance Road Swales - Design Summary

Seven new swales are being added between the two sections of the entrance road (see the attached site drainage plan). The eastern two lanes of the road are existing and the western two lanes will be added to support the additional traffic from Unit 3. Currently, the stormwater from the centerline of the existing road and west to the railroad tracks contributes to the existing ditch system, which discharges into the wetlands north of the intersection with US Hwy 17. There is also an area west of that railroad track that contributes; however, no modifications are being made in that area. After the two new lanes are constructed, the stormwater between the existing and new lanes will be routed through the new swales. The swales will have 12" culverts that will drain into the existing ditch system west of the entrance road, where the flow will be combined with the runoff from the remaining area. The new swales will also have overflow weirs equipped with 6" bleeddown pipes that will reduce the peak runoff rate and promote additional infiltration of the runoff from the entrance road modifications.

Based on the attached calculations, the new swales provide sufficient treatment of the runoff after the modifications are made along the plant entrance road. Per the St. Johns River Water Management District (SJRWMD) Regulations, the swales must provide percolation of at least 80% of the runoff from the 3-year 1-hour storm.

Using HEC-HMS (Hydraulic Modeling Software), the 25 year storm was modeled for pre and post-construction conditions. For the pre-construction condition, the impervious area of the east ditch was determined to be 15%. For the post-construction condition, the impervious area was determined to be 25% for the area contributing to the existing ditch and 55% for the area contributing to the new swales. The model shows that for the 25 year event, the post-construction peak outflow is less than the pre-construction peak outflow.

	Required Percolation Volume	Volume of Water Infiltrated
Swale #1	4,954 ft^3	6,640 ft^3
Swale #2	2,218 ft^3	2,919 ft^3
Swale #3	1,843 ft^3	2,602 ft^3
Swale #4	1,814 ft^3	2,554 ft^3
Swale #5A	2,362 ft^3	3,611 ft^3
Swale #5B	2,390 ft^3	3,503 ft^3
Swale #6	5,270 ft^3	5,428 ft^3

	Pre-Construction	Post-Construction
Storm Return Period	25 year	25 year
Storm Duration	24 hours	24 hours
Peak Discharge (ft^3/s)	12.68	12.32
Volume of Runoff (acre-ft)	3.53	3.68

Industrial Development Drainage Area		48,769	SF
		1.12	Acres
Impervious Area	55%	26,823	SF
		0.62	Acres
Offsite Drainage Area		0	Acres

Assumptions:

C = 0.59 (Table 24-1)

T_C = 33 min based on CN = 68 S = 0.6% L = 944

New trapezoidal swale with:

3:1 Side slopes 8' Flat Bottom

f = 0.3

k_{vs} = 48 ft/day

F.S. = 2

Swale Bottom Elevation = 68 ft

Seasonal High Ground Water Elevation = 66 ft

h_b = 2 ft

Step 1: Determine Q_P and V_R

For swales discharging to Class III waters, the rule requires percolation of 80% of the runoff from the 3-year, 1-hour storm

From the FDOT IDF Curve, for Zone 5 (Palatka), the average intensity for the 3-year 1-hour storm is: 2.6 in/hr

The sustained peak runoff rate is determined from Eqn 30-2:

$Q_P = C(I_D)(A)$ = 1.72 cfs

The volume of runoff is found by utilizing Eqn 30-4:

$V_R = Q_P * D$ = 6,192 CF

Step 2: Determine the swale dimensions:

From Figure 30-2 and based on the assumptions above:

Z = 3
b = 8

Use Figures 30-3 and Table 30-2 to determine Manning's n:

Based on an mowed stand of Bermuda (6") → Retardance class C
Using approx. VR = 0.2
n = 0.27

To solve for normal depth, d, rearrange Eqn 30-14 to give:

$R^{2/3}A = Qn/1.49S^{1/2}$

$R^{2/3}A$ = 4.02

Trial #1: d = 1

A = 11 SF
R = 0.77 ft
$R^{2/3}A$ = 9.24

Trial #2: d = 0.5

A = 4.75 SF
R = 0.43 ft
$R^{2/3}A$ = 2.71

Trial #3: d = 0.63

A = 6.23 SF
R = 0.52 ft
$R^{2/3}A$ = 4.03

Determine the wetted perimeter (P) and total infiltration area (A_b):

d = 0.63 → P = 12 ft

$A_b = L*P$ = 11,328 SF

Step 3: Check for lateral saturated infiltration:

Volume infiltrated (V_u) during unsaturated vertical flow is determined using Eqn 26-3:

$V_u = A_b(f)(h_b) =$ 6,797 CF

$V_u > V_R \rightarrow$ Infiltration will occur entirely under vertical unsaturated flow conditions; therefore, analysis of lateral saturated infiltration is not required

Step 4: Calculate the peak infiltration flow rate (Qi_P):

The unsaturated vertical conductivity (K_{vu}) is found using Eqn 26-11:

$K_{vu} = 2*K_{vs}/3 =$ 16.00 in/hr

From Eqn 30-5, the design infiltration rate (I_d) is:

$I_d = K_{vu} / FS =$ 8.00 in/hr

The peak infiltration rate is determined by Eqn 30-7:

$Qi_P = I_d*A_b =$ 125.87 CF/min

$=$ 2.1 cfs

Step 5: Calculate the volume of water infiltrated (V_I) and compare to the required infiltration volume:

From Eqn 30-12, the volume of water infiltrated is:

$V_I =$ 6,640 CF

$0.8*V_R =$ 4,954 CF

$V_I > 0.8*V_R \rightarrow$ **Design is adequate**

Step 6: Calculate the velocity in the swale and compare with permissible values:

From Eqn 30-13, the velocity in the swale is:

$V = 1.49/n*R^{2/3}*S^{1/2}$

$V =$ 0.28 fps

From Table 30-1, the maximum permissible velocity for the swale is approximately 6 fps; therefore, the velocity in the swale will be non-erosive

Industrial Development Drainage Area		21,908	SF
		0.50	Acres
Impervious Area	55%	12,049	SF
		0.28	Acres
Offsite Drainage Area		0	Acres

Assumptions:

C = 0.59 (Table 24-1)

T_C = 32 min based on CN = 68 S = 0.2% L = 410

New trapezoidal swale with:

3:1 Side slopes

8' Flat bottom

f = 0.3

k_{vs} = 48 ft/day

F.S. = 2

Swale Bottom Elevation = 67 ft

Seasonal High Ground Water Elevation = 65 ft

h_b = 2 ft

Step 1: Determine Q_P and V_R

For swales discharging to Class III waters, the rule requires percolation of 80% of the runoff from the 3-year, 1-hour storm

From the FDOT IDF Curve, for Zone 5 (Palatka), the average intensity for the 3-year 1-hour storm is: 2.6 in/hr

The sustained peak runoff rate is determined from Eqn 30-2:

$Q_P = C(I_D)(A)$ = 0.77 cfs

The volume of runoff is found by utilizing Eqn 30-4:

$V_R = Q_P{*}D$ = 2,772 CF

Step 2: Determine the swale dimensions:

From Figure 30-2 and based on the assumptions above:

Z = 3
b = 8

Use Figures 30-3 and Table 30-2 to determine Manning's n:

Based on an mowed stand of Bermuda (6") → Retardance class C
Using approx. VR = 0.2
n = 0.27

To solve for normal depth, d, rearrange Eqn 30-14 to give:

$R^{2/3}A = Qn/1.49S^{1/2}$

$R^{2/3}A$ = 3.12

Trial #1: d = 1

A = 11 SF
R = 0.77 ft
$R^{2/3}A$ = 9.24

Trial #2: d = 0.5

A = 4.75 SF
R = 0.43 ft
$R^{2/3}A$ = 2.71

Trial #3: d = 0.55

A = 5.31 SF
R = 0.46 ft
$R^{2/3}A$ = 3.16

Determine the wetted perimeter (P) and total infiltration area (A_b):

d = 0.55 → P = 11.5 ft

$A_b = L*P$ = 4,715 SF

Step 3: Check for lateral saturated infiltration:

Volume infiltrated (V_u) during unsaturated vertical flow is determined using Eqn 26-3:

$V_u = A_b(f)(h_b) =$ 2,829 CF

$V_u > V_R \rightarrow$ Infiltration will occur entirely under vertical unsaturated flow conditions; therefore, analysis of lateral saturated infiltration is not required

Step 4: Calculate the peak infiltration flow rate (Qi_P):

The unsaturated vertical conductivity (K_{vu}) is found using Eqn 26-11:

$K_{vu} = 2*K_{vs}/3 =$ 16.00 in/hr

From Eqn 30-5, the design infiltration rate (I_d) is:

$I_d = K_{vu} / FS =$ 8.00 in/hr

The peak infiltration rate is determined by Eqn 30-7:

$Qi_P = I_d*A_b =$ 52.39 CF/min
$=$ 0.87 cfs

Step 5: Calculate the volume of water infiltrated (V_I) and compare to the required infiltration volume:

From Eqn 30-12, the volume of water infiltrated is:

$V_I =$ 2,919 CF

$0.8*V_R =$ 2,218 CF

$V_I > 0.8*V_R \rightarrow$ **Design is adequate**

Step 6: Calculate the velocity in the swale and compare with permissible values:

From Eqn 30-13, the velocity in the swale is:

$V = 1.49/n*R^{2/3}*S^{1/2}$

$V =$ 0.15 fps

From Table 30-1, the maximum permissible velocity for the swale is approximately 6 fps; therefore, the velocity in the swale will be non-erosive

Industrial Development Drainage Area		18,102	SF
		0.42	Acres
Impervious Area	55%	9,956	SF
		0.23	Acres
Offsite Drainage Area		0	Acres

Assumptions:

C = 0.59 (Table 24-1)

T_C = 27 min based on CN = 68 S = 0.3% L = 390

New trapezoidal swale with:

3:1 Side slopes 8' Flat Bottom

f = 0.3

k_{vs} = 75 ft/day

F.S. = 2

Swale Bottom Elevation = 67 ft

Seasonal High Ground Water Elevation = 63 ft

h_b = 4 ft

Step 1: Determine Q_P and V_R

For swales discharging to Class III waters, the rule requires percolation of 80% of the runoff from the 3-year, 1-hour storm

From the FDOT IDF Curve, for Zone 5 (Palatka), the average intensity for the 3-year 1-hour storm is: 2.6 in/hr

The sustained peak runoff rate is determined from Eqn 30-2:

$Q_P = C(I_D)(A)$ = 0.64 cfs

The volume of runoff is found by utilizing Eqn 30-4:

$V_R = Q_P{*}D$ = 2,304 CF

Step 2: Determine the swale dimensions:

From Figure 30-2 and based on the assumptions above:

Z = 3
b = 8

Use Figures 30-3 and Table 30-2 to determine Manning's n:

Based on an mowed stand of Bermuda (6") → Retardance class C
Using approx. VR = 0.2
n = 0.27

To solve for normal depth, d, rearrange Eqn 30-14 to give:

$R^{2/3}A = Qn/1.49S^{1/2}$

$R^{2/3}A$ = 2.12

Trial #1: d = 1

A = 11 SF
R = 0.77 ft
$R^{2/3}A$ = 9.24

Trial #2: d = 0.5

A = 4.75 SF
R = 0.43 ft
$R^{2/3}A$ = 2.71

Trial #3: d = 0.44

A = 4.1 SF
R = 0.38 ft
$R^{2/3}A$ = 2.15

Determine the wetted perimeter (P) and total infiltration area (A_b):

d = 0.44 → P = 10.8 ft

$A_b = L*P$ = 4,212 SF

Step 3: Check for lateral saturated infiltration:

Volume infiltrated (V_u) during unsaturated vertical flow is determined using Eqn 26-3:

$V_u = A_b(f)(h_b) =$ 5,054 CF

$V_u > V_R \rightarrow$ Infiltration will occur entirely under vertical unsaturated flow conditions; therefore, analysis of lateral saturated infiltration is not required

Step 4: Calculate the peak infiltration flow rate (Qi_P):

The unsaturated vertical conductivity (K_{vu}) is found using Eqn 26-11:

$K_{vu} = 2*K_{vs}/3 =$ 25.00 in/hr

From Eqn 30-5, the design infiltration rate (I_d) is:

$I_d = K_{vu} / FS =$ 12.50 in/hr

The peak infiltration rate is determined by Eqn 30-7:

$Qi_P = I_d*A_b =$ 73.13 CF/min

$=$ 1.22 cfs

Step 5: Calculate the volume of water infiltrated (V_I) and compare to the required infiltration volume:

From Eqn 30-12, the volume of water infiltrated is:

$V_I =$ 2,602 CF

$0.8*V_R =$ 1,843 CF

$V_I > 0.8*V_R \rightarrow$ **Design is adequate**

Step 6: Calculate the velocity in the swale and compare with permissible values:

From Eqn 30-13, the velocity in the swale is:

$V = 1.49/n*R^{2/3}*S^{1/2}$

$V =$ 0.16 fps

From Table 30-1, the maximum permissible velocity for the swale is approximately 6 fps; therefore, the velocity in the swale will be non-erosive

Industrial Development Drainage Area		17,964	SF
		0.41	Acres
Impervious Area	55%	9,880	SF
		0.23	Acres
Offsite Drainage Area		0	Acres

Assumptions:

C = 0.59 (Table 24-1)

T_C = 27 min based on CN = 68 S = 0.3% L = 390

New trapezoidal swale with:

3:1 Side slopes 8' Flat Bottom

f = 0.3

k_{vs} = 75 ft/day

F.S. = 2

Swale Bottom Elevation = 66 ft

Seasonal High Ground Water Elevation = 62 ft

h_b = 4 ft

Step 1: Determine Q_P and V_R

For swales discharging to Class III waters, the rule requires percolation of 80% of the runoff from the 3-year, 1-hour storm

From the FDOT IDF Curve, for Zone 5 (Palatka), the average intensity for the 3-year 1-hour storm is: 2.6 in/hr

The sustained peak runoff rate is determined from Eqn 30-2:

$Q_P = C(I_D)(A)$ = 0.63 cfs

The volume of runoff is found by utilizing Eqn 30-4:

$V_R = Q_P{*}D$ = 2,268 CF

Step 2: Determine the swale dimensions:

From Figure 30-2 and based on the assumptions above:

Z = 3
b = 8

Use Figures 30-3 and Table 30-2 to determine Manning's n:

Based on an mowed stand of Bermuda (6") → Retardance class C
Using approx. VR = 0.2
n = 0.27

To solve for normal depth, d, rearrange Eqn 30-14 to give:

$R^{2/3}A = Qn/1.49S^{1/2}$

$R^{2/3}A$ = 2.08

Trial #1: d = 1

A = 11 SF
R = 0.77 ft
$R^{2/3}A$ = 9.24

Trial #2: d = 0.5

A = 4.75 SF
R = 0.43 ft
$R^{2/3}A$ = 2.71

Trial #3: d = 0.43

A = 3.99 SF
R = 0.37 ft
$R^{2/3}A$ = 2.06

Determine the wetted perimeter (P) and total infiltration area (A_b):

d = 0.43 → P = 10.7 ft

$A_b = L*P$ = 4,173 SF

Step 3: Check for lateral saturated infiltration:

Volume infiltrated (V_u) during unsaturated vertical flow is determined using Eqn 26-3:

$V_u = A_b(f)(h_b) =$ 5,008 CF

$V_u > V_R \rightarrow$ Infiltration will occur entirely under vertical unsaturated flow conditions; therefore, analysis of lateral saturated infiltration is not required

Step 4: Calculate the peak infiltration flow rate (Qi_P):

The unsaturated vertical conductivity (K_{vu}) is found using Eqn 26-11:

$K_{vu} = 2*K_{vs}/3 =$ 25.00 in/hr

From Eqn 30-5, the design infiltration rate (I_d) is:

$I_d = K_{vu} / FS =$ 12.50 in/hr

The peak infiltration rate is determined by Eqn 30-7:

$Qi_P = I_d*A_b =$ 72.45 CF/min
$=$ 1.21 cfs

Step 5: Calculate the volume of water infiltrated (V_I) and compare to the required infiltration volume:

From Eqn 30-12, the volume of water infiltrated is:

$V_I =$ 2,554 CF

$0.8*V_R =$ 1,814 CF

$V_I > 0.8*V_R \rightarrow$ **Design is adequate**

Step 6: Calculate the velocity in the swale and compare with permissible values:

From Eqn 30-13, the velocity in the swale is:

$V = 1.49/n*R^{2/3}*S^{1/2}$

$V =$ 0.16 fps

From Table 30-1, the maximum permissible velocity for the swale is approximately 6 fps; therefore, the velocity in the swale will be non-erosive

Industrial Development Drainage Area		23,266	SF
		0.53	Acres
Impervious Area	55%	12,796	SF
		0.29	Acres
Offsite Drainage Area		0	Acres

Assumptions:

C = 0.59 (Table 24-1)

T_C = 24 min based on CN = 68 S = 0.6% L = 505

New trapezoidal swale with:

3:1 Side slopes 8' Flat Bottom

f = 0.3

k_{vs} = 72 ft/day

F.S. = 2

Swale Bottom Elevation = 65 ft

Seasonal High Ground Water Elevation = 62 ft

h_b = 3 ft

Step 1: Determine Q_P and V_R

For swales discharging to Class III waters, the rule requires percolation of 80% of the runoff from the 3-year, 1-hour storm

From the FDOT IDF Curve, for Zone 5 (Palatka), the average intensity for the 3-year 1-hour storm is: 2.6 in/hr

The sustained peak runoff rate is determined from Eqn 30-2:

$Q_P = C(I_D)(A)$ = 0.82 cfs

The volume of runoff is found by utilizing Eqn 30-4:

$V_R = Q_P{*}D$ = 2,952 CF

Step 2: Determine the swale dimensions:

From Figure 30-2 and based on the assumptions above:

Z = 3
b = 8

Use Figures 30-3 and Table 30-2 to determine Manning's n:

Based on an mowed stand of Bermuda (6") → Retardance class C
Using approx. VR = 0.2
n = 0.27

To solve for normal depth, d, rearrange Eqn 30-14 to give:

$R^{2/3}A = Qn/1.49S^{1/2}$

$R^{2/3}A$ = 1.92

Trial #1: d = 0.5

A = 4.75 SF
R = 0.43 ft
$R^{2/3}A$ = 2.71

Trial #2: d = 0.4

A = 3.68 SF
R = 0.35 ft
$R^{2/3}A$ = 1.83

Trial #3: d = 0.41

A = 3.78 SF
R = 0.36 ft
$R^{2/3}A$ = 1.91

Determine the wetted perimeter (P) and total infiltration area (A_b):

d = 0.41 → P = 10.6 ft

$A_b = L*P$ = 5,353 SF

Step 3: Check for lateral saturated infiltration:

Volume infiltrated (V_u) during unsaturated vertical flow is determined using Eqn 26-3:

$V_u = A_b(f)(h_b) =$ 4,818 CF

$V_u > V_R \rightarrow$ Infiltration will occur entirely under vertical unsaturated flow conditions; therefore, analysis of lateral saturated infiltration is not required

Step 4: Calculate the peak infiltration flow rate (Qi_P):

The unsaturated vertical conductivity (K_{vu}) is found using Eqn 26-11:

$K_{vu} = 2*K_{vs}/3 =$ 24.00 in/hr

From Eqn 30-5, the design infiltration rate (I_d) is:

$I_d = K_{vu} / FS =$ 12.00 in/hr

The peak infiltration rate is determined by Eqn 30-7:

$Qi_P = I_d*A_b =$ 89.22 CF/min
$=$ 1.49 cfs

Step 5: Calculate the volume of water infiltrated (V_I) and compare to the required infiltration volume:

From Eqn 30-12, the volume of water infiltrated is:

$V_I =$ 3,611 CF

$0.8*V_R =$ 2,362 CF

$V_I > 0.8*V_R \rightarrow$ **Design is adequate**

Step 6: Calculate the velocity in the swale and compare with permissible values:

From Eqn 30-13, the velocity in the swale is:

$V = 1.49/n*R^{2/3}*S^{1/2}$

$V =$ 0.22 fps

From Table 30-1, the maximum permissible velocity for the swale is approximately 6 fps; therefore, the velocity in the swale will be non-erosive

Industrial Development Drainage Area		23,473	SF
		0.54	Acres
Impervious Area	55%	12,910	SF
		0.30	Acres
Offsite Drainage Area		0	Acres

Assumptions:

C = 0.59 (Table 24-1)

T_C = 26 min based on CN = 68 S = 0.5% L = 505

New trapezoidal swale with:

3:1 Side slopes 8' Flat Bottom

f = 0.3

k_{vs} = 72 ft/day

F.S. = 2

Swale Bottom Elevation = 64 ft

Seasonal High Ground Water Elevation = 61 ft

h_b = 3 ft

Step 1: Determine Q_P and V_R

For swales discharging to Class III waters, the rule requires percolation of 80% of the runoff from the 3-year, 1-hour storm

From the FDOT IDF Curve, for Zone 5 (Palatka), the average intensity for the 3-year 1-hour storm is: 2.6 in/hr

The sustained peak runoff rate is determined from Eqn 30-2:

$Q_P = C(I_D)(A)$ = 0.83 cfs

The volume of runoff is found by utilizing Eqn 30-4:

$V_R = Q_P{*}D$ = 2,988 CF

Step 2: Determine the swale dimensions:

From Figure 30-2 and based on the assumptions above:

Z = 3
b = 8

Use Figures 30-3 and Table 30-2 to determine Manning's n:

Based on an mowed stand of Bermuda (6") → Retardance class C
Using approx. VR = 0.2
n = 0.27

To solve for normal depth, d, rearrange Eqn 30-14 to give:

$R^{2/3}A = Qn/1.49S^{1/2}$

$R^{2/3}A$ = 2.13

Trial #1: d = 0.5

A = 4.75 SF
R = 0.43 ft
$R^{2/3}A$ = 2.71

Trial #2: d = 0.4

A = 3.68 SF
R = 0.35 ft
$R^{2/3}A$ = 1.83

Trial #3: d = 0.44

A = 4.1 SF
R = 0.38 ft
$R^{2/3}A$ = 2.15

Determine the wetted perimeter (P) and total infiltration area (A_b):

d = 0.44 → P = 10.8 ft

$A_b = L*P$ = 5,454 SF

Step 3: Check for lateral saturated infiltration:

Volume infiltrated (V_u) during unsaturated vertical flow is determined using Eqn 26-3:

$V_u = A_b(f)(h_b) =$ 4,909 CF

$V_u > V_R \rightarrow$ Infiltration will occur entirely under vertical unsaturated flow conditions; therefore, analysis of lateral saturated infiltration is not required

Step 4: Calculate the peak infiltration flow rate (Qi_P):

The unsaturated vertical conductivity (K_{vu}) is found using Eqn 26-11:

$K_{vu} = 2*K_{vs}/3 =$ 24.00 in/hr

From Eqn 30-5, the design infiltration rate (I_d) is:

$I_d = K_{vu} / FS =$ 12.00 in/hr

The peak infiltration rate is determined by Eqn 30-7:

$Qi_P = I_d*A_b =$ 90.9 CF/min
$=$ 1.52 cfs

Step 5: Calculate the volume of water infiltrated (V_I) and compare to the required infiltration volume:

From Eqn 30-12, the volume of water infiltrated is:

$V_I =$ 3,503 CF

$0.8*V_R =$ 2,390 CF

$V_I > 0.8*V_R \rightarrow$ **Design is adequate**

Step 6: Calculate the velocity in the swale and compare with permissible values:

From Eqn 30-13, the velocity in the swale is:

$V = 1.49/n*R^{2/3}*S^{1/2}$

$V =$ 0.2 fps

From Table 30-1, the maximum permissible velocity for the swale is approximately 6 fps; therefore, the velocity in the swale will be non-erosive

Industrial Development Drainage Area		52,043	SF
		1.19	Acres
Impervious Area	55%	28,624	SF
		0.66	Acres
Offsite Drainage Area		0	Acres

Assumptions:

C = 0.59 (Table 24-1)

T_C = 39 min based on CN = 68 S = 0.4% L = 970

New trapezoidal swale with:

3:1 Side slopes 8' Flat Bottom

f = 0.3

k_{vs} = 72 ft/day

F.S. = 2

Swale Bottom Elevation = 59 ft

Seasonal High Ground Water Elevation = 56 ft

h_b = 3 ft

Step 1: Determine Q_P and V_R

For swales discharging to Class III waters, the rule requires percolation of 80% of the runoff from the 3-year, 1-hour storm

From the FDOT IDF Curve, for Zone 5 (Palatka), the average intensity for the 3-year 1-hour storm is: 2.6 in/hr

The sustained peak runoff rate is determined from Eqn 30-2:

$Q_P = C(I_D)(A) =$ 1.83 cfs

The volume of runoff is found by utilizing Eqn 30-4:

$V_R = Q_P{*}D =$ 6,588 CF

Step 2: Determine the swale dimensions:

From Figure 30-2 and based on the assumptions above:

Z = 3
b = 8

Use Figures 30-3 and Table 30-2 to determine Manning's n:

Based on an mowed stand of Bermuda (6") → Retardance class C
Using approx. VR = 0.2
n = 0.27

To solve for normal depth, d, rearrange Eqn 30-14 to give:

$R^{2/3}A = Qn/1.49S^{1/2}$

$R^{2/3}A$ = 5.24

Trial #1: d = 1

A = 11 SF
R = 0.77 ft
$R^{2/3}A$ = 9.24

Trial #2: d = 0.5

A = 4.75 SF
R = 0.43 ft
$R^{2/3}A$ = 2.71

Trial #3: d = 0.73

A = 7.44 SF
R = 0.59 ft
$R^{2/3}A$ = 5.23

Determine the wetted perimeter (P) and total infiltration area (A_b):

d = 0.73 → P = 12.6 ft

$A_b = L*P$ = 12,222 SF

Step 3: Check for lateral saturated infiltration:

Volume infiltrated (V_u) during unsaturated vertical flow is determined using Eqn 26-3:

$V_u = A_b(f)(h_b) =$ 11,000 CF

$V_u > V_R \rightarrow$ Infiltration will occur entirely under vertical unsaturated flow conditions; therefore, analysis of lateral saturated infiltration is not required

Step 4: Calculate the peak infiltration flow rate (Qi_P):

The unsaturated vertical conductivity (K_{vu}) is found using Eqn 26-11:

$K_{vu} = 2*K_{vs}/3 =$ 24.00 in/hr

From Eqn 30-5, the design infiltration rate (I_d) is:

$I_d = K_{vu} / FS =$ 12.00 in/hr

The peak infiltration rate is determined by Eqn 30-7:

$Qi_P = I_d*A_b =$ 203.7 CF/min
$=$ 3.4 cfs

Step 5: Calculate the volume of water infiltrated (V_I) and compare to the required infiltration volume:

From Eqn 30-12, the volume of water infiltrated is:

$V_I =$ 5,428 CF

$0.8*V_R =$ 5,270 CF

$V_I > 0.8*V_R \rightarrow$ **Design is adequate**

Step 6: Calculate the velocity in the swale and compare with permissible values:

From Eqn 30-13, the velocity in the swale is:

$V = 1.49/n*R^{2/3}*S^{1/2}$

$V =$ 0.25 fps

From Table 30-1, the maximum permissible velocity for the swale is approximately 6 fps; therefore, the velocity in the swale will be non-erosive

HEC-HMS Palatka Area Meteorological Model

25 year - 24 hour storm

Exceedance Probability	4% (25 year)
Max Intensity Duration	5 min
Storm Distribution	24 hour
Peak Center	50%

Duration min	Duration hr	Depth * inches	Intensity Inches/Hr
5	0.08	1	12.00
15	0.25	2	8.00
60	1.00	3.4	3.40
120	2.00	4.3	2.15
180	3.00	5	1.67
360	6.00	6	1.00
720	12.00	7.2	0.60
1440	24.00	8	0.33

* Source TP-40

HEC-HMS Seminole Pre-Construction Input
Existing Ditch System

Western Ditch

	Impervious Area	Remaining Area	Total Area			
Method			SCS Curve No.			
Area (sq. mi.)	0.0009	0.0053	0.0062			
Initial Loss (in)			2.21			
% Impervious	100	0	15			
SCS Curve No.	90	40	48		Drop	Length
SCS Lag (min)			59	based on	5	1825
			No Baseflow			

Eastern Ditch

	Impervious Area	Remaining Area	Total Area			
Method			SCS Curve No.			
Area (sq. mi.)	0.0026	0.0145	0.0170			
Initial Loss (in)			2.21			
% Impervious	100	0	15			
SCS Curve No.	90	40	48		Drop	Length
SCS Lag (min)			75	based on	23	4500
			No Baseflow			

HEC-HMS Seminole Post-Construction Input
Existing Ditch System

West Ditch

	Impervious Area	Remaining Area	Total Area			
Method			SCS Curve No.			
Area (sq. mi.)	0.0009	0.0053	0.0062			
Initial Loss (in)			2.21			
% Impervious	100	0	15			
SCS Curve No.	90	40	48		Drop	Length
SCS Lag (min)			59	based on	5	1825
			No Baseflow			

East Ditch

	Impervious Area	Remaining Area	Total Area			
Method			SCS Curve No.			
Area (sq. mi.)	0.0024	0.0073	0.0097			
Initial Loss (in)			1.81			
% Impervious	100	0	25			
SCS Curve No.	90	40	53		Drop	Length
SCS Lag (min)			68	based on	23	4500
			No Baseflow			

New Swale #6

	Impervious Area	Remaining Area	Total Area		
Method			SCS Curve No.		
Area (sq. mi.)	0.0010	0.0009	0.0019		
Initial Loss (in)			0.96		
% Impervious	100	0	55		
SCS Curve No.	90	40	68		
SCS Lag (min)			23	based on	$0.6*T_c$
			No Baseflow		

HEC-HMS Seminole Post-Construction Input
Existing Ditch System

New Swale #5B

	Impervious Area	Remaining Area	Total Area		
Method			SCS Curve No.		
Area (sq. mi.)	0.0004	0.0004	0.0008		
Initial Loss (in)			0.96		
% Impervious	100	0	55		
SCS Curve No.	90	40	68		
SCS Lag (min)			16	based on	$0.6*T_c$
			No Baseflow		

New Swale #5A

	Impervious Area	Remaining Area	Total Area		
Method			SCS Curve No.		
Area (sq. mi.)	0.0004	0.0004	0.0008		
Initial Loss (in)			0.96		
% Impervious	100	0	55		
SCS Curve No.	90	40	68		
SCS Lag (min)			14	based on	$0.6*T_c$
			No Baseflow		

New Swale #4

	Impervious Area	Remaining Area	Total Area		
Method			SCS Curve No.		
Area (sq. mi.)	0.0003	0.0003	0.0006		
Initial Loss (in)			0.96		
% Impervious	100	0	55		
SCS Curve No.	90	40	68		
SCS Lag (min)			16	based on	$0.6*T_c$
			No Baseflow		

HEC-HMS Seminole Post-Construction Input
Existing Ditch System

New Swale #3

	Impervious Area	Remaining Area	Total Area		
Method			SCS Curve No.		
Area (sq. mi.)	0.0003	0.0003	0.0006		
Initial Loss (in)			0.96		
% Impervious	100	0	55		
SCS Curve No.	90	40	68		
SCS Lag (min)			16	based on	$0.6*T_c$
			No Baseflow		

New Swale #2

	Impervious Area	Remaining Area	Total Area		
Method			SCS Curve No.		
Area (sq. mi.)	0.0004	0.0004	0.0008		
Initial Loss (in)			0.96		
% Impervious	100	0	55		
SCS Curve No.	90	40	68		
SCS Lag (min)			19	based on	$0.6*T_c$
			No Baseflow		

New Swale #1

	Impervious Area	Remaining Area	Total Area		
Method			SCS Curve No.		
Area (sq. mi.)	0.0009	0.0008	0.0017		
Initial Loss (in)			0.96		
% Impervious	100	0	55		
SCS Curve No.	90	40	68		
SCS Lag (min)			20	based on	$0.6*T_c$
			No Baseflow		

HEC-HMS Seminole Post-Construction Input
Stage-Discharge Tables and Percolation Rates
New Swales

Z = 3
b= 8

Place Invert Elevation of Bleeddown Pipe @ 0.00 (stage)

Place Weir Inv. @ 1.00

Flow through pipe = Q
Orifice discharge coefficient = C C = 0.6
Bleeddown Pipe Diameter = D D = 6 in b = 8
Bleeddown Pipe Area = A A = 0.20 ft^2 C_s = 3.33 $ft^{0.5}/s$
Headwater height above centroid = H

$Q = (C)(A)(2gH)^{1/2} + C_s(b)(H_w)^{3/2}$ + Perc Rate

Overall Stage-Discharge Table
Swale #6

Slope = 0.004
L = 970

Id = 12.00 in/hr
Qip = 3.40 cfs

Stage (ft)	Area (SF)	Area (Acres)	Discharge (cfs)	WP	Perc. Rate (cfs)
0.00	200	0.005	**0.00**	8	0
1.00	3,500	0.08	**4.22**	14.3	3.40
1.40	5,740	0.132	**11.15**	16.9	3.40

Overall Stage-Discharge Table
Swale #5B

Slope = 0.005
L = 505

Id = 12.00 in/hr
Qip = 1.52 cfs

Stage (ft)	Area (SF)	Area (Acres)	Discharge (cfs)	WP	Perc. Rate (cfs)
0.00	160	0.004	**0.00**	8	0
1.00	2,800	0.064	**2.34**	14.3	1.52
2.00	8,000	0.184	**29.41**	20.6	1.52
2.40	10,752	0.247	**47.04**	23.2	1.52

Overall Stage-Discharge Table
Swale #5A

Slope = 0.006
L = 505

Id = 12.00 in/hr
Qip = 1.49 cfs

Stage (ft)	Area (SF)	Area (Acres)	Discharge (cfs)	WP	Perc. Rate (cfs)
0.00	133	0.003	**0.00**	8	0
1.00	2,333	0.054	**2.31**	14.3	1.49
2.00	6,667	0.153	**29.38**	20.6	1.49

HEC-HMS Seminole Post-Construction Input
Stage-Discharge Tables and Percolation Rates
New Swales

Overall Stage-Discharge Table
Swale #4

Slope = 0.003 Id = 12.50 in/hr
L = 390 Qip = 1.21 cfs

Stage (ft)	Area (SF)	Area (Acres)	Discharge (cfs)	WP	Perc. Rate (cfs)
0.00	267	0.006	**0.00**	8	0
1.00	4,667	0.107	**2.03**	14.3	1.21
2.00	7,800	0.179	**29.10**	20.6	1.21

Overall Stage-Discharge Table
Swale #3

Slope = 0.003 Id = 12.50 in/hr
L = 390 Qip = 1.22 cfs

Stage (ft)	Area (SF)	Area (Acres)	Discharge (cfs)	WP	Perc. Rate (cfs)
0.00	267	0.006	**0.00**	8	0
1.00	4,667	0.107	**2.04**	14.3	1.22
2.00	7,800	0.179	**29.11**	20.6	1.22

Overall Stage-Discharge Table
Swale #2

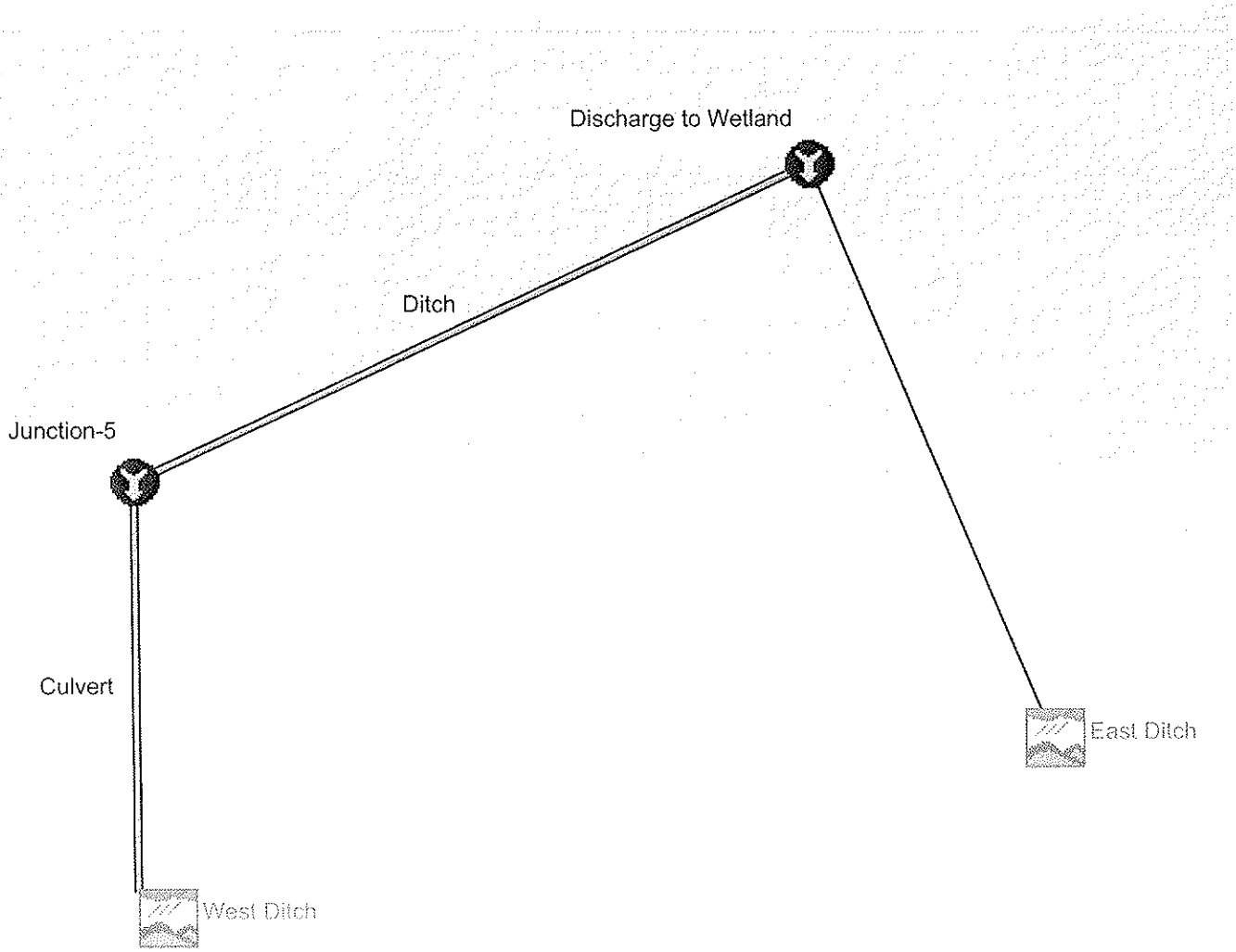
Slope = 0.002 Id = 8.00 in/hr
L = 410 Qip = 0.87 cfs

Stage (ft)	Area (SF)	Area (Acres)	Discharge (cfs)	WP	Perc. Rate (cfs)
0.00	400	0.009	**0.00**	8	0
1.00	5,740	0.132	**1.69**	14.3	0.87
2.00	8,200	0.188	**28.76**	20.6	0.87

Overall Stage-Discharge Table
Swale #1

Slope = 0.006 Id = 8.00 in/hr
L = 944 Qip = 2.10 cfs

Stage (ft)	Area (SF)	Area (Acres)	Discharge (cfs)	WP	Perc. Rate (cfs)
0.00	133	0.003	**0.00**	8	0
1.00	2,333	0.054	**2.92**	14.3	2.10
2.00	6,667	0.153	**29.99**	20.6	2.10

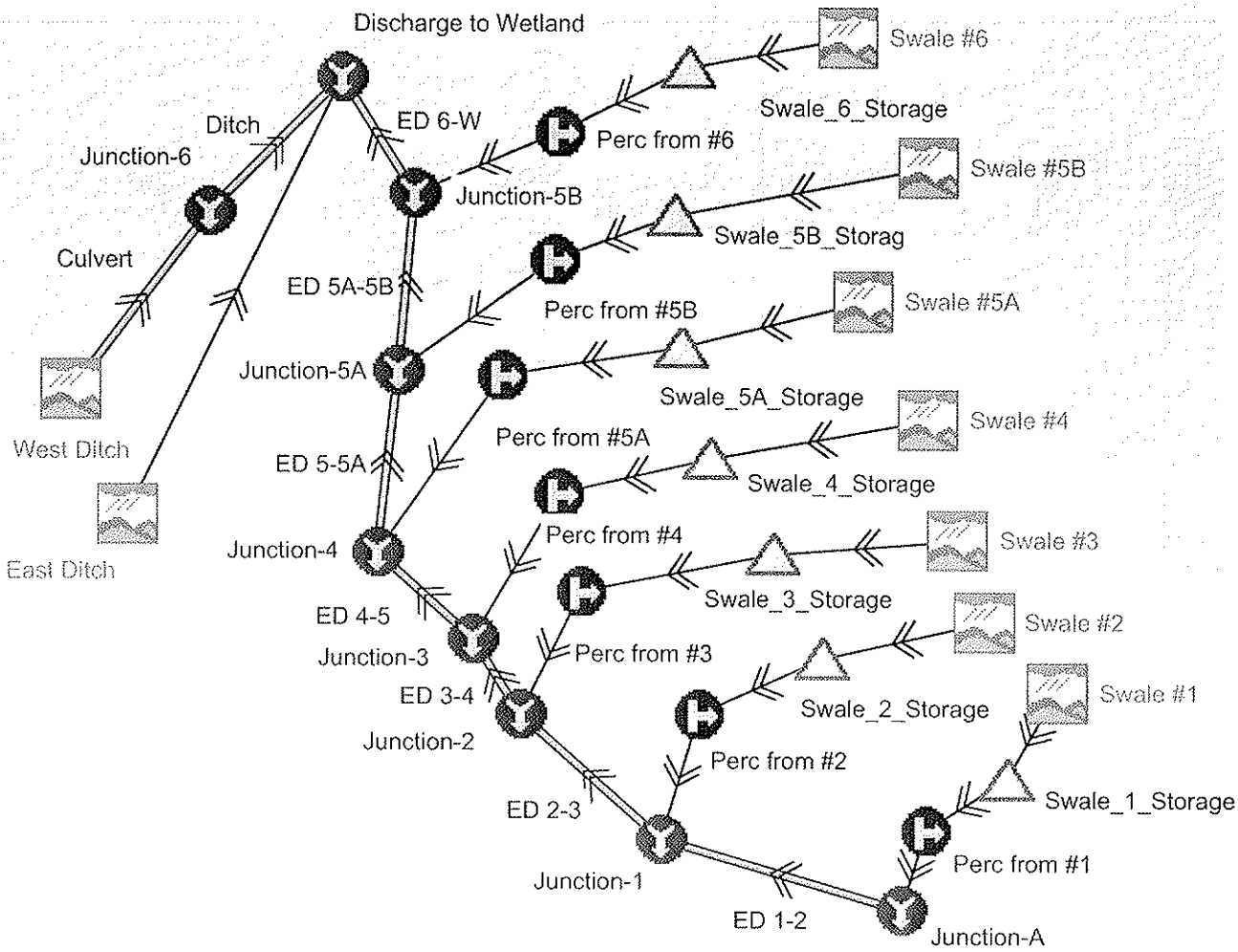

Discharge to Wetland
Ditch
Junction-5
Culvert
East Ditch
West Ditch

HMS * Summary of Results

Project : Seminole_Swales_3 Run Name : 25 yr Pre

Start of Run : 01Jan07 0800 Basin Model : Entrance Road_Pre
End of Run : 02Jan07 0800 Met. Model : 25 YR
Execution Time : 01Jun06 2202 Control Specs : 24 HR

Hydrologic Element	Discharge Peak (cfs)	Time of Peak	Volume (ac ft)	Drainage Area (sq mi)
West Ditch	3.8359	01 Jan 07 2108	0.94911	0.006
Culvert	3.8359	01 Jan 07 2108	0.94910	0.006
Junction-5	3.8359	01 Jan 07 2108	0.94910	0.006
Ditch	3.7226	01 Jan 07 2133	0.94086	0.006
East Ditch	8.9812	01 Jan 07 2127	2.5908	0.017
Discharge to Wetland	12.680	01 Jan 07 2129	3.5316	0.023


Discharge to Wetland
Swale #6
Swale_6_Storage
Ditch
ED 6-W
Perc from #6
Junction-6
Junction-5B
Swale #5B
Swale_5B_Storag
Culvert
ED 5A-5B
Perc from #5B
Swale #5A
Junction-5A
Swale_5A_Storage
Swale #4
West Ditch
Perc from #5A
ED 5-5A
Swale_4_Storage
East Ditch
Perc from #4
Swale #3
Junction-4
Swale_3_Storage
ED 4-5
Swale #2
Junction-3
Perc from #3
ED 3-4
Swale_2_Storage
Swale #1
Junction-2
Perc from #2
Swale_1_Storage
ED 2-3
Perc from #1
Junction-1
ED 1-2
Junction-A

HMS * Summary of Results

Project : Seminole_Swales_3 Run Name : CD_post

Start of Run : 01Jan07 0800 Basin Model : Ent Road_Post_CD
End of Run : 02Jan07 0800 Met. Model : 25 YR
Execution Time : 16Jun06 0956 Control Specs : 24 HR

Hydrologic Element	Discharge Peak (cfs)	Time of Peak	Volume (ac ft)	Drainage Area (sq mi)
West Ditch	3.8359	01 Jan 07 2108	0.94911	0.006
Culvert	3.8359	01 Jan 07 2108	0.94910	0.006
Junction-6	3.8359	01 Jan 07 2108	0.94910	0.006
Ditch	3.7226	01 Jan 07 2133	0.94086	0.006
Swale #3	1.8953	01 Jan 07 2018	0.20102	0.001
Swale_3_Storage	1.3431	01 Jan 07 2028	0.20059	0.001
Perc from #3	0.53987	01 Jan 07 2028	0.080630	0.001
Swale #2	2.2985	01 Jan 07 2021	0.26790	0.001
Swale_2_Storage	1.4644	01 Jan 07 2035	0.26700	0.001
Perc from #2	0.71054	01 Jan 07 2035	0.12955	0.001
Swale #1	4.7438	01 Jan 07 2022	0.56918	0.002
Swale_1_Storage	4.6420	01 Jan 07 2025	0.56876	0.002
Perc from #1	2.5420	01 Jan 07 2025	0.18794	0.002
Junction-A	2.5420	01 Jan 07 2025	0.18794	0.002
ED 1-2	2.0305	01 Jan 07 2048	0.18483	0.002
Junction-1	2.6759	01 Jan 07 2047	0.31438	0.003
ED 2-3	2.3005	01 Jan 07 2108	0.31188	0.003
Junction-2	2.5252	01 Jan 07 2108	0.39251	0.003
ED 3-4	2.3766	01 Jan 07 2125	0.39078	0.003
Swale #4	1.8953	01 Jan 07 2018	0.20102	0.001
Swale_4_Storage	1.3408	01 Jan 07 2028	0.20059	0.001
Perc from #4	0.54161	01 Jan 07 2028	0.081026	0.001
Junction-3	2.5331	01 Jan 07 2124	0.47180	0.004
ED 4-5	2.0742	01 Jan 07 2214	0.46325	0.004
Swale #5A	2.7125	01 Jan 07 2015	0.26812	0.001
Swale_5A_Storage	2.3395	01 Jan 07 2021	0.26787	0.001
Perc from #5A	0.84951	01 Jan 07 2021	0.095138	0.001
Junction-4	2.1409	01 Jan 07 2214	0.55839	0.004
ED 5-5A	1.8503	01 Jan 07 2244	0.54567	0.004
Swale #5B	2.5271	01 Jan 07 2018	0.26803	0.001
Swale_5B_Storag	2.1347	01 Jan 07 2025	0.26773	0.001
Perc from #5B	0.74806	01 Jan 07 2025	0.093820	0.001
Junction-5A	1.9047	01 Jan 07 2244	0.63949	0.005
ED 5A-5B	1.7438	01 Jan 07 2316	0.62873	0.005
Swale #6	4.8878	01 Jan 07 2025	0.63582	0.002
Swale_6_Storage	4.6383	01 Jan 07 2030	0.63533	0.002
Perc from #6	1.2383	01 Jan 07 2030	0.12748	0.002
Junction-5B	1.8071	01 Jan 07 2315	0.75621	0.007
ED 6-W	1.7572	01 Jan 07 2329	0.75154	0.007
East Ditch	7.5905	01 Jan 07 2116	1.9913	0.010
Discharge to Wetlanc	12.323	01 Jan 07 2123	3.6838	0.023

Burns & McDonnell
SINCE 1898

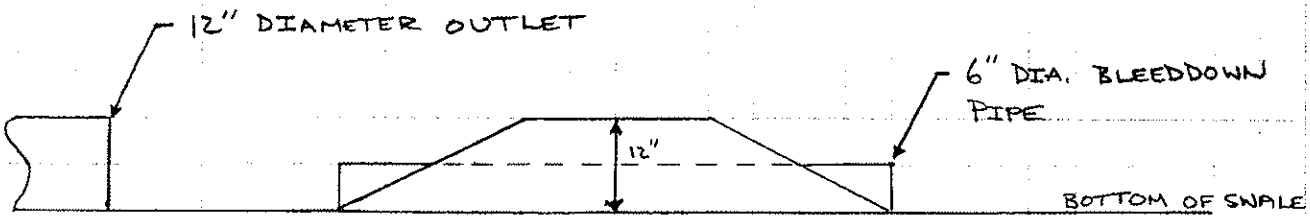
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Client SEMINOLE Page ____ of ____

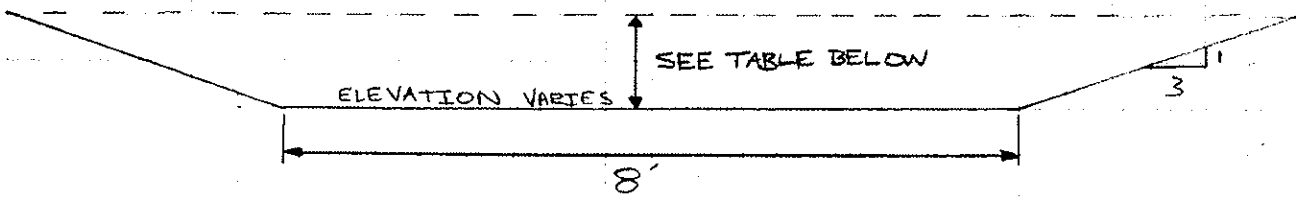
Project 39736 Date 5/31/06 Made By JCE

Checked By ____

SWALE DETAILS Preliminary ✓ Final ____



TYPICAL SECTION - SWALE OUTLETS WITH OVERFLOW WEIRS



TYPICAL SWALE CROSS SECTION

SWALE #	SWALE DEPTH
1	2'
2	2'
3	2'
4	2'
5A	2'
5B	2.4'
6	1.4'

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SINCE 1898

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Client SEMINOLE Page 1 of 3

Project 39736 Date 5/12/06 Made By JCE

TIME OF CONCENTRATION CALCULATIONS Checked By

ENTRANCE ROAD SWALES Preliminary ✓ Final

THE SCS METHOD FOR DETERMINING THE TIME OF CONCENTRATION TENDS TO OVERESTIMATE THE VALUES FOR SMALL WATERSHEDS. CONSEQUENTLY WE USED THE METHOD DEVELOPED BY THE FEDERAL AVIATION AGENCY. THIS METHOD WORKS FOR SMALLER AREAS THAT HAVE RELATIVELY FLAT SWALES, SIMILAR TO THE DESIGN CONDITIONS.

THE FAA EQUATION IS AS FOLLOWS:

$$t_c = 1.8\,(1.1 - C)\,L^{0.5}\,S^{-0.333}$$

C = RATIONAL METHOD RUNOFF COEFFICIENT
L = LENGTH, FT
S = SLOPE, %

THE EQUATION CAN ALSO BE FOUND IN THE FOLLOWING FORMAT:

$$t_c = 0.388\,(1.1 - C)\,L^{0.5}\,S^{-0.333}$$

WHERE S = SLOPE, FT/FT

THE FOLLOWING PAGES SHOW THE TIME OF CONCENTRATION CALCULATIONS FOR EACH ENTRANCE ROAD SWALE.

Burns & McDonnell
SINCE 1898

011200 Form GCO-29

Client SEMINOLE Page 2 of 3

Project 39736 Date 5/17/06 Made By JCE

ENTRANCE ROAD SWALES Checked By

T_c CALCS Preliminary ✓ Final

SWALE #1

$C = 0.59$
$S = 0.6\%$
$L = 944$ ft

$$t_c = \frac{1.8(1.1 - 0.59)\sqrt{944}}{0.6^{0.333}} \approx \boxed{33 \text{ min}}$$

SWALE #2

$C = 0.59$
$S = 0.2\%$
$L = 410$ ft

$$t_c = \frac{1.8(1.1 - 0.59)\sqrt{410}}{0.2^{0.333}} \approx \boxed{32 \text{ min}}$$

SWALE #3

$C = 0.59$
$S = 0.3\%$
$L = 390$ ft

$$t_c = \frac{1.8(1.1 - 0.59)\sqrt{390}}{0.3^{0.333}} \approx \boxed{27 \text{ min}}$$

SWALE #4

$C = 0.59$
$S = 0.3\%$
$L = 388$ ft

$$t_c = \frac{1.8(1.1 - 0.59)\sqrt{388}}{0.3^{0.333}} \approx \boxed{27 \text{ min}}$$

Burns & McDonnell
SINCE 1898

011200 Form GCO-29

Client SEMINOLE Page 3 of 3

Project 39736 Date 5/17/06 Made By JCE

ENTRANCE ROAD SWALES Checked By

T_c CALCS Preliminary ✓ Final

SWALE #5A

$C = 0.59$
$S = 0.6\%$
$L = 505$ ft

$$t_c = \frac{1.8(1.1 - 0.59)\sqrt{505}}{0.6^{0.333}} \approx \boxed{24 \text{ min}}$$

SWALE #6

$C = 0.59$
$S = 0.4\%$
$L = 970$ ft

$$t_c = \frac{1.8(1.1 - 0.59)\sqrt{970}}{0.4^{0.333}} \approx \boxed{39 \text{ min}}$$

SWALE #5B

$C = 0.59$
$S = 0.5\%$
$L = 505$ ft

$$t_c = \frac{1.8(1.1 - 0.59)\sqrt{505}}{0.5^{0.333}} = \boxed{26 \text{ min}}$$

Table 24-1. Runoff Coefficients (*C*) for a Design Storm Return Period of Ten Years or Less[1]

Slope	Land Use	Sandy Soils Min.	Sandy Soils Max.	Clay Soils Min.	Clay Soils Max.
Flat (0-2%)	Lawns	0.05	0.10	0.13	0.17
	Rooftops and pavement – 55 %	0.95	0.95	0.95	0.95
	Pervious pavements[2]	0.75	0.95	0.90	0.95
	Woodlands	0.10	0.15	0.15	0.20
	Pasture, grass, and farmland[3] - 45 %	0.15	0.20	0.20	0.25
	Residential				
	SFR: 1/2 acre lots and larger	0.30	0.35	0.35	0.45
	SFR: smaller lots and duplexes	0.35	0.45	0.40	0.50
	MFR: apartments, condominiums	0.45	0.60	0.50	0.70
	Commercial and Industrial	0.50	0.95	0.50	0.95
Rolling (2-7%)	Lawns	0.10	0.15	0.18	0.22
	Rooftops and pavements	0.95	0.95	0.95	0.95
	Pervious pavements[2]	0.80	0.95	0.90	0.95
	Woodlands	0.15	0.20	0.20	0.25
	Pasture, grass, and farmland[3]	0.20	0.25	0.25	0.30
	Residential				
	SFR: 1/2 acre lots and larger	0.35	0.50	0.40	0.55
	SFR: smaller lots and duplexes	0.40	0.55	0.45	0.60
	MFR: apartments, condominiums	0.50	0.70	0.60	0.80
	Commercial and Industrial	0.50	0.95	0.60	0.95
Steep (>7%)	Lawns	0.15	0.20	0.25	0.35
	Rooftops and pavements	0.95	0.95	0.95	0.95
	Pervious pavements[2]	0.85	0.95	0.90	0.95
	Woodlands	0.20	0.25	0.25	0.30
	Pasture, grass, and farmland[3]	0.25	0.35	0.30	0.40
	Residential				
	SFR: 1/2 acre lots and larger	0.40	0.55	0.50	0.65
	SFR: smaller lots and duplexes	0.45	0.60	0.55	0.70
	MFR: apartments, condominiums	0.60	0.75	0.65	0.85
	Commercial and Industrial	0.60	0.95	0.65	0.95

Sources: Florida Department of Transportation, 1987; Wanielista, 1990

[1]For 25- to 100-yr recurrence intervals, multiply coefficient by 1.1 and 1.25, respectively, and the product cannot exceed 1.0.

[2]Coefficients assume good ground cover and conservation treatment.

[3]Depends on depth and degree of permeability of underlying strata.

Note: SFR = Single Family Residential;
MFR = Multi-Family Residential

where: V = Average velocity in the channel (*ft/sec*)
n = Manning's roughness coefficient, based on the lining of the channel
R = Hydraulic radius (*ft*)
S = Slope of the channel (*ft/ft*)

The maximum permissible velocity for various channel slopes and types of vegetative cover is given in Table 30-1. The velocity of flow in the swale (calculated using the Manning's equation) will be non-erosive if it is less than the maximum permissible velocity given in Table 30-1.

The hydraulic radius (R) is dependent on the geometry of the swale. Equations for the hydraulic radius for three common swale shapes are given in Figure 30-2.

Manning's roughness coefficient (n) can be determined from Table 30-2 and Figure 30-3. In utilizing Table 30-2, mowed conditions are recommended for analysis of the swale infiltration capacity. The retardance class under mowed conditions result in lower n values, shallower flow depths, and less wetted perimeter for infiltration. Unmowed conditions may be more appropriate for swale analysis under flood flow conditions. The retardance class under unmowed conditions result in higher n values. This will yield more conservative flow depths which may be more appropriate for establishing floodwater elevations in the swale.

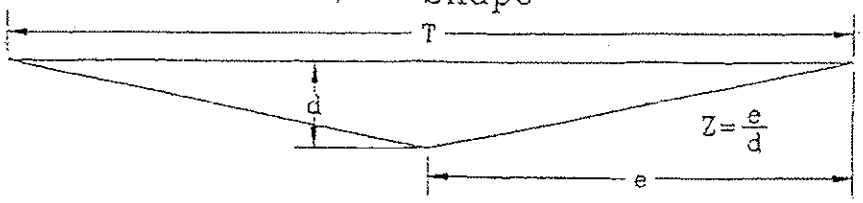
Table 30-1. Permissible Velocities for Grass-Lined Channels

Channel Slope	Lining	Permissible Velocity (ft/sec)
0 – 5%	Bermuda grass	6.0
	Bahia	5.0
	Bluestem (broomsedges)	5.0
	Grass-legume mixture	4.0
	Sericea lespedeza	2.5
	Annual lespedeza	2.5
	Small grains (temporary)	2.5
5 – 10%	Bermuda grass	5.0
	Bahia	4.0
	Bluestem (broomsedges)	4.0
	Grass-legume mixture	4.0

Source: Livingston et al. 1988

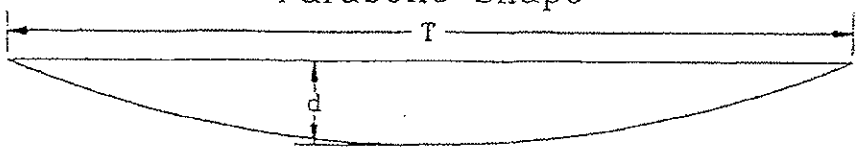
CHANNEL GEOMETRY

V – Shape



Cross-Sectional Area (A) = Zd^2
Top Width (T) = $2dZ$
Hydraulic Radius (R) = $\frac{Zd}{2\sqrt{Z^2+1}}$
Wetted Perimeter (P) = $2d\sqrt{Z^2+1}$

Parabolic Shape



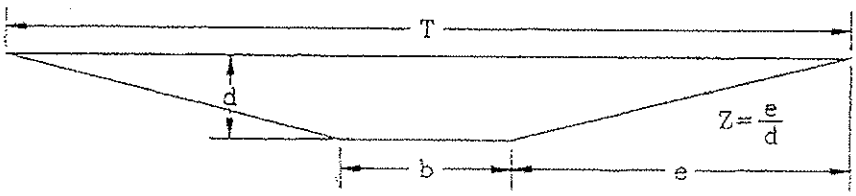
Cross-Sectional Area (A) = $\frac{2}{3}Td$

Top Width (T) = $\frac{1.5A}{d}$

Hydraulic Radius (R) = $\frac{T^2d}{1.5T^2+4d^2}$

Wetted Perimeter (P) = $T + \frac{8d^2}{3T}$

Trapezoidal Shape *



Cross-Sectional Area (A) = Zd^2+bd
Top Width (T) = $b+2dZ$
Hydraulic Radius = $\frac{Zd^2+bd}{b+2d\sqrt{Z^2+1}}$
Wetted Perimeter (P) = $b+2d\sqrt{Z^2+1}$

USE 3:1 slopes
Approx width = 8'

Figure 30-2. Typical Waterway Shapes and Mathematical Expressions for Calculating Cross-sectional Area, Top Width, Hydraulic Radius and Wetted Perimeter
Source: Livingston et al. 1988

Table 30-2. Classification of Vegetation Cover as to Degree of Retardance

Retardance Class	Cover	Condition
A	Bluestem (broomsedges)	Excellent stand, tall (average 36")
B	Bermuda or Bahia	Good stand, tall (average 12")
	Native Grass mixture (bluestem, vasey grass, and other long and short wet prairie grasses)	Good stand, unmowed
	Lespedeza sericea	Good stand, not woody tall (average 19')
C	Bahia	Good stand, uncut (6-8")
	Bermuda grass	Good stand, mowed (average 6")
	Centipede grass or St. Augustine	Very dense (average 6")
D	Bermuda or Bahia	Good stand, cut to 2.5" height Cut to 2" height
	Lespedeza sericea	Very good stand before cutting
E	Centipede grass or St. Augustine	Good stand, cut to 1.5" height

Source: Livingston et al. 1988

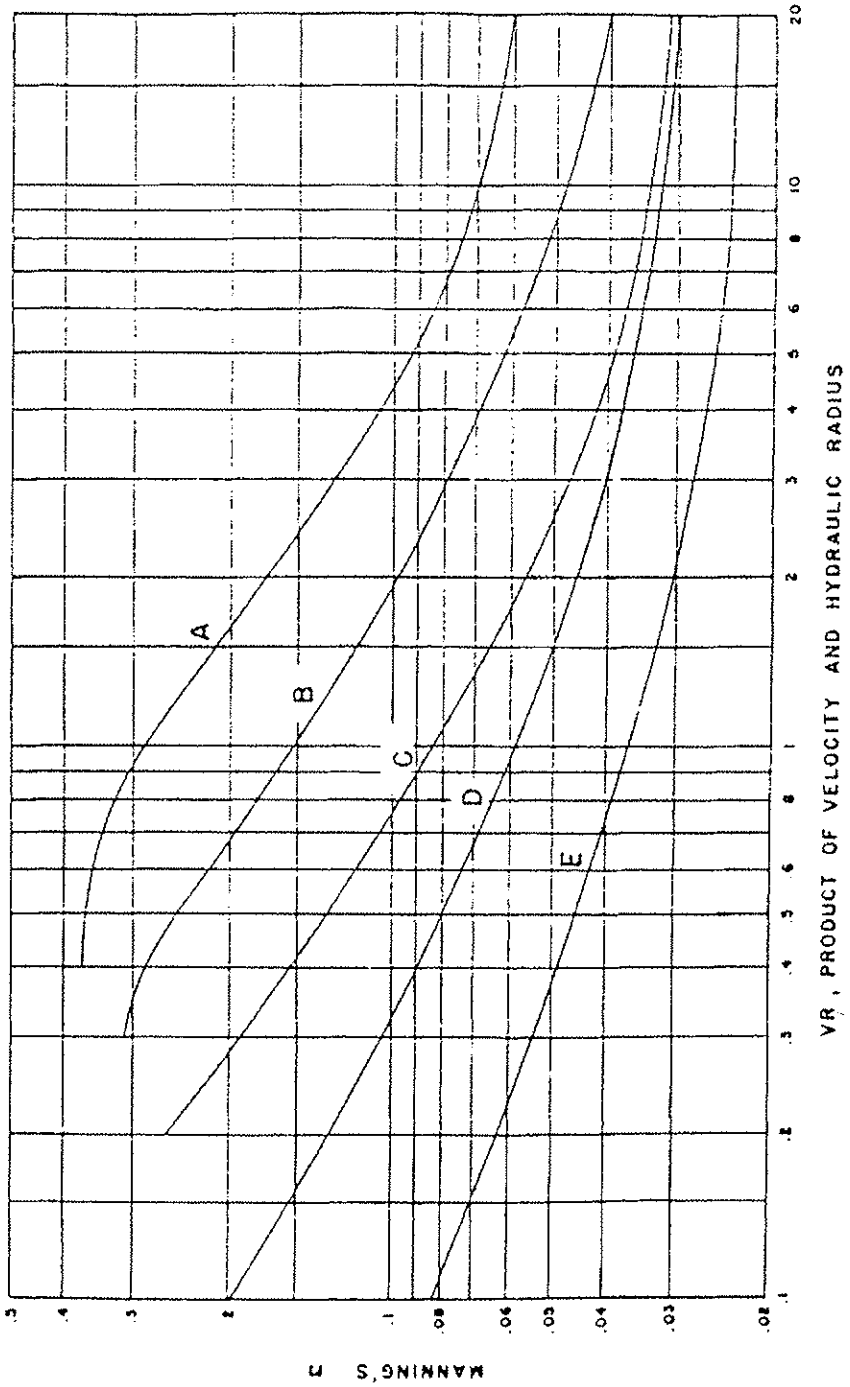


Figure 30-3. Manning's "n" Related to Velocity, Hydraulic Radius and Vegetal Retardance
Source: Livingston et al. 1988

KEY NOTES:

1. PLANT ENTRANCE ROAD
2. LAFARGE PROPERTY
3. EXISTING SERVICE BLDG.
4. EXISTING TURBINE BLDG.
5. EXISTING STACK
6. EXISTING LIMESTONE PREP.
7. EXISTING LIMESTONE STORAGE PILE
8. EXISTING FGD EFFLUENT PROCESSING AREA
9. EXISTING SWITCHYARD
10. EXISTING COOLING TOWER
11. EXISTING WASTE TREATMENT AREA
12. ~~EXISTING COAL YARD~~
13. EXISTING LANDFILL
14. EXISTING RAILCAR REPAIR
15. CONSTRUCTION PARKING
16. CONSTRUCTION OFFICE TRAILER AREA
17. UNIT 3 TURBINE BLDG.
18. UNIT 3 BOILER
19. UNIT 3 PRECIPITATOR
20. UNIT 3 WET FGD
21. UNIT 3 STACK
22. UNIT 3 EFFLUENT PROCESSING
23. UNIT 3 HOUSE SPUR
24. UNIT 3 COOLING TOWER
25. UNIT 3 LIMESTONE PILE EXPANSION
26. UNIT 3 CONSTRUCTION LAYDOWN
27. EXISTING GUARD HOUSE
28. AMMONIA STORAGE
29. UNIT 3 LIMESTONE PREPARATION
30. UNIT 3 FUEL OIL STORAGE TANK
31. WASTE WATER SURGE POND
32. PERCOLATION POND
33. TEMPORARY CONSTRUCTION WAREHOUSE
34. COAL CONVEYOR
35. UNIT 3 WET ESP
36. ZERO LIQUID DISCHARGE SYSTEM
37. NOT USED
38. UNIT 3 CRUSHER HOUSE
39. FLY ASH SILO
40. CONDENSATE STORAGE TANK
41. LIMESTONE SLURRY TANK
42. LIMESTONE SLURRY EMERGENCY STORAGE TANK
43. COAL TRANSFER TOWER
44. EMERGENCY DIESEL GENERATOR
45. EXISTING TRANSFER SAMPLE TOWER DUST COLLECTOR
46. NEW STACKER RECLAIMER W/SPRAY DUST SUPPRESSION - COAL PILE A
47. NEW STACKER RECLAIMER W/SPRAY DUST SUPPRESSION - COAL PILE B
48. NEW TRANSFER TOWER DUST COLLECTOR
49. NEW CRUSHER TOWER DUST COLLECTOR
50. UNIT FEED SYSTEM DUST COLLECTOR
51. LIMESTONE TRANSFER TO BALL MILL DUST COLLECTOR
52. FLY ASH SILO BIN VENT
53. COAL PILE A
54. COAL PILE B
55. COAL PILE RUNOFF POND
56. COAL PILE RUNOFF POND DRAINAGE BASIN
57. STORMWATER POND 1
58. STORMWATER POND 1 DRAINAGE BASIN
59. STORMWATER POND 2
60. STORMWATER POND 2 DRAINAGE BASIN
61. STORMWATER POND 3
62. STORMWATER POND 3 DRAINAGE BASIN
63. STORMWATER POND 4
64. STORMWATER POND 4 DRAINAGE BASIN
65. STORMWATER POND 5
66. STORMWATER POND 5 DRAINAGE BASIN
67. ENTRANCE ROAD STORMWATER SWALES
68. ENTRANCE ROAD STORMWATER SWALES DRAINAGE BASIN
69. SWITCHYARD EXPANSION

SEE DP-2 FOR DETAILS OF THIS AREA

NORTH

300' 0 300' 600'
SCALE IN FEET

Scale For Microfilming

Inches 1

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Burns & McDonnell
SINCE 1898

date FEBRUARY 8, 2006	detailed
designed SEDLACEK	checked

Seminole Electric COOPERATIVE, INC.

SEMINOLE GENERATING STATION
UNIT 3

SITE DRAINAGE PLAN

project 39736	contract
drawing DP1	rev. 2
sheet	of sheets

file: U:\Seminole\39736\CADD\Civil\dp1.dgn

6/7/2006

POND 1

AREA FOR SWALE #1

LAFARGE PROPERTY

AREA FOR SWALE #2

AREA FOR SWALE #3

AREA FOR SWALE #4

AREA FOR SWALE #6

AREA FOR SWALE #5B

AREA FOR SWALE #5A

EASTERN DITCH

PLANT ENTRANCE ROAD

WESTERN DITCH

0 100' 200'
SCALE IN FEET

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Burns & McDonnell

date MARCH 2, 2006	detailed
designed SEDLACEK	checked

Seminole Electric COOPERATIVE, INC

SEMINOLE GENERATING STATION
UNIT 3

PLANT ENTRANCE ROAD

project 39736	contract
drawing DP2	rev. 2
sheet	of sheets

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6/7/2006

SECTION 5.0

Northeast District - Industrial Waste Groundwater

1. **A updated monitor well location map, drawn to scale, and in reference to the percolation ponds, landfill areas, property lines, roads, buildings, wetlands, water bodies, etc. is requested.**

   An updated map with the requested information is provided as Figure 5-1.

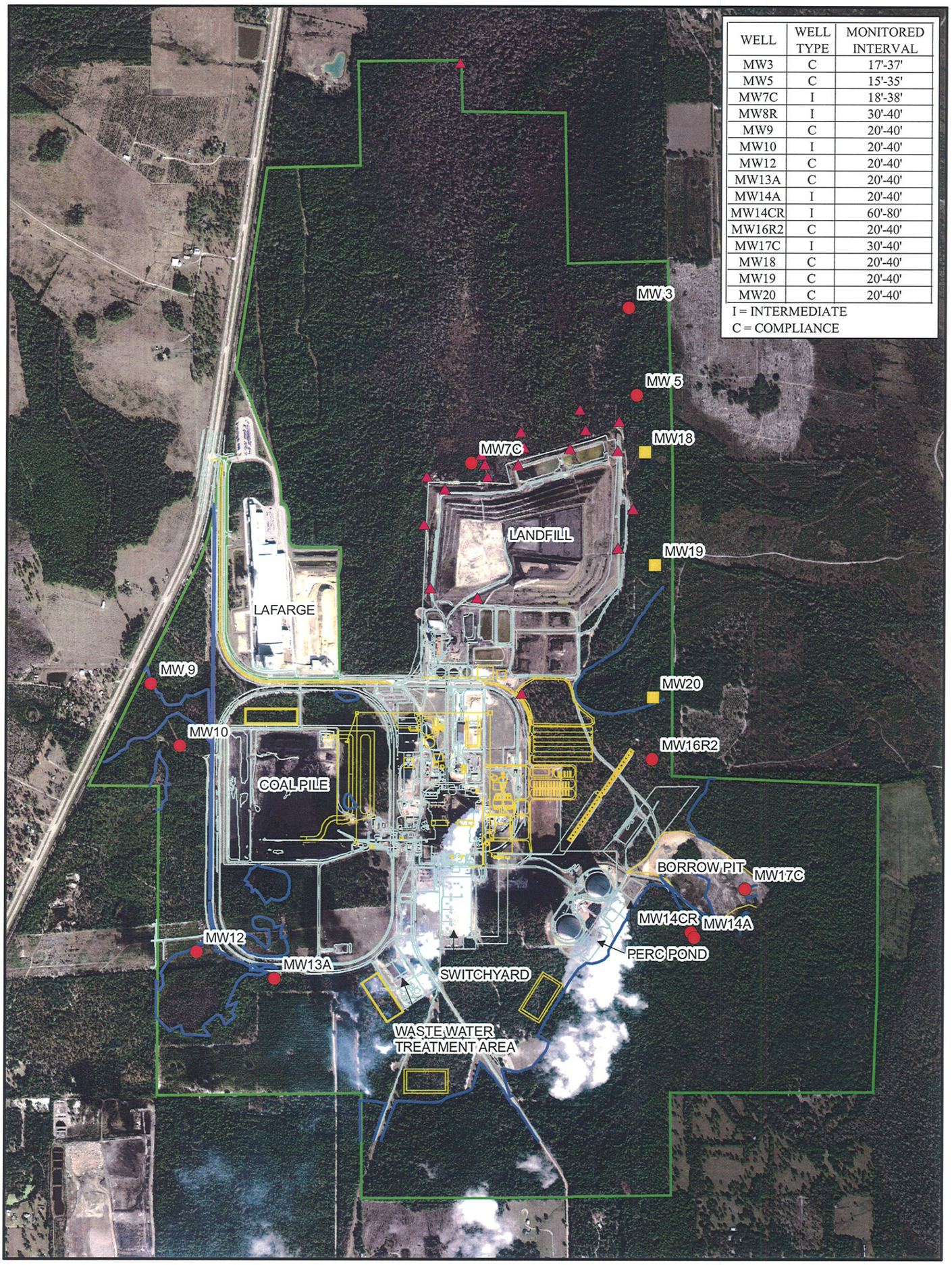
2. **Since the facility has its own on-site staff that conducts monitoring of the wells, please clarify that the sampling is conducted in accordance with today's DEP Standard Operation Procedure Manual for Field Sampling. This should include a brief summary of experienced personnel that are trained in sampling monitor wells, field/sampling equipment used, purge volumes and techniques, field measurements that are tested, decontamination procedures.**

   Seminole has adopted written standard operating procedures which meet the requirements of the Florida Department of Environmental SOPs from Chapter 62-160, F.A.C., Quality Assurance rule. The Seminole *Environmental Laboratory Quality Manual for Field Sampling and Analysis* specifically references each FDEP SOP for sampling monitor wells, field sampling equipment, purge volumes and techniques, field measurements and decontamination procedures.

   Currently, there are two Environmental Technologists assigned to perform environmental sampling and field analysis. The Senior Environmental Technologist has worked in the Seminole lab for over twenty years, and has been in the current position for over five years. The second Environmental Technologist has worked in an environmental laboratory setting for over six years, in positions as high as laboratory manager. She has been in the current position at Seminole for one year. Both have recently reviewed the Seminole environmental procedures and amended them as necessary to insure compliance with current FDEP SOPs. In April 2006, both Environmental Technologists attended a seminar at TREEO Inc., specifically designed to provide training to those responsible for environmental sampling and field analysis in the State of Florida.

3. **In section 5.2.1, it is referenced that contact stormwater is discharged into an equalization basin. Please clarify if this basin is lined, or unlined, and the type of liner.**

   The existing equalization basins are constructed of concrete and the proposed wastewater surge pond will be lined with a minimum 60 mil HDPE liner.



WELL	WELL TYPE	MONITORED INTERVAL
MW3	C	17'-37'
MW5	C	15'-35'
MW7C	I	18'-38'
MW8R	I	30'-40'
MW9	C	20'-40'
MW10	I	20'-40'
MW12	C	20'-40'
MW13A	C	20'-40'
MW14A	I	20'-40'
MW14CR	I	60'-80'
MW16R2	C	20'-40'
MW17C	I	30'-40'
MW18	C	20'-40'
MW19	C	20'-40'
MW20	C	20'-40'

I = INTERMEDIATE
C = COMPLIANCE

LEGEND

- Landfill Drain Performance Monitoring Plan Wells (Ardaman & Associates Data)
- Groundwater Monitoring Plan Wells
- Proposed Groundwater Monitoring Plan Wells
- Existing Structures
- New Construction
- Wetlands
- Property Boundary

REFERENCE

1. Site Plan, Burns & McDonnell
2. FDEP Jurisdictional Wetlands
3. 2004 aerial photography, USGS Digital Ortho Quarter Quadrangles (DOQQ)

0.2 0 0.2 Miles

N

PROJECT
SEMINOLE ELECTRIC COOPERATIVE INC.
SGS UNIT 3
PUTNUM COUNTY, FL

TITLE
MONITORING WELL SITE PLAN

Golder Associates
Tampa, Florida

PROJECT No. 053-9540			SCALE AS SHOWN	REV. 0
DESIGN	QY	9 June 2006	**FIGURE: 5-1**	
GIS	QY	9 June 2006		
CHECK	MM	9 June 2006		
REVIEW	MM	9 June 2006		

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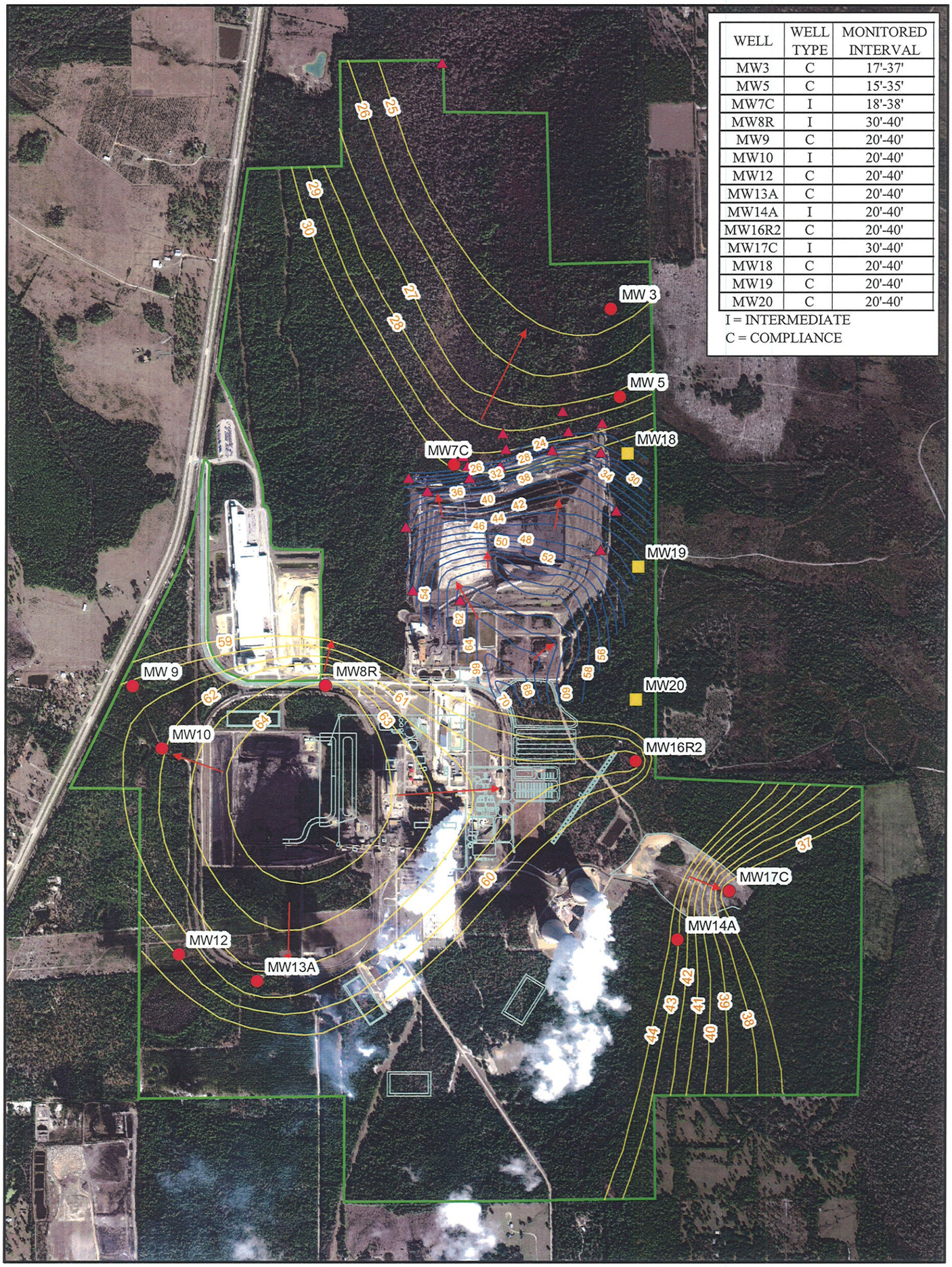
SECTION 6.0

Northeast District - Waste Cleanup

The Waste Cleanup Section has reviewed the above-referenced document prepared by Golder Associates Inc. (Golder) on behalf of Seminole Electric Cooperative, Inc. (Seminole) dated March 7, 2006. The subject document was submitted to the FDEP in partial fulfillment of Rule 62-17.205(1) requirements. This review has primarily focused on groundwater related issues as they relate to the solid waste disposal or storage areas and comments are provided as follows:

1. **The documents provided make reference to the existing groundwater monitoring program but does not provide an evaluation of that program or make an affirmation of the adequacy of the existing well network and sampling requirements. Please provide a detailed evaluation of the groundwater monitoring program and its adequacy to detect potential contaminant releases. Insofar as the on-site existing solid waste disposal unit has contributed to groundwater degradation that was not detected by the existing monitoring wells, it is appropriate that the adequacy of the existing site wide groundwater monitoring system be evaluated. Revisions to the groundwater monitoring system may be required.**

   Section III.E of the SGS Units 1 and 2 Conditions of Certification constitutes the approved groundwater monitoring plan for the Seminole Generating Station (See Appendix 10.4.1, Volume III of III, SGS Unit 3 SCA). Figures 6-1 and 6-2 depict the location of the groundwater monitoring wells as well as the SGS Landfill Drain Performance Monitoring Plan Wells. Based on correspondence with and approvals received by the Department, it is Seminole's understanding that there are no pending issues concerning the adequacy of this program. The SGS Unit 3 project, as proposed in the Site Certification Application, does not include project features that necessitate changes to the groundwater monitoring plan. The SGS Unit 3 project includes elimination of existing percolation pond discharges, enhances reuse of coal combustion products in lieu of disposal, and will comply with Chapter 62-701, F.A.C. requirements within the existing landfill area. Seminole will cooperate with the Northeast District office in addressing any potential changes to the Groundwater Monitoring Plan.



WELL	WELL TYPE	MONITORED INTERVAL
MW3	C	17'-37'
MW5	C	15'-35'
MW7C	I	18'-38'
MW8R	I	30'-40'
MW9	C	20'-40'
MW10	I	20'-40'
MW12	C	20'-40'
MW13A	C	20'-40'
MW14A	I	20'-40'
MW16R2	C	20'-40'
MW17C	I	30'-40'
MW18	C	20'-40'
MW19	C	20'-40'
MW20	C	20'-40'

I = INTERMEDIATE
C = COMPLIANCE

LEGEND

- Groundwater Monitoring Plan Wells
- Proposed Groundwater Monitoring Plan Wells
- Landfill Drain Performance Monitoring Plan Wells (Ardaman & Associates Data)
- Contours - Mar. 02 Groundwater Monitoring Plan Data
- Contours - 1999 Piezometer Data
- Groundwater Flow Direction
- Site Plan
- Property Boundary

REFERENCE

1. Groundwater contour lines (Foot, NGVD29), Golder
2. The landfill area has 28 monitoring wells that are being monitored as part of an Intermediate Remedial Action Plan
3. 2004 aerial photography, USGS Digital Ortho Quarter Quadrangles (DOQQ)
4. Groundwater contour lines near landfill area, Ardaman & Associates, Feasibility Study, 2001

0.3 0 0.3 Miles

N

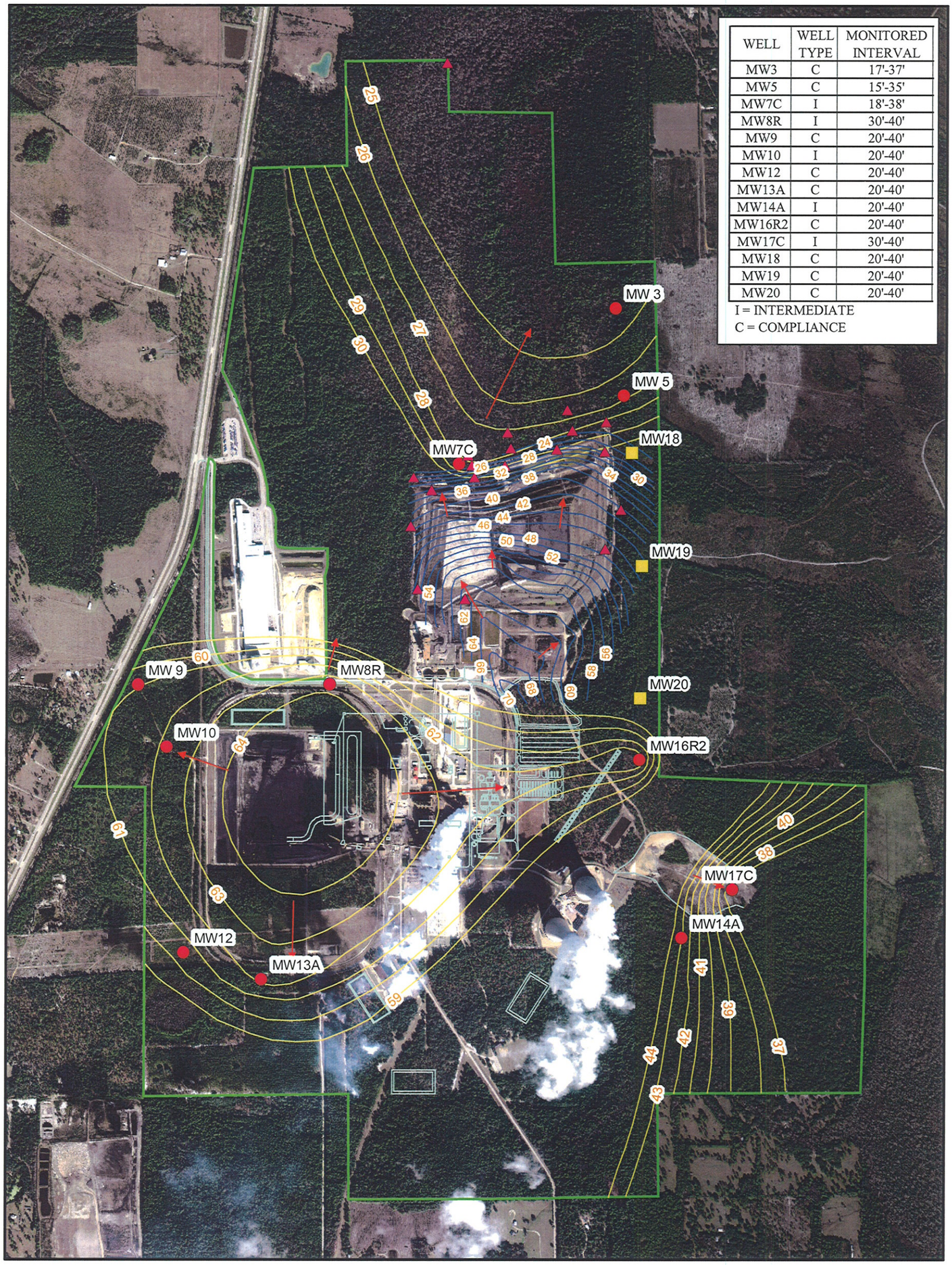
PROJECT
SEMINOLE ELECTRIC COOPERATIVE INC.
SGS UNIT 3
PUTNUM COUNTY, FL

TITLE
ESTIMATED GROUNDWATER CONTOURS

Golder Associates
Tampa, Florida

PROJECT No. 053-9540			SCALE AS SHOWN	REV. 0
DESIGN	QY	9 June 2006	FIGURE: 6-1	
GIS	QY	9 June 2006		
CHECK	ALG	9 June 2006		
REVIEW	MM	9 June 2006		

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WELL	WELL TYPE	MONITORED INTERVAL
MW3	C	17'-37'
MW5	C	15'-35'
MW7C	I	18'-38'
MW8R	I	30'-40'
MW9	C	20'-40'
MW10	I	20'-40'
MW12	C	20'-40'
MW13A	C	20'-40'
MW14A	I	20'-40'
MW16R2	C	20'-40'
MW17C	I	30'-40'
MW18	C	20'-40'
MW19	C	20'-40'
MW20	C	20'-40'

I = INTERMEDIATE
C = COMPLIANCE

LEGEND

- Groundwater Monitoring Plan Wells
- Proposed Groundwater Monitoring Plan Wells
- Landfill Drain Performance Monitoring Plan Wells (Ardaman & Associates Data)
- Contours - Aug. 05 Groundwater Monitoring Plan Data
- Contours - 1999 Piezometer Data
- Groundwater Flow Direction
- Site Plan
- Property Boundary

REFERENCE

1. Groundwater contour lines (Foot, NGVD29), Golder
2. The landfill area has 28 monitoring wells that are being monitored as part of an Intermediate Remedial Action Plan
3. 2004 aerial photography, USGS Digital Ortho Quarter Quadrangles (DOQQ)
4. Groundwater contour lines near landfill area, Ardaman & Associates, Feasibility Study, 2001

0.3 0 0.3 Miles

N

PROJECT
SEMINOLE ELECTRIC COOPERATIVE INC.
SGS UNIT 3
PUTNUM COUNTY, FL

TITLE
ESTIMATED GROUNDWATER CONTOURS

Golder Associates
Tampa, Florida

PROJECT No. 053-9540			SCALE AS SHOWN	REV. 0
DESIGN	QY	9 June 2006		
GIS	QY	9 June 2006		
CHECK	ALG	9 June 2006	**FIGURE: 6-2**	
REVIEW	MM	9 June 2006		

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SECTION 7.0

Division of Water Resources Management's Watershed Assessment Section

The Division of Water Resources Managements Watershed Assessment Section has the following comments:

1. **The applicant used the CORMIX model to calculate the dilution characteristics for the requested mixing zones. Based on the derivation of dilution in our Attachment 1, the dilution factors in Table 10.1.2-4 appear to be calculated as dilution (D) instead of (S) as used by CORMIX All CORMIX concentrations are expressed as 'excess' concentrations after the ambient concentration has been subtracted from both the effluent and the criterion concentrations. Dilution (S) in CORMIX is then the ratio of the excess concentration at the discharge port (after subtracting out the ambient concentration) to the 'diluted' concentration at any downstream location. To correctly match up predicted dilution to required dilution, the ambient concentrations must be subtracted from both the effluent and criterion concentrations in the calculation of required dilution. This is important, even when modeling as a percent reduction, as the predicted dilution (S) in the model assumes the background ambient concentration has been subtracted out. It appears to us that the applicant used the equation [(EC-C)/C-BC)] from our Attachment 1 for the required dilution. It is our understanding that to match up with the CORMIX dilution (S) the equation [(EC-BC)/(C-BC)] should be used to calculate the required dilution. This will have the effect of adding 1 to each of the required dilutions in Table 10.1.2-4 and increasing the size of mixing zones. Please have the applicant address this concern.**

   Dilutions in the Table 10.1.2-4 are calculated as required in the referenced Attachment. During the initial mixing zone calculation in CORMIX the ambient concentration was taken into account by adding one to the dilutions in order to produce S. This can be seen from the CORMIX output that the mixing zone for conductivity (dilution of 3.01 according to Table 10.1.2-4) is the mixing zone for S = 4.01. Table 10.1.2-4 has been revised to include the required dilution (S) in the equation [(EC-BC)/(C-BC)] as was previously used in CORMIX for clarification (See Table 7-1)

2. **The water quality criterion for specific conductance is 1,275 umhos or 50 percent above background, whichever is greater. Please have the applicant explain the derivation of the specific conductance criterion of 1,990 umhos/cm that was used in the modeling. Include all calculations and assumptions.**

   The 95th percentile background concentration for conductivity for the St Johns River is 1,327 µmhos/cm, therefore fifty percent above the background concentration value for the St. Johns River is 1,990 µmhos/cm. The water quality database can be found in Section 10.1.2, Attachment B, and includes data from St. Johns River Water Management District STORET database and/or Seminole Generating Station Discharge Monitoring Reports (period of record 1993 through 2005). The data was tabulated and the 95th percentile values for the various water quality parameters were calculated and used as input data in the CORMIX model. The database is provided on the attached CD.

3. **Please have the applicant provide the details for how the worst-case criteria were developed for each of the hardness dependent metals. Include all calculations and assumptions. In previous renewal cycles we have provided the applicant with the following recommendations. Worst-case ambient criteria and effluent concentrations**

for hardness dependent metals should be based on the lowest hardness (worst case) for both effluent and receiving water. For mixing zones it should be the lowest 5th percentile hardness from either the receiving water or the effluent and not the average. Alternatively, it would be more accurate to use actual paired hardness and metal data. By this we mean, use the actual hardness (if available) from the same station/date/time as the metal sample to calculate the criterion value and compare it to the metal concentration of the same sample.

Average values for hardness were originally used in the CORMIX mixing zone calculations. Tables 7-1 and 7-2 (Table 10.1.2-4-REVISED and 10.1.2-5-REVISED) are attached and incorporate the use of the lowest 5th percentile hardness value(s) for the standard calculation in the mixing zone calculation. Seminole anticipates that hardness will be monitored in the future and "paired" effluent data will be used to calculate the metals criterion values.

4. **The CORMIX model switches between predicting flux-average dilution and centerline dilution depending on which module is in use. The output clearly indicates whether the prediction of dilution is centerline or flux-average. The CORMIX manual provides guidance for converting between the two values. Guidance previously provided to the applicant clearly states that DEP required dilution be met along the centerline as opposed to using the flux-average. Please have the applicant address this concern.**

   The applicant concurs and as provided in Section 10.1.2, Volume II of the SCA, Attachment C - CORMIX Prediction File, the output states the dilution is centerline.

5. **The applicant states that if all samples from the river were less than the detection limit then the constituent was assumed absent. We have previously provided the applicant with the rule requirement (Rule 62-4.246, FAC.) and guidance for handling this situation. Rule 62-4.246(11), FAC., allows for the use of zero only when there is no evidence that the pollutant is present in the ambient water. For all naturally occurring constituents, the assumption made by the applicant could be a violation of Rule 62-4.246(8), FAC, which requires the use of one half the MDL or the criterion whichever is less when there is evidence that the pollutant is present. This is particularly important, as the river is the source of the water used by the facility. Therefore, all naturally occurring constituents of the St. Johns River should be believed present. Data less than DEP approved detection limits would indicate compliance with the criteria, but not the absence of the constituent. Please have the applicant address this concern.**

   While the text provided as a footnote on the raw data indicates that "if all samples are non-detect then the constituent is assumed absent", none of the sample values were assumed to be absent or zero because the condition never occurred. If samples were less than the detection limit, as noted as a footnote, "half of the detection limit or half of the water quality standard was used, whichever is less".

6. **The applicant notes that no toxicity data are available that are representative of the proposed discharge. However, it is our understanding that the current discharge is not in compliance with the acute toxicity criterion. As such, no mixing zones other than thermal can be implemented in a permit without a demonstration of compliance with the acute toxicity criterion. This is in accordance with Rule 62-4.244, FAC**

requirements that all waters of the state, (even inside mixing zones) comply with the minimum criteria for surface waters. Please have the applicant address this concern.

Toxicity data representative of the proposed discharge from the Units 1 and 2 Cooling Tower Blowdown is attached. Toxicity tests were conducted using the species, *Daphnia magna* (See Attachment 7-1). The current discharge via plant outfall 001 is not representative of the proposed discharge after the construction and operation of Unit 3 because surface water discharge of all process wastewaters, with the exception of cooling tower blowdown, will be eliminated. It is anticipated that in the future, acute toxicity tests will be conducted using *Daphnia magna* and *Pimephales promelas* (freshwater species). Based on the dramatic improvements projected through the Unit 3 surface water discharge elimination proposal, there are reasonable assurances of expected compliance with the minimum criteria for surface waters.

7. **Please have the applicant explain why oil and grease will become a constituent of concern when no mixing zone was requested for the most recent renewal. Also have the applicant explain why the concentrations of cadmium and lead are expected to increase while the concentrations for all other metals will either remain the same or decrease.**

   The ambient river quality data for oil and grease, cadmium, and lead all contain either a series of non detects with high detection limits or values that were entered into the database as zero (for the purposes of the mixing zone calculations) and are taken to be one-half the water quality standard. All three of these constituent's 95th percentile values are likely artificially inflated; as a result, the modeling indicates that mixing zones are needed. However, it is not possible to confirm that a mixing zone is not required without additional monitoring data. As previously discussed, it is anticipated that future effluent monitoring data can be used to calculate the criterion values for oil and grease, cadmium, and lead.

8. **The applicant explains that the mixing zones are sized on the 'composited' results from the six different scenarios run with the CORMIX model. The results of these analyses are presented in Table 10.1.2-5m, as distance parallel to the shore and distance perpendicular to the shore. The area calculated from the distances is double the area of the requested mixing zones. Please have the applicant provide a detailed explanation of how the mixing zones were sized and why the requested mixing zones are smaller than the area calculated from the dimensions of the 'composited' model results.**

   The value of the mixing zone parallel to shore was doubled because the St. Johns River is tidally influenced. This accounts for the movement of the river in both the upstream and the downstream direction; however, not at the same time since it is assumed that the effluent plume will disperse either upstream or downstream. We have revised the size of the mixing zones to account for the movement and request that the mixing zone is centered on the discharge port, however, it is anticipated that only a portion of the requested mixing zones will be used at one time.

9. **The applicant provided the DEP with an electronic copy of the report in PDF format. The DEP was not able to search or extract information (data) from this PDF file. Therefore, we could not verify the determination of worst-case effluent and ambient**

SECTION 7.0

Division of Water Resources Management's Watershed Assessment Section

conditions. Please have the applicant provide all ambient and effluent data used in the application in usable electronic form such as EXCEL or ACCESS.

The attached CD provides the CORMIX data in EXCEL format.
NOTE: Tables 7-3 through 7-12 provide a summary of the mixing zone flow scenarios, upstream/downstream/offshore limits and resulting mixing zone sizes for temperature, oil and grease, specific conductivity, cadmium, copper, cyanide, iron, lead, mercury, and selenium, respectively. Section 10.1.2 of the SCA has been revised to reflect the above referenced revisions to the mixing zone calculations (See Attachment 7-2 and 7-3).

TABLE 7-1
SEMINOLE GENERATING STATION COOLING TOWER BLOWDOWN CHARACTERISTICS

Parameter	Average	Maximum	95th Percentile	Class III Water Quality Standard	Number of Samples	Assumed Blowdown Quality	Exceeds Standard	Dilutions (D) Required[1]
Temperature (°F)*	77.10	92.28	57.26	92.0000	947	89.2000	no	
Temperature Rise (°F)*	0.00	0.00	0.00	5.0000		31.9406	yes	6.39
Oil and Grease (mg/L)	1.42	6.40	3.08	5.0000	253	10.7800	yes	4.01
Specific Conductivity (µmhos/cm)	940.3	1,516	1,327	1,990.7250	978	4,645.0250	yes	5.00
Cadmium (ug/L)	0.57	2.20	1.00	1.1697	415	3.5000	yes	14.73
Copper (ug/L)	1.76	17.00	5.00	9.6469	424	17.5000	yes	2.69
Cyanide (ug/L)	1.70	4.00	2.60	5.2000	33	9.1000	yes	2.50
Iron (ug/L)	0.20	1.52	0.43	1.0000	433	1.4969	yes	1.87
Lead (ug/L)	1.77	10.00	2.00	3.3445	375	11.4030	yes	6.99
Mercury (ug/L)	0.004	0.017	0.01	0.0120	61	0.0354	yes	13.29
Selenium (ug/L)	1.16	4.90	2.50	5.0000	75	8.7500	yes	2.50
Silver (ug/L)***	0.01	0.05	0.02	0.0700	49	0.0700	no	

Source of Sampling Data: ECT, 2004.

* 95% Temperature is 5% low temperature

**pH controlled between 7.0 and 7.5 by addition of sulfuric acid

*** Data based on Method E200.8

Blowdown temperature is highest value for months October thru May (October Value Combined 3 units)

Discharge Flow = 5970 gpm = 13.3 cfs

[1] Dilutions are calculated using the formula: [(EC-BC)/(C-BC)]

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TABLE 7-2
EXISTING AND PROPOSED MIXING ZONES

Constituent	Existing Units 1 and 2 Mixing Zone (square meters)	Proposed Units 1-3 Mixing Zones (square meters)	Parallel to Shore[1] (meters)	Perpendicular to Shore (meters)
Copper	253.00	31.33	4.58	6.84
Mercury	67,323.00	2,045.68	51.04	40.08
Cyanide	108.00	25.58	4.18	6.12
Iron	15.00	11.78	2.86	4.12
Oil and Grease	23.00	84.00	7.44	11.29
Selenium	7.00	25.58	4.18	6.12
Specific Conductivity	170.00	145.93	9.84	14.83
Temperature	39.00	240.39	13.10	18.35
Zinc	29.00	NR	NR	NR
Cadmium	NR	3,297.31	68.48	48.15
Lead	NR	1,195.67	35.96	33.25

NR - Not Required

Note:

[1] Data was doubled to account for tidal influence, and account for the upstream or downstream flow direction.

Mixing zone should be centered on the discharge point.

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TABLE 7-3
THERMAL MIXING ZONE CALCULATIONS
(TEMPERATURE)

Effluent Value = +31.94
Water Quality Standard = +5 °F
Dilution Reguired = 6.39

Flow Scenario	Upstream Limit (m)	Downstream Limits (m)	Offshore Limits (m)	Mixing Zone (m^2)
Median Ebb Current	0	6.37	17.41	110.9017
Median Flood Current	0	5.46	15.46	84.4116
High Ebb Current	0	6.55	13.24	86.722
High Flood Current	0	6.12	16.26	99.5112
Low Ebb Current	0	6.2	18.35	113.77
Low Flood Current	0	5.87	14.69	86.2303
Composite	0	6.55	18.35	120.1925

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TABLE 7-4
ANNUAL AVERAGE 16 INCH
OIL AND GREASE MIXING ZONE

Effluent Value = 10.78
Water Quality Standard = 5 mg/l
Dilution Reguired = 4.01

Flow Scenario	Upstream Limit (m)	Downstream Limits (m)	Offshore Limits (m)	Mixing Zone (m^2)
Median Ebb Current	0	3.66	9.34	34.1844
Median Flood Current	0	3.5	10.45	36.575
High Ebb Current	0	3.72	8.46	31.4712
High Flood Current	0	3.13	11.29	35.3377
Low Ebb Current	0	3.62	9.82	35.5484
Low Flood Current	0	3.59	10.01	35.9359
Composite	0	3.72	11.29	41.9988

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TABLE 7-5
ANNUAL AVERAGE 16 INCH
SPECIFIC CONDUCTIVITY MIXING ZONE

Effluent Value = 4645
Water Quality Standard = 1990.725 umhos/cm
Dilution Reguired = 5

Flow Scenario	Upstream Limit (m)	Downstream Limits (m)	Offshore Limits (m)	Mixing Zone (m^2)
Median Ebb Current	0	4.86	12.12	58.9032
Median Flood Current	0	4.54	13.98	63.4692
High Ebb Current	0	4.92	10.63	52.2996
High Flood Current	0	3.53	14.83	52.3499
Low Ebb Current	0	4.73	12.76	60.3548
Low Flood Current	0	4.66	13.04	60.7664
Composite	0	4.92	14.83	72.9636

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TABLE 7-6
ANNUAL AVERAGE 16 INCH
CADMIUM MIXING ZONE

Effluent Value = 3.5
Water Quality Standard = 1.17 ug/l
Dilution Reguired = 14.73

Flow Scenario	Upstream Limit (m)	Downstream Limits (m)	Offshore Limits (m)	Mixing Zone (m^2)
Median Ebb Current	0	26.72	47.15	1259.848
Median Flood Current	0	7.34	45.47	333.7498
High Ebb Current	0	34.24	39.57	1354.8768
High Flood Current	0	5.72	43.98	251.5656
Low Ebb Current	0	19.23	48.15	925.9245
Low Flood Current	0	14.58	44.55	649.539
Composite	0	34.24	48.15	1648.656

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TABLE 7-7
ANNUAL AVERAGE 16 INCH
COPPER MIXING ZONE

Effluent Value = 17.5
Water Quality Standard = 9.65 ug/l
Dilution Reguired = 2.7

Flow Scenario	Upstream Limit (m)	Downstream Limits (m)	Offshore Limits (m)	Mixing Zone (m^2)
Median Ebb Current	0	2.26	5.94	13.4244
Median Flood Current	0	2.23	6.42	14.3166
High Ebb Current	0	2.22	5.42	12.0324
High Flood Current	0	2.14	6.84	14.6376
Low Ebb Current	0	2.28	6.21	14.1588
Low Flood Current	0	2.29	6.34	14.5186
Composite	0	2.29	6.84	15.6636

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TABLE 7-8
ANNUAL AVERAGE 16 INCH
CYANIDE MIXING ZONE

Effluent Value = 9.1
Water Quality Standard = 5.2 ug/l
Dilution Reguired = 2.5

Flow Scenario	Upstream Limit (m)	Downstream Limits (m)	Offshore Limits (m)	Mixing Zone (m^2)
Median Ebb Current	0	2.02	5.32	10.7464
Median Flood Current	0	2.05	5.9	12.095
High Ebb Current	0	2.09	5.13	10.7217
High Flood Current	0	1.95	6.12	11.934
Low Ebb Current	0	2.04	5.57	11.3628
Low Flood Current	0	2.05	5.68	11.644
Composite	0	2.09	6.12	12.7908

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TABLE 7-9
ANNUAL AVERAGE 16 INCH
IRON MIXING ZONE

Effluent Value = 1.4969
Water Quality Standard = 1 ug/l
Dilution Reguired = 1.87

Flow Scenario	Upstream Limit (m)	Downstream Limits (m)	Offshore Limits (m)	Mixing Zone (m^2)
Median Ebb Current	0	1.4	3.75	5.25
Median Flood Current	0	1.35	3.81	5.1435
High Ebb Current	0	1.35	3.45	4.6575
High Flood Current	0	1.37	4.12	5.6444
Low Ebb Current	0	1.43	3.92	5.6056
Low Flood Current	0	1.39	3.83	5.3237
Composite	0	1.43	4.12	5.8916

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TABLE 7-10
ANNUAL AVERAGE 16 INCH
LEAD MIXING ZONE

Effluent Value =	11.403	
Water Quality Standard =	3.34 ug/l	
Dilution Reguired =	6.99*1.7	11.883

Flow Scenario	Upstream Limit (m)	Downstream Limits (m)	Offshore Limits (m)	Mixing Zone (m^2)
Median Ebb Current	0	14.87	29.8	443.13
Median Flood Current	0	6.69	30.47	203.84
High Ebb Current	0	17.98	25.46	457.77
High Flood Current	0	0.54	29.55	15.96
Low Ebb Current	0	12.94	33.25	430.26
Low Flood Current	0	10	29.62	296.20
Composite	0	17.98	33.25	597.84

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TABLE 7-11
ANNUAL AVERAGE 16 INCH
MERCURY MIXING ZONE

Effluent Value = 0.0354
Water Quality Standard = 0.012 ug/l
Dilution Reguired = 13.29

Flow Scenario	Upstream Limit (m)	Downstream Limits (m)	Offshore Limits (m)	Mixing Zone (m^2)
Median Ebb Current	0	20.22	37.85	765.327
Median Flood Current	0	7.11	37.47	266.4117
High Ebb Current	0	25.52	32.26	823.2752
High Flood Current	0	2.16	36.48	78.7968
Low Ebb Current	0	15.8	40.08	633.264
Low Flood Current	0	12.16	36.58	444.8128
Composite	0	25.52	40.08	1022.8416

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TABLE 7-12
ANNUAL AVERAGE 16 INCH
SELENIUM MIXING ZONE

Effluent Value = 8.75
Water Quality Standard = 5 ug/l
Dilution Reguired = 2.5

Flow Scenario	Upstream Limit (m)	Downstream Limits (m)	Offshore Limits (m)	Mixing Zone (m^2)
Median Ebb Current	0	2.02	5.32	10.7464
Median Flood Current	0	2.05	5.9	12.095
High Ebb Current	0	2.09	5.13	10.7217
High Flood Current	0	1.95	6.12	11.934
Low Ebb Current	0	2.04	5.57	11.3628
Low Flood Current	0	2.05	5.68	11.644
Composite	0	2.09	6.12	12.7908

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ATTACHMENT 7-1

Client / Project Information	
Client Name: Seminole Electric	
Project No.: 3-200.144	
NPDES No.:	DSN No.:
Sample: C1-541	Receiving Stream:
I-C4B Cooling Tower Blowdown	

Test Information	
Test Method: Acute	Duration: 96 hrs
Test Concentration: C4, 100%	
No. of Reps.: ~~C4, 100%~~ 4	No. of Organisms/Rep.: 10
Test Vessel: 150 mL dish	Test Volume: 100 mLs
Control Water: MHSFW	Diluent: MHSFW
Temperature: 20 ±1°C	Photoperiod: 16 hours light / 8 hours dark
Test Species: *Daphnia magna*	Organism Age: < 24 hrs
Location: Env. chamber #1	D.O. Limitation: NA
Salinity: NA	Synthetic Salt: NA
Brine: NA	Natural Sea Water: NA
Feeding Regime: Prior to test and at 48 hrs	Food: YCT + *Selanastrum*
Start Date: 8/23/01	Completion Date: 8/27/01
Start Time: 1240	Completion Time: 1410

Associated Physical and Chemical Parameters		
Temp ✓	DO ✓	pH ✓
Alk ✓	Hard ✓	Cond ✓
Sal.	TRC	NH_3
BOD	TSS	TDS

Comments:

Prepared By: Stephanie Tisher

WHOLE EFFLUENT ANALYTICAL DATA

Episode Number: E-074-01

ASSOCIATED ANALYTICAL PARAMETERS	Sample No S-115-01	Sample No.	Sample No.	Sample No.
Cond (µmhos)	4,000 SM 3			
Alk (mg/l)	55 SM			
Hard (mg/l)	1046 SM			
TRC (mg/l)				
NH_3 (mg/l)				
DO (mg/l)	9.36 SM 1			
Temp (°C)	3° SM 5lB			
pH (su)	7.2 SM 4			
Sal (ppt)	5 SM Refr			

Salinity 3 - Yellow conductivity key

DILUTION WATER ANALYTICAL DATA

Water	Analytical Parameters					
Date/Water	DO	pH	Alk	Hard	Cond	Sal
8-23-01 / P.2C-01	8.85	7.9	58	94	300	NA

Water	Prep Date	1st Use
P.2C-01	8/13/01 @ 1500	8/15/01

Sample Number	S-115-C4	PG 3 of 4
Species Tested	D. Magna	
Age of organism at test initiation	< 24 hrs. old	

ACUTE ANALYTICAL DAILY DATA SHEET

Conc unit (%)	Rep	Dissolved Oxygen (mg/l)						Temperature (^{0}C)					
		0 h	24 h	48 h Old	48 h New	72 h	96 h	0 h	24 h	48 h Old	48 h New	72 h	96 h
4	A	9.07	7.83	8.13	9.11	7.73	8.12	20	20	20	21	21	21
100	A	9.36	7.30	8.14	8.36	7.48	7.86	20	20	20	21	21	21
Time		1232	1449	1130	1215	1125	1417	1230	1452	1130	1215	1126	1416
Observer/Meter		SM 1	SM 1	SM 1	SM 1	JG 1	SM 1	SM 52B	SM 52B	SM 52B	SM 52B	JG 52B	SM 52B

Conc unit (%)	Rep	pH (su)					
		0 h	24 h	48 h Old	48 h New	72 h	96 h
4	A	~~7.2~~ 7.9	8.1	7.7	7.8	7.8	7.7
100	A	7.2	7.2	7.5	6.9	7.5	7.3
Time		1231	1152	1133	1200	1125	1416
Observer/Meter		SM 4	SM 4	SM 4	SM 4	JG 4	SM 4

Initial Effluent Dissolved Oxygen: 9.36 mg/L

Action Taken (if any): NONE

Analyst: [signature]

Test Area

Env. Chamber: 1

Water bath: NA

Dates: Chemistry

0 h - 8/23/01

24 h - 8/24/01

48 h - 8/25/01

72 h - 8/26/01

96 h - 8/27/01

Signature of Review:

Sample Number	5-113-01	PG 4 of 4
Species Tested	*D.Magna*	
Age of organism at test initiation	< 24 hrs. old	

ACUTE ANALYTICAL DAILY DATA SHEET

Conc Units (%)	Replicate	Counts				
		Set Up	24 hours	48 hours	72 hours	96 hours
Ct	A	5	5	5	5	5
	B	5	5	5	5	5
	C	5	5	5	5	5
	D	5	5	5	5	5
	E	5	5	4	4	4
	F	5	5	5	5	5
	G	5	5	5	5	5
	H	5	5	5	5	5
100	A	5	5	5	5	5
	B	5	5	5	5	5
	C	5	5	5	5	5
	D	5	5	5	5	5
	E	5	5	5	5	5
	F	5	5	5	5	5
	G	5	5	5	5	5
	H	5	5	5	5	5
Observer		Tavia	Mishea	Dusher	JC	Dusher
Date		8/23/01	8/24/01	8/25/01	8/26/01	8/27/01
Time		1240	1255	1135	1105	1410

Comments:

Signature of Review:

BIOASSAY INFORMATION FORM

Client / Project Information

Client Name: Seminole Electric

Project No.: 3-200.144 3-321.100

NPDES No.: DSN No.:

Sample: I-04 01-630 Receiving Stream:

Cooling Tower Blowdown - S-157-01

Test Information

Test Method: Acute	Duration: 96 hours
Test Concentration: Ct., 100 %	
No. of Reps.: 8	No. of Organisms/Rep.: 5
Test Vessel: 250 mL dish	Test Volume: 200 mL
Control Water: MHSFW	Diluent: NA
Temperature: 20 ± 1°C	Photoperiod: 16 hours light / 8 hours dark
Test Species: *Daphnia magna*	Organism Age: <24 hrs
Location: Env. chamber #4	D.O. Limitation: > 4.0 mg/l
Salinity:	Synthetic Salt: NA
Brine: NA	Natural Sea Water: NA
Feeding Regime: Prior to test and at 48 hours	Food: YCT & *Selanastrum*
Start Date: 9-26-01	Completion Date: 9-30-01
Start Time: 1530	Completion Time: 1330

Associated Physical and Chemical Parameters

Temp	✓	DO	✓	pH	✓
Alk	✓	Hard	✓	Cond	✓
Sal.	✓	TRC		NH_3	
BOD		TSS		TDS	

Comments:

Prepared By: D Fisher

WHOLE EFFLUENT ANALYTICAL DATA

Episode Number: E-086-01

ASSOCIATED ANALYTICAL PARAMETERS	Sample No 5-157-01		Sample No.		Sample No.		Sample No.	
Cond (µmhos)	3,800	SM 3						
Alk (mg/l)	48	SM						
Hard (mg/l)	7200	SM						
TRC (mg/l)								
NH_3 (mg/l)								
DO (mg/l)	8.89	SM 3						
Temp (°C)	2°	SM 5B						
pH (su)	7.3	SM 4						
Sal (ppt)	5	SM Ref						

Salinity measured via conductivity - 3 ppt

CONTROL WATER ANALYTICAL DATA

Water	Analytical Parameters					
Date/Water	DO	pH	Alk	Hard	Cond	Sal
9-26-01/P-23-01	9.00	7.8	61	91	300	NA

Water	Prep Date	1st Use
P-23-01	9-22-01 @1200	9-24-01

Sample Number	S-157-01	PG 3 of 4
Species Tested	D. Magna	
Age of organism at test initiation	< 24 hrs	

ACUTE ANALYTICAL DAILY DATA SHEET

Conc unit (%)	Rep	Dissolved Oxygen (mg/l)						Temperature (^{0}C)					
		0 h	24 h	48 h Old	48 h New	72 h	96 h	0 h	24 h	48 h Old	48 h New	72 h	96 h
Ct.	A	8.72	8.33	8.38	9.27	8.22	8.35	20	19	19	21	19	20
CT (S)	A	8.65	8.07	8.87	8.52	8.48	8.47	20	19	19	21	19	20
100	A	9.22	8.19	8.85	8.43	8.55	8.61	20	19	19	21	19	20
Time		1527	1756	1740	1741	1207	1307	1525	1755	1735	1740	1205	1305
Observer/Meter		JH 1	JH 1	JG 1	JH 1	JG 1	JG 1	JH 51 13	JH 51 13	JG	JH	JH 51 13	JG 51 13	JG 51 13

Conc unit (%)	Rep	pH (su)						Salinity (ppt)					
		0 h	24 h	48 h Old	48 h New	72 h	96 h	0 h	24 h	48 h Old	48 h New	72 h	96 h
Ct.	A	7.8	8.0	8.0	8.3	8.1	8.1	0	0	0	0	0	0
CT (S)	A	7.9	8.0	8.0	8.0	8.4	8.0	5	7	7	8	8	8
100	A	7.5	7.8	7.9	7.6	7.9	7.7	5	5	6	5	5	5
Time		1526	1757	1741	1742	1206	1306	1527	1758	1742	1743	1210	1310
Observer/Meter		JH 4	JH 4	JG 4	JH 4	JG 4	JG 4	JH 1	JH 1	JG	JH 1	JG 1	JG 1

Initial Effluent Dissolved Oxygen: 8.89 mg/L

Action Taken (if any): NONE Analyst: JH

Test Area

Env. Chamber: 1 Water Bath: NA

Dates: Chemistry

0 h – 9-26-01
24 h – 9-27-01
48 h – 9-28-01
72 h – 9-29-01
96 h – 9-30-01

Comments:

Signature of Review:

Sample Number	S-157-01	PG 4 of 4
Species Tested	*D. Magna*	
Age of organism at test initiation	< 24 hrs	

ACUTE ANALYTICAL DAILY DATA SHEET

Conc Units (%)	Replicate	Counts				
		Set Up	24 hours	48 hours	72 hours	96 hours
Ct.	A	5	5	5	5	5
	B	5	5	5	5	5
	C	5	5	5	5	5
	D	5	5	5	5	5
	E	5	5	5	5	5
	F	5	5	5	5	5
	G	5	5	5	5	5
	H	5	5	5	5	5
Ct (S)	A	5	5	5	5	2
	B	5	5	4	4	3
	C	5	5	5	5	4
	D	5	4	4	4	4
	E	5	5	4	4	4
	F	5	5	2	2	2
	G	5	5	3	3	3
	H	5	4	3	3	3
100	A	5	5	5	5	5
	B	5	5	5	5	5
	C	5	5	5	5	5
	D	5	5	5	5	5
	E	5	5	5	5	5
	F	5	5	5	5	5
	G	5	5	5	5	5
	H	5	5	5	5	5
Observer		JH	JH	JG	JG	JG
Date		9-26-01	9-27-01	9-28-01	9-29-01	9-30-01
Time		1530	1810	1752	1215	1325

Comments:

Signature of Review:

ATTACHMENT 7-2

NPDES Permit Modification Narrative (Revised SCA Section 10.1.2)

The SGS is authorized to operate under NPDES Permit No. FL0036498 which is currently being processed for renewal. It is anticipated that the renewal NPDES permit will be issued during the second quarter of 2006. This SCA and NPDES permit modification application is specific to the SGS Unit 3 project.

SGS Unit 3 Project

The SGS Unit 3 project consists of the addition of a new unit (Unit 3) and related appurtenances onto the existing SGS Site. Existing plant systems such as the process wastewater treatment system, surface water intake and discharge structures will be utilized to support the new unit. The primary water uses for SGS Unit 3 will be for cooling tower makeup, wet FGD makeup, steam cycle makeup and process service water. Cooling water will continue to be withdrawn from the St. Johns River. Condenser cooling will be provided by a new mechanical draft cooling tower. The existing intake structure will continue to be used; however, two intake screen ports which are currently in the closed position will be opened during the operation of SGS Unit 3.

An additional intake pipe will be added in the river between the intake structure and the river water pump house. New pumps will be installed in the river pump house. Additionally, a new pipe will be added within the existing easement between the existing river pump house and SGS Unit 3. The source of water for the FGD makeup will be river water and treated wastewaters. Process service water will also come from river water.

Circulating Water Heat Rejection System

An induced draft, counterflow, rectangular in-line design mechanical draft cooling tower will be used to reject the heat load of about 3.4 Btu/hr for SGS Unit 3. It is estimated that the cooling tower will consist of 26 cells, each with a 200 HP fan. The circulating water (C.W.) flow rate to the cooling tower is estimated to be 360,000 gpm, with a drift rate estimated at 0.0005 percent of the C.W. flow rate (about 1.8 gpm). Cooling tower blowdown from Unit 3 will be combined with cooling tower blowdown from Units 1 and 2, and discharged to the St. Johns River. Table 10.1.2-1 provides an estimate of the monthly evaporation and blowdown rates of the Unit 3

cooling tower, and Table 10.1.2-2 provides the associated estimated blowdown temperatures. The cooling tower is designed to operate at 3.5 cycles of concentration.

Process Wastewater

Process wastewater streams other than cooling tower blowdown from Units 1, 2, and 3, will be treated and recycled as make-up water to the FGD scrubber system. Wastewater from the FGD system will be treated in a new zero liquid discharge (ZLD) system that will remove dissolved solids from the wastewater. Condensate from the ZLD system will be recovered as make-up to the steam cycles from Units 1, 2, and 3. The waste concentrate from the ZLD system will be evaporated in a spray dryer and disposed in the onsite landfill or offsite in permitted landfills. Existing process wastewater discharge to the St. Johns River from Units 1 and 2, as well as from the proposed SGS Unit 3, will be eliminated; the only SGS process wastewater proposed to be discharged to the St. Johns River from Units 1, 2, and 3 will be cooling tower blowdown, which primarily passes-through pollutants from the intake water.

SGS Units 1, 2 and 3 Water Quality

The quantitative water-use diagram/water budget for SGS Unit 3 is presented in Figure 10.1.2-1. The water quality typical of the St. Johns River in the vicinity of the SGS D-001 outfall is presented in Table 10.1.2-3. The water quality data primarily was collected from the St. Johns River Water Management District (SJRWMD, Watershed Action Volunteers Database) and is representative of the period of record from 1993 to 2005 (See Attachment 7-2 for raw data).

As discussed above, the existing process wastewater discharge from Units 1 and 2 will be eliminated from Outfall D-001 (except for cooling tower blowdown). For permitting purposes, the anticipated effluent discharge will consist of intake (river) water that has been cycled through the cooling tower 3.5 times. Therefore, the predicted effluent water quality is anticipated to be 3.5 times the representative water quality in the river (based on the value 95th percentile data) (See Table 10.1.2-3).

Mixing Zone Analysis

Methodology

In order to avoid increasing the discharge velocity from the SGS discharge structure to levels that might scour the river bottom, Seminole is proposing to remove the 12-inch diameter nozzle from the discharge port, resulting in a discharge port diameter of 16-inches. Seminole has utilized the FDEP-approved CORMIX discharge model to evaluate the impact of the proposed discharge from Units 1, 2, and 3 and quantify proposed mixing zones for certain water quality criteria. CORMIX-GI (Cornell Mixing Zone Expert System) version 4.03b (1999) was used to simulate initial jet turbulent mixing and the transformation of the pollutant plume by buoyant spreading, turbulent dispersion, and advective mixing. The model is capable of simulating single submerged port, multiport submerged and surface discharges. The proposed mixing zones for temperature, oil and grease, specific conductance, cadmium, copper, cyanide, iron, lead, mercury, silver and selenium were determined based on the model output for the dilution factors identified in Table 10.1.2-4 (Revised).

Model Inputs

Inputs into the CORMIX model include river geometry (depth and width), flow velocity or rate, ambient temperature or density, location of the discharge (depth and distance from bank), discharge flow rate or velocity, discharge temperature or density, constituent concentration, discharge port diameter or area, port height, and discharge vertical and horizontal angles. The river geometry is 3.05 m deep, 1,829 m wide, and has a slight meander. Six flow velocity scenarios were calculated by ECT for the existing permit renewal. The same scenarios were used for this modeling. The scenarios are:

- 90th Percentile Flood Current (0.22 fps)
- Median Flood Current (0.084 fps)
- 10th Percentile Flood Current (0.015 fps)
- 90th Percentile Ebb Current (0.22 feet fps)
- Median Ebb Current (0.084 fps)
- 10th Percentile Ebb Current (0.015 fps)

The ambient density was also calculated by ECT as 997.58 kilograms per cubic meter. The discharge was placed at 2.14 m deep and 274.3 m from the left bank of the river. The annual average discharge flowrate is 8.598 MGD from the Units 1, 2, and 3 flow diagram and the discharge temperature is 89.2°F. The discharge port is assumed to be a 16-inch pipe (the 12-inch diffuser is to be removed) in the river at a vertical angle of 20° and a horizontal angle of 290° and a port height of 0.184 m.

Proposed Mixing Zones

The results for each of the six flow scenarios and a composite envelop for each of the water quality parameters provided in Table 10.1.2-5 (Revised). A summary of the requested mixing zones for the parameters identified above along with a comparison to the previous mixing zones requested in the current permit renewal is provided in Table 10.1.2-5 (Revised).

Water Temperature

As previously discussed, the blowdown from the Unit 3 mechanical draft cooling tower will be combined with that of the Units 1 and 2 natural draft cooling towers and discharged to the St. Johns River. Table 10.1.2-2 tabulates the predicted average and maximum temperatures of the blowdown discharges, and the maximum and average ambient river temperatures, on a monthly basis. Because the predicted summertime (June-September) discharge temperatures with Unit 3 blowdown included are less than the existing Units 1 and 2 discharge temperatures, the addition of Unit 3 will not result in any additional temperature effect on the receiving body of water during the summer months.

Table 10.1.2-4 (Revised) summarizes the worst case discharge temperature for the year, and the worst case temperature, as well as the average, maximum, and 95th percentile values for the river, as well as the associated Class III water quality standard. The number of dilutions (6.39) of ambient river water required to lower the discharge temperature rise to the standard are also shown on Table 10.1.2-4 (Revised).

The resultant mixing zone for temperature, as well as the present required mixing zone size for Units 1 and 2, are shown in Table 10.1.2-5 (Revised). The highest predicted effluent temperature for the SGS Units 1, 2 and 3 discharge is 89.2°F. The low 95th percentile ambient temperature is

57.3°F. This discharge will result in a temperature rise of 31.9°F [See Table 10.1.2-4(Revised)]. A dilution factor of 5.4 is required to meet the temperature rise limitation of 5°F. As a result, the mixing zone for temperature will increase from 39 square meters (m^2) to about 240.39 m^2. This is a small portion of the St. Johns River in the site vicinity and therefore, no adverse impacts are anticipated as a result of the addition of Unit 3.

Oil and Grease

For Units 1, 2, and 3, the assumed effluent oil and grease concentration is 10.8 mg/L. The predicted effluent is above the water quality standard of 5 mg/L. A dilution factor of 4.0 is required and a mixing zone of 84.0 m^2 is proposed.

Specific Conductivity

The Units 1, 2, and 3 discharge is anticipated to be 4,645 (µmhos/cm). The 95th percentile ambient concentration is 1,327 µmhos/cm. A dilution factor of 5.0 is required to meet the water quality standard and a mixing zone of 145.9 m^2 is proposed.

Cadmium

The Units 1, 2, and 3 discharge is anticipated to be 3.5 mg/L compared to the water quality standard of 1.17 mg/L. The 95th percentile in the river is 1.0 mg/L, therefore the required dilution factor is 14.73 and a mixing zone of 3,297.3 m^2 is proposed.

Copper

For Units 1, 2, and 3, the assumed effluent concentration is 17.5 µg/L and the water quality standard is 9.65 µg/L. The 95th percentile ambient concentration is 5.0 µg/L, therefore, a dilution factor of 2.69 is required and a proposed mixing zone of 31.3 m^2 is currently proposed.

Cyanide

For Units 1, 2, and 3, the assumed effluent concentration is 9.1 µg/L compared to a water quality standard is 5.2 µg/L. The 95th percentile ambient concentration is 2.6 µg/L, therefore, a dilution factor of 2.5 is required and a mixing zone of 25.5 m^2 is requested.

Iron

For Units 1, 2, and 3, the assumed effluent concentration is 1.5 mg/L and the water quality standard is 1.0 mg/L. The 95th percentile ambient concentration is 0.43 mg/L. A dilution factor of 1.9 is required and a mixing zone of 11.7 m^2 is requested.

Mercury

For Units 1, 2, and 3, the assumed effluent concentration is 0.035 µg/L, compared to the water quality standard is 0.012 µg/L. The 95th percentile ambient concentration is 0.010 µg/L. A dilution factor of 13.29 is required and a mixing zone of 2,045.6 m^2 is requested.

Selenium

For Units 1, 2, and 3, the assumed effluent concentration is 8.75 µg/L and the water quality standard is 5.0 µg/L. The 95th percentile ambient concentration is 2.5 µg/L, therefore, a dilution factor of 2.5 is required and the requested mixing zone is 25.6 m^2.

Lead

The Units 1, 2, and 3 discharge is anticipated to be 11.40 mg/L compared to the water quality standard of 3.34 mg/L. The 95th percentile in the river is 2.0 mg/L, therefore the required dilution factor is 6.99 and a mixing zone of 1,195.67 m^2 is proposed.

Silver

Historical data indicate numerous exceedances of the water quality standard for silver in this segment of the St. Johns River. For that reason, EPA has listed this segment as impaired for silver and prepared a Total Maximum Daily Load (TMDL) for silver under Section 303(d) of the Clean Water Act. However, Seminole has conducted water quality sampling for silver using ultra-clean techniques (EPA Method No. E308) from July 2004 to December 2005. These data, as set forth in Table 10.1.2-3, demonstrate that this segment of the St. Johns River is in compliance with the water quality standard for silver. Therefore, neither a mixing zone nor any other manner of regulatory relief are proposed for silver because the best available data indicate that there is not a compliance problem.

Conclusion

In general, SGS Unit 3 entails an additional discharge of cooling tower blowdown. Significantly, the SGS Unit 3 Project includes the installation and operation of a ZLD process wastewater elimination system. With the ZLD, the operation of Unit 3 will not result in discharges of low volume waste, cleaning wastestreams, ash handling water or other traditional pollutant waste streams to the St. Johns River. Moreover, the ZLD will also eliminate all of these wastestreams from Units 1 and 2, resulting in a substantial, net environmental improvement. The only remaining surface water discharges will be cooling tower blowdown from Units 1, 2, and 3. The pollutants in the cooling tower blowdown predominantly are "pass-through" pollutants from the intake river water.

TABLE 10.1.2-1
Estimated SGS Unit 3 Cooling Tower Monthly Evaporation and Blowdown Rates in GPM

Month	Peak Evaporation	Peak Blowdown	Average Evaporation	Average Blowdown
January	5,202	2,079	4,501	1,799
February	5,350	2,139	4,579	1,830
March	5,350	2,139	4,723	1,888
April	5,507	2,201	4,898	1,958
May	5,673	2,268	5,079	2,030
June	5,601	2,239	5,157	2,061
July	5,601	2,239	5,195	2,076
August	5,576	2,229	5,175	2,068
September	5,601	2,239	5,120	2,046
October	5,437	2,173	4,911	1,963
November	5,350	2,139	4,710	1,882
December	5,068	2,026	4,534	1,812

Source: Golder, 2005

TABLE 10.1.2.2

Estimated SGS Unit 3 Cooling Tower Monthly Blowdown Temperatures in ° F.

Month	Peak Blowdown Temperature	Average Blowdown Temperature
January	85.7	76.4
February	87.2	77.0
March	87.2	78.7
April	88.1	80.0
May	89.2	81.4
June	90.8	83.9
July	90.8	84.4
August	91.3	84.8
September	90.8	83.4
October	89.7	81.6
November	87.2	78.5
December	88.5	77.2

Source: Golder, 2005

TABLE 10.1.2-3
ST. JOHNS RIVER SURFACE WATER QUALITY NEAR SGS OUTFALL

Parameter	Average	Maximum	95th Precentile	Number of Samples	Class III Water Quality Standard[1]
Temperature (°F)*	77.10	92.28	57.26	947	92 or +5
Turbidity (NTU)	5.44	117.00	9.03	750	
pH	7.71	9.01	8.56	918	6.0 to 8.5
Oil and Greese (mg/L)	1.42	6.40	3.08	253	5
Ammonia, as NH4 (mg/L)	0.027	0.531	0.089	734	
Unionized Ammonia, as NH4 (mg/L)	0.00099	0.0284	0.0039	644	0.02
TKN, as N (mg/L)	1.30	2.40	1.78	717	
Nitrate+Nitrite, as N (mg/L)	0.052	0.410	0.190	344	
Nitraogen, total (mg/L)	1.304	2.237	1.831	317	
Phosphorus, total (mg/L)	0.074	0.682	0.119	708	
Ortho-phasphate (mg/L)	0.022	0.073	0.052	205	
Total Hardness, as CaCO3 (mg/L)	176	480	255	419	
Specific Conductivity (µmhos/cm)	940.3	1,516	1,327	978	1,991
Beryllium, annual average (µg/L)	0.022	0.050	0.038	22	0.13
Arsenic (µg/L)	2.23	8.85	8.85	214	50
Cadmium (µg/L)	0.57	2.20	1.00	415	1.77
Chromium (µg/L)	2.05	22.80	9.63	397	
Copper (µg/L)	1.76	17.00	5.00	424	15.1
Cyanide (µg/L)	1.70	4.00	2.60	33	5.2
Iron (mg/L)	0.20	1.52	0.43	433	1.0
Lead (µg/L)	1.77	10.00	3.26	375	6.5
Mercury (µg/L)	0.004	0.017	0.010	61	0.012
Nickel (µg/L)	3.56	53.00	9.45	376	84
Selenium (µg/L)	1.16	4.90	2.50	75	5
Silver (µg/L)	0.010	16.0	0.020	49	0.07
Zinc (µg/L)	9.00	196.0	25.0	443	193
Total Alpha (picocuries/L)	0.80	2.1	1.9	24	

Source: ECT, 2005.

* 95% Temperature is 5% low temperature

[1]Florida Administrative Code Chapter 62-302 Surface Water Quality Standards.

TABLE 10.1.2-4 (REVISED)
SEMINOLE GENERATING STATION COOLING TOWER BLOWDOWN CHARACTERISTICS

Parameter	Average	Maximum	95th Percentile	Class III Water Quality Standard	Number of Samples	Assumed Blowdown Quality	Exceeds Standard	Dilutions (D) Required[1]
Temperature (°F)*	77.10	92.28	57.26	92.0000	947	89.2000	no	
Temperature Rise (°F)*	0.00	0.00	0.00	5.0000		31.9406	yes	6.39
Oil and Grease (mg/L)	1.42	6.40	3.08	5.0000	253	10.7800	yes	4.01
Specific Conductivity (µmhos/cm)	940.3	1,516	1,327	1,990.7250	978	4,645.0250	yes	5.00
Cadmium (ug/L)	0.57	2.20	1.00	1.1697	415	3.5000	yes	14.73
Copper (ug/L)	1.76	17.00	5.00	9.6469	424	17.5000	yes	2.69
Cyanide (ug/L)	1.70	4.00	2.60	5.2000	33	9.1000	yes	2.50
Iron (ug/L)	0.20	1.52	0.43	1.0000	433	1.4969	yes	1.87
Lead (ug/L)	1.77	10.00	2.00	3.3445	375	11.4030	yes	6.99
Mercury (ug/L)	0.004	0.017	0.01	0.0120	61	0.0354	yes	13.29
Selenium (ug/L)	1.16	4.90	2.50	5.0000	75	8.7500	yes	2.50
Silver (ug/L)***	0.01	0.05	0.02	0.0700	49	0.0700	no	

Source of Sampling Data: ECT, 2004.

* 95% Temperature is 5% low temperature

**pH controlled between 7.0 and 7.5 by addition of sulfuric acid

*** Data based on Method E200.8

Blowdown temperature is highest value for months October thru May (October Value Combined 3 units)

Discharge Flow = 5970 gpm = 13.3 cfs

[1] Dilutions are calculated using the formula: [(EC-BC)/(C-BC)]

TABLE 10.1.2-5 (REVISED)
EXISTING AND PROPOSED MIXING ZONES

Constituent	Existing Units 1 and 2 Mixing Zone (square meters)	Proposed Units 1-3 Mixing Zones (square meters)	Parallel to Shore[1] (meters)	Perpendicular to Shore (meters)
Copper	253.00	31.33	4.58	6.84
Mercury	67,323.00	2,045.68	51.04	40.08
Cyanide	108.00	25.58	4.18	6.12
Iron	15.00	11.78	2.86	4.12
Oil and Grease	23.00	84.00	7.44	11.29
SeleNium	7.00	25.58	4.18	6.12
Specific Conductivity	170.00	145.93	9.84	14.83
Temperature	39.00	240.39	13.10	18.35
Zinc	29.00	NR	NR	NR
Cadmium	NR	3,297.31	68.48	48.15
Lead	NR	1,195.67	35.96	33.25

NR - Not Required

Note:

[1] Data was doubled to account for tidal influence, and account for the upstream or downstream flow direction.

Mixing zone should be centered on the discharge point.

ATTACHMENT 7-3

Ambient Total Cadmium Data in St. Johns River near SECI Palatka Plant

Class III Water Quality Standard = 1.17 µg/L

Average MDL = 2.7 µg/L

Average =	0.43 µg/L
Maximum =	2.20 µg/L
Standard Dev =	0.38 µg/L
95 Percentile =	1.00 µg/L

Count 415.00

Station	Date	Time		Cadmium (µg/L)	Remark Code	Value used (µg/L)
SECI D-005	6/93		<	2	K	0.58
SECI D-005	9/93		<	2	K	0.58
SECI D-005	12/93		<	2	K	0.58
SECI D-005	3/94		<	2	K	0.58
SECI D-005	6/94		<	2	K	0.58
SECI D-005	9/94					0.58
SECI D-005	12/94		<	2	K	0.58
SECI D-005	3/95		<	2	K	0.58
SECI D-005	6/95		<	2	K	0.58
SECI D-005	9/95		<	2	K	0.58
SECI D-005	12/95		<	1	K	0.50
SECI D-005	3/96		<	1	K	0.50
SECI D-005	6/96		<	1	K	0.50
SECI D-005	9/96		<	2	K	0.58
SECI D-005	12/96			1.5		1.50
SECI D-005	3/97		<	1	K	0.50
SECI D-005	6/97		<	1	K	0.50
SECI D-005	9/97		<	1	K	0.50
SECI D-005	12/97		<	1	K	0.50
FP41	9/22/1993	14:50		0	T	0.58
FP42	9/22/1993	15:00		0	T	0.58
FP42	11/27/2001	10:00		0.019	T	0.02
FP43	9/22/1993	15:15		0	T	0.58
SJ6	5/16/2002	10:45		-0.014	T	0.58
SJRCC	5/12/1993	13:40		0	T	0.58
SJRCC	6/8/1993	8:25		-0.1	T	0.58
SJRCC	7/7/1993	11:20		-0.1	T	0.58
SJRCC	9/22/1993	8:50		0	T	0.58
SJRCC	12/15/1993	11:30		-0.1	T	0.58
SJRCC	1/20/1994	12:05		-0.1	T	0.58
SJRCC	2/15/1994	10:15		0	T	0.58
SJRCC	3/14/1994	12:10		0.2		0.20
SJRCC	4/12/1994	11:30		2		2.00
SJRCC	5/16/1994	12:05		0	T	0.58
SJRCC	6/14/1994	12:25		-0.1	T	0.58
SJRCC	7/12/1994	11:40		-1.6	T	0.58
SJRCC	8/16/1994	11:45		0	T	0.58
SJRCC	9/13/1994	11:55		0	T	0.58
SJRCC	10/17/1994	11:25		0.01	W	0.01
SJRCC	11/18/1994	10:40		0	T	0.58
SJRCC	12/13/1994	12:10		0	T	0.58
SJRCC	1/19/1995	11:40		0	T	0.58
SJRCC	3/15/1995	10:40		0.6	T	0.60
SJRCC	4/11/1995	9:30		0	T	0.58
SJRCC	5/16/1995	11:25		0.1	T	0.10
SJRCC	6/13/1995	10:00		0.3	T	0.30
SJRCC	7/11/1995	11:15		0.2	T	0.20
SJRCC	8/15/1995	12:15		-0.1	T	0.58
SJRCC	9/13/1995	12:10		0	T	0.58
SJRCC	10/17/1995	11:00		1.4	T	1.40
SJRCC	11/16/1995	11:20		-0.2	T	0.58

SJRCC	12/13/1995	10:40	-0.8	T	0.58
SJRCC	1/16/1996	10:50	1	T	1.00
SJRCC	2/13/1996	11:25	-0.05	T	0.58
SJRCC	3/13/1996	11:15	0.2	T	0.20
SJRCC	4/16/1996	10:40	1.3	T	1.30
SJRCC	5/14/1996	11:00	0.6	T	0.60
SJRCC	6/12/1996	11:15	1.4	T	1.40
SJRCC	7/16/1996	10:55	0.5	T	0.50
SJRCC	8/21/1996	11:20	0.5	T	0.50
SJRCC	9/17/1996	10:15	2.1		2.10
SJRCC	10/15/1996	10:15	1.4	T	1.40
SJRCC	11/13/1996	10:40	0	T	0.58
SJRCC	12/3/1996	10:40	-0.2	T	0.58
SJRCC	1/14/1997	10:25	0	T	0.58
SJRCC	2/11/1997	10:25	0	T	0.58
SJRCC	3/11/1997	10:25	0	T	0.58
SJRCC	4/15/1997	10:25	0	T	0.58
SJRCC	4/15/1997	10:25	0	T	0.58
SJRCC	5/13/1997	10:20	0	T	0.58
SJRCC	5/13/1997	10:20	0	T	0.58
SJRCC	6/10/1997	10:40	0	T	0.58
SJRCC	6/10/1997	10:40	0	T	0.58
SJRCC	7/8/1997	10:40	0	T	0.58
SJRCC	7/8/1997	10:40	0	T	0.58
SJRCC	8/5/1997	10:30	0	T	0.58
SJRCC	8/5/1997	10:30	0	T	0.58
SJRCC	9/16/1997	9:40	-0.008	T	0.58
SJRCC	9/16/1997	9:40	-0.008	T	0.58
SJRCC	10/9/1997	14:20	0	T	0.58
SJRCC	11/11/1997	9:50	-0.008	T	0.58
SJRCC	12/9/1997	9:45	0.009	T	0.01
SJRCC	1/13/1998	10:10	-0.011	T	0.58
SJRCC	2/10/1998	9:45	-0.002	T	0.58
SJRCC	3/17/1998	10:20	0.004	T	0.00
SJRCC	4/14/1998	9:45	0.001	T	0.00
SJRCC	5/12/1998	13:40	0.006	T	0.01
SJRCC	6/9/1998	13:25	0.015	T	0.02
SJRCC	7/14/1998	14:00	0.011	T	0.01
SJRCC	8/18/1998	9:15	-0.033	T	0.58
SJRCC	9/8/1998	13:30	-0.026	T	0.58
SJRCC	10/15/1998	14:00	-0.001	T	0.58
SJRCC	12/15/1998	13:30	0.005	T	0.01
SJRCC	1/12/1999	9:50	-0.007	T	0.58
SJRCC	2/9/1999	10:30	-0.009	T	0.58
SJRCC	3/10/1999	13:35	-0.022	T	0.58
SJRCC	4/27/1999	10:45	0.013	T	0.01
SJRCC	5/10/1999	10:30	0.007	T	0.01
SJRCC	6/7/1999	10:15	0.007	T	0.01
SJRCC	7/12/1999	13:10	-0.008	T	0.58
SJRCC	8/10/1999	13:20	-0.007	T	0.58
SJRCC	9/28/1999	14:30	0.05	T	0.05
SJRCC	10/12/1999	14:30	0.1	T	0.10
SJRCC	11/9/1999	11:40	0.04	T	0.04
SJRCC	12/6/1999	14:10	0.03	T	0.03
SJRCC	1/10/2000	14:20	0.29	T	0.29
SJRCC	2/7/2000	15:40	0.163	W	0.16
SJRCC	3/6/2000	15:10	0.352	W	0.35
SJRCC	4/10/2000	10:50	0.19	T	0.19
SJRCC	5/8/2000	11:15	0.244	W	0.24
SJRCC	6/12/2000	15:00	0.145	W	0.15

SJRCC	7/10/2000	10:30	0.04	T	0.04
SJRCC	8/7/2000	10:45	0.47	T	0.47
SJRCC	9/11/2000	9:55	0.144	T	0.14
SJRCC	10/11/2000	15:25	0.555	W	0.56
SJRCC	11/13/2000	9:40	0.217	W	0.22
SJRCC	12/14/2000	9:55	-0.007	T	0.58
SJRCC	1/9/2001	11:40	0.002	T	0.00
SJRCC	2/15/2001	10:00	-0.092	T	0.58
SJRCC	3/15/2001	9:00	0.023	T	0.02
SJRCC	4/10/2001	8:50	-0.08	T	0.58
SJRCC	5/14/2001	13:55	-0.088	T	0.58
SJRCC	6/11/2001	13:50	-0.126	T	0.58
SJRCC	7/11/2001	12:34	0.028	T	0.03
SJRCC	8/9/2001	11:50	0.031	T	0.03
SJRCC	9/11/2001	14:40	-0.055	T	0.58
SJRCC	10/9/2001	12:20	-0.014	T	0.58
SJRCC	11/20/2001	13:10	0.011	T	0.01
SJRCC	12/5/2001	12:50	-0.027	T	0.58
SJRCC	1/8/2002	12:15	-0.039	T	0.58
SJRCC	2/11/2002	11:40	-0.048	T	0.58
SJRCC	3/11/2002	9:20	0.037	T	0.04
SJRCC	4/8/2002	13:05	0.5	U	0.25
SJRCC	5/13/2002	12:10	-0.024	T	0.58
SJRCC	6/10/2002	12:15	0.32	T	0.32
SJRCC	7/15/2002	12:50	-0.04	T	0.58
SJRCC	8/12/2002	11:45	0.117	T	0.12
SJRCC	9/12/2002	11:30	-0.079	T	0.58
SJRCC	10/7/2002	12:20	-0.011	T	0.58
SJRCC	11/11/2002	11:50	-0.136	T	0.58
SJRCC	12/9/2002	11:30	0.111	T	0.11
SJRCC	1/6/2003	11:20	-0.032	T	0.58
SJRCC	2/11/2003	10:00	0.072	T	0.07
SJRCC	3/11/2003	13:10	0.004	T	0.00
SJRCC	3/11/2003	13:15	0.032	T	0.03
SJRCC	4/14/2003	12:15	0.016	T	0.02
SJRCC	4/14/2003	12:20	0.012	T	0.01
SJRCC	5/12/2003	12:50	0.056	T	0.06
SJRCC	5/12/2003	13:00	0.008	T	0.01
SJRCC	6/9/2003	12:20	0.062	T	0.06
SJRCC	6/9/2003	12:25	0.023	T	0.02
SJRCC	8/12/2003	12:50	0.105	T	0.11
SJRCC	8/12/2003	12:55	0.098	T	0.10
SJRCC	9/8/2003	12:10	0.101	T	0.10
SJRCC	10/7/2003	11:45	-0.044	T	0.58
SJRCC	11/12/2003	12:25	0.245	T	0.25
SJRCC	12/10/2003	13:30	0.079	T	0.08
SJRCC	1/12/2004	13:30	0.004	T	0.00
SJRCC	2/9/2004	12:55	0.028	T	0.03
SJRCE	5/12/1993	13:50	0	T	0.58
SJRCE	6/8/1993	8:15	-0.1	T	0.58
SJRCE	7/7/1993	11:10	0	T	0.58
SJRCE	9/22/1993	8:40	0	T	0.58
SJRCE	12/15/1993	11:20	-0.1	T	0.58
SJRCE	1/20/1994	11:50	0.4	T	0.40
SJRCE	2/15/1994	10:30	0	T	0.58
SJRCE	3/14/1994	11:55	0	T	0.58
SJRCE	4/12/1994	11:20	2		2.00
SJRCE	5/16/1994	11:50	0.1	T	0.10
SJRCE	6/14/1994	12:05	-0.1	T	0.58
SJRCE	7/12/1994	11:20	-3.1	T	0.58

SJRCE	8/16/1994	11:35	-0.1	T	0.58
SJRCE	9/13/1994	11:40	0	T	0.58
SJRCE	10/17/1994	11:10	0.1	T	0.10
SJRCE	11/18/1994	10:30	0	T	0.58
SJRCE	12/13/1994	12:00	0	T	0.58
SJRCE	1/19/1995	11:30	0	T	0.58
SJRCE	3/15/1995	10:30	0.6	T	0.60
SJRCE	4/11/1995	9:25	0	T	0.58
SJRCE	5/16/1995	11:15	0.2	T	0.20
SJRCE	6/13/1995	9:50	0.3	T	0.30
SJRCE	7/11/1995	10:55	0.1	T	0.10
SJRCE	8/15/1995	12:00	-0.1	T	0.58
SJRCE	9/13/1995	11:55	0	T	0.58
SJRCE	10/17/1995	10:45	1.1	T	1.10
SJRCE	11/16/1995	11:05	-0.3	T	0.58
SJRCE	12/13/1995	10:25	-1.5	T	0.58
SJRCE	1/16/1996	10:45	0.8	T	0.80
SJRCE	2/13/1996	11:15	-0.4	T	0.58
SJRCE	3/13/1996	11:05	0	T	0.58
SJRCE	4/16/1996	10:30	1.2	T	1.20
SJRCE	5/14/1996	10:50	0.5	T	0.50
SJRCE	6/12/1996	11:05	1.6	T	1.60
SJRCE	7/16/1996	10:45	0.7	T	0.70
SJRCE	8/21/1996	11:05	0.5	T	0.50
SJRCE	9/17/1996	9:55	2.2		2.20
SJRCE	10/15/1996	10:30	1.2	T	1.20
SJRCE	11/13/1996	10:15	0	T	0.58
SJRCE	12/3/1996	10:25	-0.2	T	0.58
SJRCE	1/14/1997	10:15	0	T	0.58
SJRCE	2/11/1997	10:15	0	T	0.58
SJRCE	3/11/1997	10:20	0	T	0.58
SJRCE	4/15/1997	10:15	0	T	0.58
SJRCE	4/15/1997	10:15	0	T	0.58
SJRCE	5/13/1997	10:10	0	T	0.58
SJRCE	5/13/1997	10:10	0	T	0.58
SJRCE	6/10/1997	10:25	0	T	0.58
SJRCE	6/10/1997	10:25	0	T	0.58
SJRCE	7/8/1997	10:30	0	T	0.58
SJRCE	7/8/1997	10:30	0	T	0.58
SJRCE	8/5/1997	10:20	0	T	0.58
SJRCE	8/5/1997	10:20	0	T	0.58
SJRCE	9/16/1997	9:35	0.002	T	0.00
SJRCE	9/16/1997	9:35	0.002	T	0.00
SJRCE	10/9/1997	14:00	0	T	0.58
SJRCE	11/11/1997	9:45	0	T	0.58
SJRCE	12/9/1997	9:30	0.01	T	0.01
SJRCE	1/13/1998	9:55	0	T	0.58
SJRCE	2/10/1998	9:40	0.007	T	0.01
SJRCE	3/17/1998	10:15	0	T	0.58
SJRCE	4/14/1998	9:30	-0.002	T	0.58
SJRCE	5/12/1998	13:45	0.004	T	0.00
SJRCE	6/9/1998	13:45	-0.029	T	0.58
SJRCE	7/14/1998	13:45	0.003	T	0.00
SJRCE	8/18/1998	9:00	-0.037	T	0.58
SJRCE	9/8/1998	13:20	-0.018	T	0.58
SJRCE	10/15/1998	13:40	-0.01	T	0.58
SJRCE	12/15/1998	13:40	0	T	0.58
SJRCE	1/12/1999	9:45	0.008	T	0.01
SJRCE	2/9/1999	10:15	-0.007	T	0.58
SJRCE	3/10/1999	13:45	-0.004	T	0.58

SJRCE	4/27/1999	10:20	0.022	T	0.02
SJRCE	5/10/1999	10:10	-0.003	T	0.58
SJRCE	6/7/1999	10:00	0.007	T	0.01
SJRCE	7/12/1999	13:20	-0.009	T	0.58
SJRCE	8/10/1999	13:35	-0.006	T	0.58
SJRCE	9/28/1999	14:40	0.006	T	0.01
SJRCE	10/12/1999	14:40	0.12	T	0.12
SJRCE	11/9/1999	11:20	0.06	T	0.06
SJRCE	12/6/1999	14:20	0.016	W	0.02
SJRCE	1/10/2000	14:30	0.14	T	0.14
SJRCE	2/7/2000	15:50	0.268	W	0.27
SJRCE	3/6/2000	15:20	0.083	W	0.08
SJRCE	4/10/2000	10:40	0.08	T	0.08
SJRCE	5/8/2000	10:55	0.196	W	0.20
SJRCE	6/12/2000	15:15	0.507	W	0.51
SJRCE	7/10/2000	10:15	0.03	T	0.03
SJRCE	8/7/2000	10:35	0.41	T	0.41
SJRCE	9/11/2000	9:45	0.227	T	0.23
SJRCE	10/11/2000	15:35	0.223	W	0.22
SJRCE	11/13/2000	9:30	0.379	W	0.38
SJRCE	12/14/2000	9:45	-0.004	T	0.58
SJRCE	1/9/2001	11:50	0.048	T	0.05
SJRCE	2/15/2001	9:50	0.006	T	0.01
SJRCE	3/15/2001	8:45	0.009	T	0.01
SJRCE	4/10/2001	8:45	-0.136	T	0.58
SJRCE	5/14/2001	13:40	-0.071	T	0.58
SJRCE	6/11/2001	13:40	-0.127	T	0.58
SJRCE	7/11/2001	12:45	0.032	T	0.03
SJRCE	8/9/2001	12:00	0.099	T	0.10
SJRCE	9/11/2001	14:50	-0.103	T	0.58
SJRCE	10/9/2001	12:30	-0.004	T	0.58
SJRCW	5/12/1993	13:30	-0.1	T	0.58
SJRCW	6/8/1993	8:30	-0.1	T	0.58
SJRCW	7/7/1993	11:30	0	T	0.58
SJRCW	9/22/1993	9:00	0	T	0.58
SJRCW	12/15/1993	11:45	-0.1	T	0.58
SJRCW	1/20/1994	12:15	0	T	0.58
SJRCW	2/15/1994	9:50	0	T	0.58
SJRCW	3/14/1994	12:25	0	T	0.58
SJRCW	4/12/1994	11:40	2		2.00
SJRCW	5/16/1994	12:20	0	T	0.58
SJRCW	6/14/1994	12:35	-0.1	T	0.58
SJRCW	7/12/1994	11:55	-1.6	T	0.58
SJRCW	8/16/1994	12:00	0	T	0.58
SJRCW	9/13/1994	11:55	0	T	0.58
SJRCW	10/17/1994	11:45	0.01	W	0.01
SJRCW	11/18/1994	10:50	0	T	0.58
SJRCW	12/13/1994	12:20	0	T	0.58
SJRCW	1/19/1995	11:50	0	T	0.58
SJRCW	3/15/1995	10:55	0.6	T	0.60
SJRCW	4/11/1995	9:40	0	T	0.58
SJRCW	5/16/1995	11:35	0.1	T	0.10
SJRCW	6/13/1995	10:15	-1	T	0.58
SJRCW	7/11/1995	11:30	0	T	0.58
SJRCW	8/15/1995	12:30	0	T	0.58
SJRCW	9/13/1995	12:25	0	T	0.58
SJRCW	10/17/1995	11:20	2.1		2.10
SJRCW	11/16/1995	11:35	0.2	T	0.20
SJRCW	12/13/1995	10:50	-1	T	0.58
SJRCW	1/16/1996	11:00	0.9	T	0.90

SJRCW	2/13/1996	11:35	1.4	T	1.40
SJRCW	3/13/1996	11:25	0	T	0.58
SJRCW	4/16/1996	10:50	1	T	1.00
SJRCW	5/14/1996	11:15	0.3	T	0.30
SJRCW	6/12/1996	11:30	1.6	T	1.60
SJRCW	7/16/1996	11:10	1.8	T	1.80
SJRCW	8/21/1996	11:35	0.5	T	0.50
SJRCW	9/17/1996	10:30	2		2.00
SJRCW	10/15/1996	10:00	1.1	T	1.10
SJRCW	11/13/1996	11:00	0	T	0.58
SJRCW	12/3/1996	10:55	-0.2	T	0.58
SJRCW	1/14/1997	10:40	0	T	0.58
SJRCW	2/11/1997	10:40	0	T	0.58
SJRCW	3/11/1997	10:45	0	T	0.58
SJRCW	4/15/1997	10:35	0	T	0.58
SJRCW	4/15/1997	10:35	0	T	0.58
SJRCW	5/13/1997	10:25	0	T	0.58
SJRCW	5/13/1997	10:25	0	T	0.58
SJRCW	6/10/1997	10:50	0	T	0.58
SJRCW	6/10/1997	10:50	0	T	0.58
SJRCW	7/8/1997	10:45	0	T	0.58
SJRCW	7/8/1997	10:45	0	T	0.58
SJRCW	8/5/1997	10:40	0	T	0.58
SJRCW	8/5/1997	10:40	0	T	0.58
SJRCW	9/16/1997	9:50	0.003	T	0.00
SJRCW	9/16/1997	9:50	0.003	T	0.00
SJRCW	10/9/1997	14:50	0	T	0.58
SJRCW	11/11/1997	10:00	0.013	T	0.01
SJRCW	12/9/1997	10:00	0.021	T	0.02
SJRCW	1/13/1998	10:20	-0.011	T	0.58
SJRCW	2/10/1998	10:00	0.014	T	0.01
SJRCW	3/17/1998	10:35	0.008	T	0.01
SJRCW	4/14/1998	10:10	0.008	T	0.01
SJRCW	5/12/1998	13:20	0.002	T	0.00
SJRCW	6/9/1998	13:20	-0.007	T	0.58
SJRCW	7/14/1998	14:15	-0.001	T	0.58
SJRCW	8/18/1998	9:30	0.13	T	0.13
SJRCW	9/8/1998	10:45	-0.025	T	0.58
SJRCW	9/8/1998	13:45	-0.018	T	0.58
SJRCW	10/15/1998	14:15	-0.006	T	0.58
SJRCW	11/10/1998	13:30	-0.01	T	0.58
SJRCW	12/15/1998	13:15	-0.002	T	0.58
SJRCW	1/12/1999	10:15	0.003	T	0.00
SJRCW	2/9/1999	10:40	0.01	T	0.01
SJRCW	3/10/1999	13:20	-0.019	T	0.58
SJRCW	4/27/1999	11:00	0.021	T	0.02
SJRCW	5/10/1999	11:00	0.004	T	0.00
SJRCW	6/7/1999	10:30	0.012	T	0.01
SJRCW	7/12/1999	13:00	-0.007	T	0.58
SJRCW	8/10/1999	13:15	0.004	T	0.00
SJRCW	9/28/1999	14:20	0.12	T	0.12
SJRCW	10/12/1999	14:20	0.13	T	0.13
SJRCW	11/9/1999	12:00	0.06	T	0.06
SJRCW	12/6/1999	14:00	0.07	T	0.07
SJRCW	1/10/2000	14:10	0.21	T	0.21
SJRCW	2/7/2000	15:30	0.07	T	0.07
SJRCW	3/6/2000	15:00	0.348	W	0.35
SJRCW	4/10/2000	11:00	0.08	T	0.08
SJRCW	5/8/2000	11:25	0.075	W	0.08
SJRCW	6/12/2000	14:55	0.045	W	0.05

SJRCW	7/10/2000	10:50	0.16	T	0.16
SJRCW	8/7/2000	11:00	0.25	T	0.25
SJRCW	9/11/2000	10:05	0.153	T	0.15
SJRCW	10/11/2000	15:15	0.603	W	0.60
SJRCW	11/13/2000	9:50	0.242	W	0.24
SJRCW	12/14/2000	10:05	0.018	T	0.02

SJRCW	1/9/2001	11:30	0.053		0.05
SJRCW	2/15/2001	10:10	-0.109	T	0.58
SJRCW	3/15/2001	9:15	-0.033	T	0.58
SJRCW	4/10/2001	8:55	-0.071	T	0.58
SJRCW	5/14/2001	14:10	-0.138	T	0.58
SJRCW	6/11/2001	13:55	-0.076	T	0.58
SJRCW	7/11/2001	12:25	0.037	T	0.04
SJRCW	8/9/2001	11:40	0.016	T	0.02
SJRCW	9/11/2001	14:30	-0.11	T	0.58
SJRCW	10/9/2001	12:05	0.024	T	0.02
SJRCW	11/20/2001	12:55	0.119	T	0.12
SJRCW	12/5/2001	12:40	0.024	T	0.02
SJRCW	1/8/2002	12:00	0.054	T	0.05
SJRCW	2/11/2002	11:25	-0.068	T	0.58
SJRCW	3/11/2002	9:35	0.053	T	0.05
SJRCW	4/8/2002	12:55	0.5	U	0.25
SJRCW	5/13/2002	12:00	0.016	T	0.02
SJRCW	6/10/2002	12:10	0.33	T	0.33
SJRCW	7/15/2002	12:30	-0.04	T	0.58
SJRCW	8/12/2002	11:35	0.098	T	0.10
SJRCW	9/12/2002	11:20	0.021	T	0.02
SJRCW	10/7/2002	12:10	-0.018	T	0.58
SJRCW	11/11/2002	11:40	-0.087	T	0.58
SJRCW	12/9/2002	11:15	0.091		0.09
SJRCW	1/6/2003	11:10	-0.074	T	0.58
SJRCW	2/11/2003	9:50	0.006	T	0.01
SJRCW	3/11/2003	13:05	0.004	T	0.00
SJRCW	4/14/2003	12:00	0.018	T	0.02
SJRCW	5/12/2003	12:40	0.041	T	0.04
SJRCW	6/9/2003	12:15	0.034	T	0.03
SJRCW	8/12/2003	12:45	0.079	T	0.08
SJRCW	9/8/2003	12:00	0.141	T	0.14
SJRCW	10/7/2003	11:35	0.047	T	0.05
SJRCW	11/12/2003	12:20	0.134	T	0.13
SJRCW	12/10/2003	13:40	0.193	T	0.19
SJRCW	1/12/2004	13:25	-0.006	T	0.58
SJRCW	2/9/2004	12:45	0.019	T	0.02
sjrcc	3/24/2005	10:16	0.027	I	0.0270
SJRM 74C	3/24/2005	2:15	0.033	I	0.0330
SJ6	3/24/2005	3:00	0.051	I	0.0510
SJRCC	4/26/2005	1:00	0.026	U	0.0130
SJ6	4/26/2005	4:45	0.026	U	0.0130
SJRM 74C	4/26/2005	5:15	0.026	U	0.0130
SJRCC	5/17/2005	9:00	0.026	U	0.0130
SJ6	5/17/2005	10:45	0.026	U	0.0130
SJRM 74C	5/17/2005	11:15	0.026	U	0.0130
SJRCC	6/20/2005	10:00	0.035	I	0.0350
SJRM 74C	6/20/2005	3:15	0.026	U	0.0130
SJ6	6/20/2005	2:45	0.026	U	0.0130
SJRCC	7/25/2005	7:30	0.026	U	0.0130
SJ6	7/25/2005	2:00	0.026	U	0.0130
SJRM 74C	7/25/2005	2:15	0.026	U	0.0130
SJRCC	8/31/2005	9:30	0.026	U	0.0130
SJ6	8/31/2005	1:30	0.026	U	0.0130
SJRM 74C	8/31/2005	2:00	0.048	I	0.0480
SJ6	9/27/2005	12:45	0.026	U	0.0130
SJRM 74C	9/27/2005	1:30	0.026	U	0.0130
SJRCC	9/27/2005	2:00	0.026	U	0.0130

Note: If non-detect was reported, half of the detection limit or half of the water quality standard was used, whichever was less.

Source: SJRWMD, 2004.
ECT, 2004.

Ambient Conductivity Data in St. Johns River near SECI Palatka Plant

Class III Water Quality Standard = 1,991 µmhos/cm

Station	Date	Time	Specific Conductivity (µmhos/cm)	Remark Code
SECI D-005	10/1/1995		365	
SECI D-005	10/1/1995		380	
SECI D-005	10/1/1995		410	
SECI D-005	2/1/1996		500	
SECI D-005	2/1/1996		450	
SECI D-005	2/1/1996		410	
SECI D-005	2/1/1996		390	
SECI D-005	8/1/1996		847	
SECI D-005	8/1/1996		829	
SECI D-005	8/1/1996		901	
SECI D-005	8/1/1996		828	
SECI D-005	8/6/1997		870	
SECI D-005	8/6/1997		655	
SECI D-005	8/6/1997		736	
SECI D-005	8/6/1997		882	
SECI D-005	7/13/1998		834	
SECI D-005	7/13/1998		786	
SECI D-005	7/13/1998		791	
SECI D-005	7/13/1998		853	
SECI D-005	6/18/98		713	
SECI D-005	8/19/98		850	
SECI D-005	3/1/2000		846	
SECI D-005	6/1/2000		921	
SECI D-005	9/1/2000		1,042	
SECI D-005	12/11/2000		1,384	
SECI D-005	3/1/2001		1,282	
SECI D-005	6/1/2001		1,500	
SECI D-005	12/1/2001		661	
SECI D-005	3/1/2002		950	
SECI D-005	6/1/2002		1,269	
SECI D-005	7/29/2002		999	
SECI D-005	1/28/2003		740	
SECI D-005	5/13/2003		727	
SECI D-005	8/26/2003		712	
FP41	9/22/1993	14:50	1,024	
FP41	10/20/1993	13:20	1,037	
FP41	11/30/1993	13:40	959	
FP41	12/28/1993	13:05	1,132	
FP41	1/26/1994	12:35	1,020	
FP41	2/23/1994	11:40	936	
FP41	3/30/1994	13:01	1,101	

Average =	940.3	µmhos/cm
Maximum =	1,516.0	µmhos/cm
Standard Dev =	231.0	µmhos/cm
95 Percentile =	1,327.2	µmhos/cm
Count	978.0	

Ambient Conductivity Data in St. Johns River near SECI Palatka Plant

Class III Water Quality Standard = 1,991 µmhos/cm

Station	Date	Time	Specific Conductivity (µmhos/cm)	Remark Code
FP41	4/20/1994	12:09	1,267	
FP41	5/25/1994	12:02	1,216	
FP41	6/29/1994	12:15	1,304	
FP41	7/27/1994	12:15	1,260	
FP41	7/27/1994	12:16	1,260	
FP41	8/23/1994	11:34	1,103	
FP41	9/29/1994	11:45	699	
FP41	10/24/1994	9:45	700	
FP41	12/28/1994	10:00	500	
FP41	2/15/1995	10:00	362	
FP41	3/1/1995	11:10	665	
FP41	3/29/1995	12:15	751	
FP41	5/2/1995	12:05	805	
FP41	5/31/1995	12:15	819	
FP41	6/29/1995	12:45	868	
FP41	7/27/1995	11:45	933	
FP41	8/31/1995	15:30	821	
FP41	9/26/1995	14:55	727	
FP41	10/24/1995	14:25	522	
FP41	11/21/1995	13:00	547	
FP41	1/3/1996	14:00	679	
FP41	1/30/1996	14:10	558	
FP41	2/27/1996	14:00	749	
FP41	3/26/1996	14:05	649	
FP41	4/30/1996	14:45	702	
FP41	5/28/1996	14:50	648	
FP41	7/2/1996	15:40	733	
FP41	8/6/1996	13:50	745	
FP41	9/12/1996	13:35	773	
FP41	10/1/1996	13:30	909	
FP41	10/24/1996	13:30	766	
FP42	9/22/1993	15:00	1,066	
FP42	10/20/1993	13:35	1,020	
FP42	11/30/1993	13:55	993	
FP42	12/28/1993	13:20	1,127	
FP42	1/26/1994	12:45	1,065	
FP42	2/23/1994	11:49	970	
FP42	3/30/1994	13:14	1,124	
FP42	3/30/1994	13:15	1,124	
FP42	4/20/1994	12:00	1,256	
FP42	5/25/1994	12:20	1,261	
FP42	6/29/1994	12:20	1,286	

Average =	940.3	µmhos/cm
Maximum =	1,516.0	µmhos/cm
Standard Dev =	231.0	µmhos/cm
95 Percentile =	1,327.2	µmhos/cm
Count	978.0	

Ambient Conductivity Data in St. Johns River near SECI Palatka Plant

Class III Water Quality Standard = 1,991 µmhos/cm

Station	Date	Time	Specific Conductivity (µmhos/cm)	Remark Code
FP42	7/27/1994	12:10	1,258	
FP42	8/23/1994	11:40	1,070	
FP42	9/29/1994	11:55	700	
FP42	10/24/1994	10:00	600	
FP42	12/28/1994	10:20	478	
FP42	2/15/1995	10:10	630	
FP42	3/1/1995	11:20	638	
FP42	3/29/1995	12:30	725	
FP42	5/2/1995	12:15	812	
FP42	5/31/1995	12:26	830	
FP42	6/29/1995	13:00	867	
FP42	7/27/1995	11:55	979	
FP42	8/31/1995	15:45	835	
FP42	9/26/1995	14:50	732	
FP42	10/24/1995	14:35	508	
FP42	11/21/1995	13:10	554	
FP42	1/3/1996	14:10	682	
FP42	1/30/1996	14:25	558	
FP42	2/27/1996	14:10	756	
FP42	3/26/1996	14:10	667	
FP42	4/30/1996	15:00	715	
FP42	5/28/1996	15:00	631	
FP42	7/2/1996	15:55	704	
FP42	8/6/1996	14:00	745	
FP42	9/12/1996	13:20	728	
FP42	10/1/1996	13:55	955	
FP42	10/24/1996	13:20	768	
FP42	2/26/1997	13:30	874	
FP42	3/26/1997	13:10	1,044	
FP42	6/25/1997	13:40	969	
FP42	6/25/1997	13:40	969	
FP42	7/23/1997	13:35	932	
FP42	7/23/1997	13:35	932	
FP42	8/20/1997	13:40	1,170	
FP42	8/20/1997	13:40	1,170	
FP42	9/25/1997	13:20	1,260	
FP42	9/25/1997	13:20	1,260	
FP42	11/24/1997	13:10	759	
FP42	12/22/1997	12:15	621	
FP42	2/23/1998	14:40	398	
FP42	4/2/1998	12:40	455	
FP42	4/27/1998	12:20	501	

Average =	940.3	µmhos/cm
Maximum =	1,516.0	µmhos/cm
Standard Dev =	231.0	µmhos/cm
95 Percentile =	1,327.2	µmhos/cm
Count	978.0	

Ambient Conductivity Data in St. Johns River near SECI Palatka Plant

Class III Water Quality Standard = 1,991 µmhos/cm

Station	Date	Time	Specific Conductivity (µmhos/cm)	Remark Code
FP42	5/26/1998	13:10	666	
FP42	6/30/1998	13:50	783	
FP42	8/3/1998	12:15	870	
FP42	8/24/1998	12:00	759	
FP42	9/22/1998	13:40	906	
FP42	9/22/1998	13:40	904	
FP42	9/22/1998	13:40	905	
FP42	10/28/1998	13:35	964	
FP42	10/28/1998	13:35	946	
FP42	10/28/1998	13:35	955	
FP42	11/24/1998	13:25	969	
FP42	11/24/1998	13:25	971	
FP42	11/24/1998	13:25	970	
FP42	12/28/1998	14:55	897	
FP42	12/28/1998	14:55	897	
FP42	12/28/1998	14:55	897	
FP42	1/27/1999	10:10	997	
FP42	1/27/1999	10:10	998	
FP42	1/27/1999	10:10	998	
FP42	1/27/1999	10:20	998	
FP42	2/24/1999	14:55	752	
FP42	2/24/1999	14:55	756	
FP42	2/24/1999	14:55	754	
FP42	3/30/1999	10:30	1,055	
FP42	3/30/1999	10:30	1,063	
FP42	3/30/1999	10:30	1,059	
FP42	4/29/1999	10:00	1,227	
FP42	4/29/1999	10:00	1,226	
FP42	4/29/1999	10:00	1,226	
FP42	5/27/1999	14:50	1,126	
FP42	5/27/1999	14:50	1,124	
FP42	5/27/1999	14:50	1,125	
FP42	6/29/1999	16:30	902	
FP42	6/29/1999	16:30	900	
FP42	6/29/1999	16:30	901	
FP42	8/12/1999	9:35	1,327	
FP42	8/12/1999	9:35	1,328	
FP42	8/12/1999	9:35	1,328	
FP42	8/26/1999	14:45	1,271	
FP42	8/26/1999	14:45	1,296	
FP42	8/26/1999	14:45	1,284	
FP42	9/23/1999	15:40	1,196	

Average =	940.3	µmhos/cm
Maximum =	1,516.0	µmhos/cm
Standard Dev =	231.0	µmhos/cm
95 Percentile =	1,327.2	µmhos/cm
Count	978.0	

Ambient Conductivity Data in St. Johns River near SECI Palatka Plant

Class III Water Quality Standard = 1,991 µmhos/cm

Average =	940.3	µmhos/cm
Maximum =	1,516.0	µmhos/cm
Standard Dev =	231.0	µmhos/cm
95 Percentile =	1,327.2	µmhos/cm
Count	978.0	

Station	Date	Time	Specific Conductivity (µmhos/cm)	Remark Code
FP42	9/23/1999	15:40	1,159	
FP42	9/23/1999	15:40	1,178	
FP42	10/26/1999	16:30	1,246	
FP42	10/26/1999	16:30	1,314	
FP42	10/26/1999	16:30	1,280	
FP42	11/23/1999	14:10	856	
FP42	11/23/1999	14:10	850	
FP42	11/23/1999	14:10	853	
FP42	12/21/1999	10:15	673	
FP42	12/21/1999	10:15	666	
FP42	12/21/1999	10:15	670	
FP42	1/27/2000	14:50	729	
FP42	1/27/2000	14:50	733	
FP42	1/27/2000	14:50	731	
FP42	2/21/2000	13:50	881	
FP42	2/21/2000	13:50	881	
FP42	2/21/2000	13:50	881	
FP42	3/29/2000	10:10	868	
FP42	3/29/2000	10:10	867	
FP42	3/29/2000	10:10	868	
FP42	4/26/2000	9:30	872	
FP42	4/26/2000	9:30	884	
FP42	4/26/2000	9:30	878	
FP42	5/24/2000	14:45	905	
FP42	5/24/2000	14:45	898	
FP42	5/24/2000	14:45	902	
FP42	6/29/2000	9:10	981	
FP42	6/29/2000	9:10	981	
FP42	6/29/2000	9:10	981	
FP42	7/27/2000	14:55	1,039	
FP42	7/27/2000	14:55	1,037	
FP42	7/27/2000	14:55	1,038	
FP42	8/24/2000	14:00	1,137	
FP42	8/24/2000	14:00	1,147	
FP42	8/24/2000	14:00	1,142	
FP42	9/28/2000	13:45	949	
FP42	9/28/2000	13:45	951	
FP42	9/28/2000	13:45	950	
FP42	10/26/2000	13:15	864	
FP42	10/26/2000	13:15	864	
FP42	10/26/2000	13:15	864	
FP42	11/27/2000	15:15	1,275	

Ambient Conductivity Data in St. Johns River near SECI Palatka Plant

Class III Water Quality Standard = 1,991 µmhos/cm

Station	Date	Time	Specific Conductivity (µmhos/cm)	Remark Code
FP42	11/27/2000	15:15	1,275	
FP42	11/27/2000	15:15	1,275	
FP42	12/21/2000	12:55	1,203	
FP42	12/21/2000	12:55	1,196	
FP42	12/21/2000	12:55	1,200	
FP42	2/27/2001	15:20	1,349	
FP42	2/27/2001	15:20	1,357	
FP42	2/27/2001	15:20	1,353	
FP42	3/29/2001	15:00	1,232	
FP42	3/29/2001	15:00	1,230	
FP42	3/29/2001	15:00	1,231	
FP42	5/1/2001	10:20	1,409	
FP42	5/1/2001	10:20	1,410	
FP42	5/1/2001	10:20	1,410	
FP42	5/30/2001	13:50	1,475	
FP42	5/30/2001	13:50	1,508	
FP42	5/30/2001	13:50	1,492	
FP42	6/28/2001	14:45	1,419	
FP42	6/28/2001	14:45	1,423	
FP42	6/28/2001	14:45	1,421	
FP42	7/23/2001	14:55	1,323	
FP42	7/23/2001	14:55	1,324	
FP42	7/23/2001	14:55	1,324	
FP42	8/20/2001	10:00	1,350	
FP42	8/20/2001	10:00	1,353	
FP42	8/20/2001	10:00	1,352	
FP42	9/25/2001	10:25	913	
FP42	9/25/2001	10:25	919	
FP42	9/25/2001	10:25	916	
FP42	10/24/2001	14:55	786	
FP42	10/24/2001	14:55	780	
FP42	10/24/2001	14:55	783	
FP42	11/27/2001	10:00	618	
FP42	11/27/2001	10:00	601	
FP42	11/27/2001	10:00	610	
FP42	2/26/2002	10:50	887	
FP42	2/26/2002	10:50	884	
FP42	2/26/2002	10:50	886	
FP42	3/25/2002	15:30	994	
FP42	3/25/2002	15:30	992	
FP42	3/25/2002	15:30	993	
FP42	4/29/2002	14:55	1,060	

Average =	940.3	µmhos/cm
Maximum =	1,516.0	µmhos/cm
Standard Dev =	231.0	µmhos/cm
95 Percentile =	1,327.2	µmhos/cm
Count	978.0	

Ambient Conductivity Data in St. Johns River near SECI Palatka Plant

Class III Water Quality Standard = 1,991 µmhos/cm

Station	Date	Time	Specific Conductivity (µmhos/cm)	Remark Code
FP42	4/29/2002	14:55	1,059	
FP42	4/29/2002	14:55	1,059	
FP42	5/29/2002	13:45	1,149	
FP42	5/29/2002	13:45	1,150	
FP42	5/29/2002	13:45	1,150	
FP42	6/26/2002	15:10	1,038	
FP42	6/26/2002	15:10	1,054	
FP42	6/26/2002	15:10	1,046	
FP42	7/30/2002	14:00	1,024	
FP42	7/30/2002	14:00	1,028	
FP42	7/30/2002	14:00	1,026	
FP42	8/26/2002	10:00	793	
FP42	8/26/2002	10:00	793	
FP42	8/26/2002	10:00	793	
FP42	9/25/2002	14:30	524	
FP42	9/25/2002	14:30	519	
FP42	9/25/2002	14:30	522	
FP42	10/24/2002	14:35	587	
FP42	10/24/2002	14:35	580	
FP42	10/24/2002	14:35	584	
FP42	11/25/2002	15:05	662	
FP42	11/25/2002	15:05	656	
FP42	11/25/2002	15:05	659	
FP42	1/28/2003	9:45	748	
FP42	1/28/2003	9:45	749	
FP42	1/28/2003	9:45	748	
FP43	9/22/1993	15:15	1,056	
FP43	10/20/1993	13:50	1,020	
FP43	11/30/1993	14:05	974	
FP43	12/28/1993	13:32	1,129	
FP43	1/26/1994	12:53	1,014	
FP43	2/23/1994	12:00	970	
FP43	3/30/1994	13:45	1,116	
FP43	4/20/1994	11:55	1,257	
FP43	5/25/1994	12:30	1,258	
FP43	6/29/1994	12:30	1,249	
FP43	7/27/1994	12:00	1,241	
FP43	8/23/1994	11:45	1,020	
FP43	9/29/1994	12:10	673	
FP43	10/24/1994	10:05	600	
FP43	12/28/1994	10:30	483	
FP43	2/15/1995	10:15	634	

Average =	940.3	µmhos/cm
Maximum =	1,516.0	µmhos/cm
Standard Dev =	231.0	µmhos/cm
95 Percentile =	1,327.2	µmhos/cm
Count	978.0	

Ambient Conductivity Data in St. Johns River near SECI Palatka Plant

Class III Water Quality Standard = 1,991 µmhos/cm

Station	Date	Time	Specific Conductivity (µmhos/cm)	Remark Code
FP43	3/1/1995	11:30	647	
FP43	3/29/1995	12:40	732	
FP43	5/2/1995	12:25	811	
FP43	5/31/1995	12:40	831	
FP43	6/29/1995	13:08	880	
FP43	7/27/1995	12:05	969	
FP43	8/31/1995	15:55	823	
FP43	9/26/1995	14:40	733	
FP43	10/24/1995	14:40	514	
FP43	11/21/1995	13:20	545	
FP43	1/3/1996	14:20	659	
FP43	1/30/1996	14:30	588	
FP43	2/27/1996	14:20	746	
FP43	3/26/1996	14:20	656	
FP43	4/30/1996	15:10	708	
FP43	7/2/1996	16:00	710	
FP43	8/6/1996	14:10	755	
FP43	9/12/1996	13:10	728	
FP43	10/1/1996	14:05	964	
FP43	10/24/1996	13:10	757	
PA34	2/23/1994	11:22	920	
PA34	3/30/1994	12:35	1,186	
PA34	4/20/1994	11:43	1,277	
PA34	5/25/1994	11:45	1,302	
PA34	6/29/1994	11:55	1,234	
PA34	7/27/1994	11:47	1,208	
PA34	8/23/1994	11:20	1,046	
PA34	9/29/1994	11:20	708	
PA34	10/24/1994	9:30	500	
PA34	12/28/1994	9:40	475	
PA34	2/15/1995	9:50	668	
PA34	3/1/1995	11:00	639	
PA34	3/29/1995	11:55	736	
PA34	5/2/1995	11:50	821	
PA34	5/31/1995	12:00	851	
PA34	6/29/1995	12:28	816	
PA34	7/27/1995	11:28	842	
PA34	8/31/1995	16:10	631	
PA34	9/26/1995	15:10	747	
PA34	10/24/1995	15:00	531	
PA34	11/21/1995	13:30	546	
PA34	1/3/1996	14:40	692	

Average =	940.3	µmhos/cm
Maximum =	1,516.0	µmhos/cm
Standard Dev =	231.0	µmhos/cm
95 Percentile =	1,327.2	µmhos/cm
Count	978.0	

Ambient Conductivity Data in St. Johns River near SECI Palatka Plant

Class III Water Quality Standard = 1,991 µmhos/cm

Average =	940.3	µmhos/cm
Maximum =	1,516.0	µmhos/cm
Standard Dev =	231.0	µmhos/cm
95 Percentile =	1,327.2	µmhos/cm
Count	978.0	

Station	Date	Time	Specific Conductivity (µmhos/cm)	Remark Code
PA34	1/30/1996	14:55	559	
PA34	2/27/1996	14:30	787	
PA34	3/26/1996	14:35	686	
PA34	4/30/1996	15:45	699	
PA34	5/28/1996	15:40	662	
PA34	7/9/1996	10:20	755	
PA34	8/6/1996	14:20	760	
PA34	9/12/1996	12:55	769	
PA34	10/1/1996	13:10	965	
PA34	10/24/1996	12:50	745	
SJ6	5/16/2002	10:45	1,183	
SJ6	5/16/2002	10:45	1,184	
SJ6	5/16/2002	10:45	1,183	
SJRCC	3/9/1993	15:00	800	
SJRCC	4/13/1993	15:10	695	
SJRCC	5/12/1993	13:40	910	
SJRCC	7/7/1993	11:20	1,080	
SJRCC	9/22/1993	8:50	1,060	
SJRCC	10/20/1993	10:30	1,050	
SJRCC	11/15/1993	11:40	1,053	
SJRCC	12/15/1993	11:30	1,140	
SJRCC	1/20/1994	12:05	1,104	
SJRCC	2/15/1994	10:15	984	
SJRCC	3/14/1994	12:10	1,095	
SJRCC	4/12/1994	11:30	1,219	
SJRCC	5/16/1994	12:05	1,279	
SJRCC	6/14/1994	12:25	1,178	
SJRCC	7/12/1994	11:40	1,278	
SJRCC	8/16/1994	11:45	1,216	
SJRCC	9/13/1994	11:55	959	
SJRCC	10/17/1994	11:25	675	
SJRCC	11/18/1994	10:40	572	
SJRCC	12/13/1994	12:10	499	
SJRCC	1/19/1995	11:40	489	
SJRCC	2/15/1995	9:45	609	
SJRCC	3/15/1995	10:40	704	
SJRCC	4/11/1995	9:30	746	
SJRCC	5/16/1995	11:25	813	
SJRCC	6/13/1995	10:00	842	
SJRCC	7/11/1995	11:15	776	
SJRCC	8/15/1995	12:15	954	
SJRCC	9/13/1995	12:10	773	

Ambient Conductivity Data in St. Johns River near SECI Palatka Plant

Class III Water Quality Standard = 1,991 µmhos/cm

Average =	940.3	µmhos/cm
Maximum =	1,516.0	µmhos/cm
Standard Dev =	231.0	µmhos/cm
95 Percentile =	1,327.2	µmhos/cm
Count	978.0	

Station	Date	Time	Specific Conductivity (µmhos/cm)	Remark Code
SJRCC	10/17/1995	11:00	502	
SJRCC	11/16/1995	11:20	563	
SJRCC	12/13/1995	10:40	610	
SJRCC	1/16/1996	10:50	521	
SJRCC	2/13/1996	11:25	671	
SJRCC	3/13/1996	11:15	736	
SJRCC	4/16/1996	10:40	721	
SJRCC	5/14/1996	11:00	733	
SJRCC	6/12/1996	11:15	739	
SJRCC	7/16/1996	10:55	578	
SJRCC	8/21/1996	11:20	784	
SJRCC	9/17/1996	10:15	973	
SJRCC	10/15/1996	10:15	730	
SJRCC	11/13/1996	10:40	906	
SJRCC	12/3/1996	10:40	856	
SJRCC	1/14/1997	10:25	855	
SJRCC	2/11/1997	10:25	962	
SJRCC	3/11/1997	10:25	1,023	
SJRCC	4/15/1997	10:25	985	
SJRCC	4/15/1997	10:25	985	
SJRCC	5/13/1997	10:20	776	
SJRCC	5/13/1997	10:20	776	
SJRCC	6/10/1997	10:40	927	
SJRCC	6/10/1997	10:40	927	
SJRCC	7/8/1997	10:40	1,039	
SJRCC	7/8/1997	10:40	1,039	
SJRCC	8/5/1997	10:30	1,160	
SJRCC	8/5/1997	10:30	1,160	
SJRCC	9/16/1997	9:40	1,251	
SJRCC	9/16/1997	9:40	1,251	
SJRCC	10/9/1997	14:20	1,050	
SJRCC	11/11/1997	9:50	878	
SJRCC	12/9/1997	9:45	807	
SJRCC	1/13/1998	10:10	599	
SJRCC	2/10/1998	9:45	557	
SJRCC	3/17/1998	10:20	481	
SJRCC	4/14/1998	9:45	480	
SJRCC	5/12/1998	13:40	598	
SJRCC	6/9/1998	13:25	720	
SJRCC	7/14/1998	14:00	790	
SJRCC	8/18/1998	9:15	737	
SJRCC	9/8/1998	13:30	851	

Ambient Conductivity Data in St. Johns River near SECI Palatka Plant

Class III Water Quality Standard = 1,991 µmhos/cm

Station	Date	Time	Specific Conductivity (µmhos/cm)	Remark Code
SJRCC	10/15/1998	14:00	866	
SJRCC	12/15/1998	13:30	900	
SJRCC	1/12/1999	9:50	844	
SJRCC	2/9/1999	10:30	664	
SJRCC	3/10/1999	13:35	911	
SJRCC	4/27/1999	10:45	1,175	
SJRCC	5/10/1999	10:30	1,119	
SJRCC	6/7/1999	10:15	1,125	
SJRCC	7/12/1999	13:10	1,140	
SJRCC	8/10/1999	13:20	1,371	
SJRCC	9/28/1999	14:30	1,188	
SJRCC	10/12/1999	14:30	1,323	
SJRCC	11/9/1999	11:40	1,095	
SJRCC	12/6/1999	14:10	666	
SJRCC	1/10/2000	14:20	717	
SJRCC	3/6/2000	15:10	818	
SJRCC	5/8/2000	11:15	984	
SJRCC	6/12/2000	15:00	1,047	
SJRCC	7/10/2000	10:30	1,017	
SJRCC	7/10/2000	10:30	1,017	
SJRCC	8/7/2000	10:45	1,060	
SJRCC	9/11/2000	9:55	987	
SJRCC	10/11/2000	15:25	754	
SJRCC	11/13/2000	9:40	1,253	
SJRCC	12/14/2000	9:55	1,229	
SJRCC	1/9/2001	11:40	1,226	
SJRCC	2/15/2001	10:00	1,273	
SJRCC	3/15/2001	9:00	1,335	
SJRCC	4/10/2001	8:50	1,386	
SJRCC	5/14/2001	13:55	1,491	
SJRCC	6/11/2001	13:50	1,316	
SJRCC	7/11/2001	12:34	1,210	
SJRCC	8/9/2001	11:50	1,026	
SJRCC	9/11/2001	14:40	1,422	
SJRCC	10/9/2001	12:20	869	
SJRCC	11/20/2001	13:10	600	
SJRCC	12/5/2001	12:50	609	
SJRCC	1/8/2002	12:15	787	
SJRCC	2/11/2002	11:40	848	
SJRCC	3/11/2002	9:20	925	
SJRCC	4/8/2002	13:05	1,045	
SJRCC	5/13/2002	12:10	1,190	

Average =	940.3	µmhos/cm
Maximum =	1,516.0	µmhos/cm
Standard Dev =	231.0	µmhos/cm
95 Percentile =	1,327.2	µmhos/cm
Count	978.0	

Ambient Conductivity Data in St. Johns River near SECI Palatka Plant

Class III Water Quality Standard = 1,991 µmhos/cm

Station	Date	Time	Specific Conductivity (µmhos/cm)	Remark Code
SJRCC	6/10/2002	12:15	1,186	
SJRCC	7/15/2002	12:50	1,237	
SJRCC	8/12/2002	11:45	1,001	
SJRCC	9/12/2002	11:30	637	
SJRCC	10/7/2002	12:20	511	
SJRCC	11/11/2002	11:50	620	
SJRCC	12/9/2002	11:30	715	
SJRCC	1/6/2003	11:20	615	
SJRCC	2/11/2003	10:00	696	
SJRCC	3/11/2003	13:10	484	
SJRCC	3/11/2003	13:10	527	
SJRCC	3/11/2003	13:15	570	
SJRCC	4/14/2003	12:15	610	
SJRCC	4/14/2003	12:15	614	
SJRCC	4/14/2003	12:20	617	
SJRCC	8/12/2003	12:50	693	
SJRCC	8/12/2003	12:50	693	
SJRCC	8/12/2003	12:55	692	
SJRCC	9/8/2003	12:10	873	
SJRCC	9/8/2003	12:10	870	
SJRCC	10/7/2003	11:45	792	
SJRCC	11/12/2003	12:25	736	
SJRCC	11/12/2003	12:25	734	
SJRCC	11/12/2003	12:25	735	
SJRCC	12/10/2003	13:30	796	
SJRCC	12/10/2003	13:30	794	
SJRCC	12/10/2003	13:30	795	
SJRCC	1/12/2004	13:30	853	
SJRCC	2/9/2004	12:55	850	
SJRCC	2/9/2004	12:55	837	
SJRCC	2/9/2004	12:55	844	
SJRCE	3/9/1993	15:05	837	
SJRCE	4/13/1993	15:15	691	
SJRCE	5/12/1993	13:50	910	
SJRCE	7/7/1993	11:10	1,080	
SJRCE	9/22/1993	8:40	1,055	
SJRCE	10/20/1993	10:10	1,053	
SJRCE	11/15/1993	11:30	1,065	
SJRCE	12/15/1993	11:20	1,159	
SJRCE	1/20/1994	11:50	1,114	
SJRCE	2/15/1994	10:30	967	
SJRCE	3/14/1994	11:55	1,114	

Average =	940.3	µmhos/cm
Maximum =	1,516.0	µmhos/cm
Standard Dev =	231.0	µmhos/cm
95 Percentile =	1,327.2	µmhos/cm
Count	978.0	

Ambient Conductivity Data in St. Johns River near SECI Palatka Plant

Class III Water Quality Standard = 1,991 µmhos/cm

Station	Date	Time	Specific Conductivity (µmhos/cm)	Remark Code
SJRCE	4/12/1994	11:20	1,206	
SJRCE	5/16/1994	11:50	1,276	
SJRCE	6/14/1994	12:05	1,218	
SJRCE	7/12/1994	11:20	1,336	
SJRCE	8/16/1994	11:35	1,177	
SJRCE	9/13/1994	11:40	1,040	
SJRCE	10/17/1994	11:10	666	
SJRCE	11/18/1994	10:30	568	
SJRCE	12/13/1994	12:00	492	
SJRCE	1/19/1995	11:30	477	
SJRCE	2/15/1995	9:40	619	
SJRCE	3/15/1995	10:30	703	
SJRCE	4/11/1995	9:25	747	
SJRCE	5/16/1995	11:15	797	
SJRCE	6/13/1995	9:50	863	
SJRCE	7/11/1995	10:55	777	
SJRCE	8/15/1995	12:00	982	
SJRCE	9/13/1995	11:55	764	
SJRCE	10/17/1995	10:45	543	
SJRCE	11/16/1995	11:05	563	
SJRCE	12/13/1995	10:25	607	
SJRCE	1/16/1996	10:45	528	
SJRCE	2/13/1996	11:15	665	
SJRCE	3/13/1996	11:05	736	
SJRCE	4/16/1996	10:30	722	
SJRCE	5/14/1996	10:50	731	
SJRCE	6/12/1996	11:05	741	
SJRCE	7/16/1996	10:45	585	
SJRCE	8/21/1996	11:05	775	
SJRCE	9/17/1996	9:55	981	
SJRCE	10/15/1996	10:30	732	
SJRCE	11/13/1996	10:15	902	
SJRCE	12/3/1996	10:25	857	
SJRCE	1/14/1997	10:15	869	
SJRCE	2/11/1997	10:15	932	
SJRCE	3/11/1997	10:20	1,032	
SJRCE	4/15/1997	10:15	1,026	
SJRCE	4/15/1997	10:15	1,026	
SJRCE	5/13/1997	10:10	816	
SJRCE	5/13/1997	10:10	816	
SJRCE	6/10/1997	10:25	881	
SJRCE	6/10/1997	10:25	881	

Average =	940.3	µmhos/cm
Maximum =	1,516.0	µmhos/cm
Standard Dev =	231.0	µmhos/cm
95 Percentile =	1,327.2	µmhos/cm
Count	978.0	

Ambient Conductivity Data in St. Johns River near SECI Palatka Plant

Class III Water Quality Standard = 1,991 µmhos/cm

Station	Date	Time	Specific Conductivity (µmhos/cm)	Remark Code
SJRCE	7/8/1997	10:30	1,020	
SJRCE	7/8/1997	10:30	1,020	
SJRCE	8/5/1997	10:20	1,157	
SJRCE	8/5/1997	10:20	1,157	
SJRCE	9/16/1997	9:35	1,253	
SJRCE	9/16/1997	9:35	1,253	
SJRCE	10/9/1997	14:00	1,073	
SJRCE	11/11/1997	9:45	872	
SJRCE	12/9/1997	9:30	809	
SJRCE	1/13/1998	9:55	598	
SJRCE	2/10/1998	9:40	558	
SJRCE	3/17/1998	10:15	493	
SJRCE	4/14/1998	9:30	483	
SJRCE	5/12/1998	13:45	594	
SJRCE	6/9/1998	13:45	703	
SJRCE	7/14/1998	13:45	778	
SJRCE	8/18/1998	9:00	742	
SJRCE	9/8/1998	13:20	845	
SJRCE	10/15/1998	13:40	833	
SJRCE	12/15/1998	13:40	883	
SJRCE	1/12/1999	9:45	850	
SJRCE	2/9/1999	10:15	665	
SJRCE	3/10/1999	13:45	935	
SJRCE	4/27/1999	10:20	1,172	
SJRCE	5/10/1999	10:10	1,107	
SJRCE	6/7/1999	10:00	1,129	
SJRCE	7/12/1999	13:20	1,165	
SJRCE	8/10/1999	13:35	1,380	
SJRCE	9/28/1999	14:40	1,183	
SJRCE	10/12/1999	14:40	1,318	
SJRCE	11/9/1999	11:20	1,102	
SJRCE	12/6/1999	14:20	647	
SJRCE	1/10/2000	14:30	718	
SJRCE	3/6/2000	15:20	794	
SJRCE	5/8/2000	10:55	949	
SJRCE	6/12/2000	15:15	1,019	
SJRCE	7/10/2000	10:15	1,029	
SJRCE	8/7/2000	10:35	1,046	
SJRCE	9/11/2000	9:45	988	
SJRCE	10/11/2000	15:35	735	
SJRCE	11/13/2000	9:30	1,264	
SJRCE	12/14/2000	9:45	1,219	

Average =	940.3	µmhos/cm
Maximum =	1,516.0	µmhos/cm
Standard Dev =	231.0	µmhos/cm
95 Percentile =	1,327.2	µmhos/cm
Count	978.0	

Ambient Conductivity Data in St. Johns River near SECI Palatka Plant

Class III Water Quality Standard = 1,991 µmhos/cm

Station	Date	Time	Specific Conductivity (µmhos/cm)	Remark Code
SJRCE	1/9/2001	11:50	1,261	
SJRCE	2/15/2001	9:50	1,262	
SJRCE	3/15/2001	8:45	1,339	
SJRCE	4/10/2001	8:45	1,388	
SJRCE	5/14/2001	13:40	1,487	
SJRCE	6/11/2001	13:40	1,321	
SJRCE	7/11/2001	12:45	1,205	
SJRCE	8/9/2001	12:00	1,227	
SJRCE	9/11/2001	14:50	1,368	
SJRCE	10/9/2001	12:30	848	
SJRCW	3/9/1993	14:50	718	
SJRCW	4/13/1993	15:05	798	
SJRCW	5/12/1993	13:30	940	
SJRCW	7/7/1993	11:30	1,090	
SJRCW	9/22/1993	9:00	1,090	
SJRCW	10/20/1993	10:40	803	
SJRCW	11/15/1993	11:50	882	
SJRCW	12/15/1993	11:45	1,092	
SJRCW	1/20/1994	12:15	967	
SJRCW	2/15/1994	9:50	827	
SJRCW	3/14/1994	12:25	995	
SJRCW	4/12/1994	11:40	1,240	
SJRCW	5/16/1994	12:20	1,305	
SJRCW	6/14/1994	12:35	1,101	
SJRCW	7/12/1994	11:55	1,030	
SJRCW	8/16/1994	12:00	1,170	
SJRCW	8/16/1994	12:01	89	
SJRCW	9/13/1994	11:55	937	
SJRCW	10/17/1994	11:45	399	
SJRCW	11/18/1994	10:50	587	
SJRCW	12/13/1994	12:20	471	
SJRCW	1/19/1995	11:50	397	
SJRCW	3/15/1995	10:55	737	
SJRCW	4/11/1995	9:40	644	
SJRCW	5/16/1995	11:35	843	
SJRCW	6/13/1995	10:15	774	
SJRCW	7/11/1995	11:30	798	
SJRCW	8/15/1995	12:30	869	
SJRCW	9/13/1995	12:25	700	
SJRCW	10/17/1995	11:20	529	
SJRCW	11/16/1995	11:35	552	
SJRCW	12/13/1995	10:50	643	

Average =	940.3	µmhos/cm
Maximum =	1,516.0	µmhos/cm
Standard Dev =	231.0	µmhos/cm
95 Percentile =	1,327.2	µmhos/cm
Count	978.0	

Ambient Conductivity Data in St. Johns River near SECI Palatka Plant

Class III Water Quality Standard = 1,991 µmhos/cm

Station	Date	Time	Specific Conductivity (µmhos/cm)	Remark Code
SJRCW	1/16/1996	11:00	548	
SJRCW	2/13/1996	11:35	649	
SJRCW	3/13/1996	11:25	737	
SJRCW	4/16/1996	10:50	708	
SJRCW	5/14/1996	11:15	735	
SJRCW	6/12/1996	11:30	717	
SJRCW	7/16/1996	11:10	681	
SJRCW	8/21/1996	11:35	757	
SJRCW	9/17/1996	10:30	889	
SJRCW	10/15/1996	10:00	706	
SJRCW	11/13/1996	11:00	953	
SJRCW	12/3/1996	10:55	877	
SJRCW	1/14/1997	10:40	834	
SJRCW	2/11/1997	10:40	1,025	
SJRCW	3/11/1997	10:45	1,058	
SJRCW	4/15/1997	10:35	1,001	
SJRCW	4/15/1997	10:35	1,001	
SJRCW	5/13/1997	10:25	782	
SJRCW	5/13/1997	10:25	782	
SJRCW	6/10/1997	10:50	904	
SJRCW	6/10/1997	10:50	904	
SJRCW	7/8/1997	10:45	1,047	
SJRCW	7/8/1997	10:45	1,047	
SJRCW	8/5/1997	10:40	927	
SJRCW	8/5/1997	10:40	927	
SJRCW	9/16/1997	9:50	1,249	
SJRCW	9/16/1997	9:50	1,249	
SJRCW	10/9/1997	14:50	1,057	
SJRCW	11/11/1997	10:00	760	
SJRCW	12/9/1997	10:00	828	
SJRCW	1/13/1998	10:20	562	
SJRCW	2/10/1998	10:00	412	
SJRCW	3/17/1998	10:35	473	
SJRCW	4/14/1998	10:10	503	
SJRCW	5/12/1998	13:20	641	
SJRCW	6/9/1998	13:20	792	
SJRCW	7/14/1998	14:15	811	
SJRCW	8/18/1998	9:30	744	
SJRCW	9/8/1998	10:45	799	
SJRCW	9/8/1998	13:45	984	
SJRCW	10/15/1998	14:15	782	
SJRCW	11/10/1998	13:30	1,028	

Average =	940.3	µmhos/cm
Maximum =	1,516.0	µmhos/cm
Standard Dev =	231.0	µmhos/cm
95 Percentile =	1,327.2	µmhos/cm
Count	978.0	

Ambient Conductivity Data in St. Johns River near SECI Palatka Plant

Class III Water Quality Standard = 1,991 µmhos/cm

Station	Date	Time	Specific Conductivity (µmhos/cm)	Remark Code
SJRCW	12/15/1998	13:15	899	
SJRCW	1/12/1999	10:15	880	
SJRCW	2/9/1999	10:40	754	
SJRCW	3/10/1999	13:20	910	
SJRCW	4/27/1999	11:00	1,183	
SJRCW	5/10/1999	11:00	1,127	
SJRCW	6/7/1999	10:30	1,164	
SJRCW	7/12/1999	13:00	1,172	
SJRCW	8/10/1999	13:15	1,328	
SJRCW	9/28/1999	14:20	1,183	
SJRCW	10/12/1999	14:20	1,347	
SJRCW	11/9/1999	12:00	1,069	
SJRCW	12/6/1999	14:00	638	
SJRCW	1/10/2000	14:10	813	
SJRCW	3/6/2000	15:00	852	
SJRCW	5/8/2000	11:25	1,006	
SJRCW	6/12/2000	14:55	1,084	
SJRCW	7/10/2000	10:50	1,020	
SJRCW	8/7/2000	11:00	1,063	
SJRCW	9/11/2000	10:05	790	
SJRCW	10/11/2000	15:15	767	
SJRCW	11/13/2000	9:50	1,248	
SJRCW	12/14/2000	10:05	1,279	
SJRCW	1/9/2001	11:30	1,188	
SJRCW	2/15/2001	10:10	1,284	
SJRCW	3/15/2001	9:15	1,377	
SJRCW	4/10/2001	8:55	1,372	
SJRCW	5/14/2001	14:10	1,516	
SJRCW	6/11/2001	13:55	1,312	
SJRCW	7/11/2001	12:25	1,346	
SJRCW	8/9/2001	11:40	1,101	
SJRCW	9/11/2001	14:30	1,408	
SJRCW	10/9/2001	12:05	863	
SJRCW	11/20/2001	12:55	642	
SJRCW	12/5/2001	12:40	627	
SJRCW	1/8/2002	12:00	824	
SJRCW	2/11/2002	11:25	834	
SJRCW	3/11/2002	9:35	919	
SJRCW	4/8/2002	12:55	1,056	
SJRCW	5/13/2002	12:00	1,238	
SJRCW	6/10/2002	12:10	1,226	
SJRCW	7/15/2002	12:30	1,197	

Average =	940.3	µmhos/cm
Maximum =	1,516.0	µmhos/cm
Standard Dev =	231.0	µmhos/cm
95 Percentile =	1,327.2	µmhos/cm
Count	978.0	

Ambient Conductivity Data in St. Johns River near SECI Palatka Plant

Class III Water Quality Standard = 1,991 µmhos/cm

Station	Date	Time	Specific Conductivity (µmhos/cm)	Remark Code
SJRCW	8/12/2002	11:35	921	
SJRCW	9/12/2002	11:20	649	
SJRCW	10/7/2002	12:10	504	
SJRCW	11/11/2002	11:40	625	
SJRCW	12/9/2002	11:15	744	
SJRCW	1/6/2003	11:10	491	
SJRCW	2/11/2003	9:50	710	
SJRCW	3/11/2003	13:05	572	
SJRCW	3/11/2003	13:05	460	
SJRCW	4/14/2003	12:00	613	
SJRCW	8/12/2003	12:45	685	
SJRCW	9/8/2003	12:00	985	
SJRCW	10/7/2003	11:35	822	
SJRCW	11/12/2003	12:20	740	X
SJRCW	11/12/2003	12:20	744	
SJRCW	11/12/2003	12:20	742	
SJRCW	12/10/2003	13:40	798	
SJRCW	1/12/2004	13:25	890	
SJRCW	1/12/2004	13:25	854	
SJRCW	1/12/2004	13:25	851	
SJRCW	2/9/2004	12:45	790	
SJRM70B	6/7/2000	10:10	983	
SJRM70B	6/7/2000	10:10	986	
SJRM70B	6/7/2000	10:10	984	
SJRM70B	6/14/2000	9:55	1,047	
SJRM70B	6/14/2000	9:55	1,048	
SJRM70B	6/14/2000	9:55	1,048	
SJRM70B	6/21/2000	9:10	1,024	
SJRM70B	6/21/2000	9:10	1,018	
SJRM70B	6/21/2000	9:10	1,021	
SJRM70B	6/28/2000	8:50	964	
SJRM70B	6/28/2000	8:50	956	
SJRM70B	6/28/2000	8:50	960	
SJRM70B	7/5/2000	10:25	1,074	
SJRM70B	7/5/2000	10:25	1,064	
SJRM70B	7/5/2000	10:25	1,069	
SJRM70B	7/12/2000	9:50	1,044	
SJRM70B	7/12/2000	9:50	1,038	
SJRM70B	7/12/2000	9:50	1,041	
SJRM70B	7/19/2000	10:30	1,050	
SJRM70B	7/19/2000	10:30	1,048	
SJRM70B	7/19/2000	10:30	1,049	

Average =	940.3	µmhos/cm
Maximum =	1,516.0	µmhos/cm
Standard Dev =	231.0	µmhos/cm
95 Percentile =	1,327.2	µmhos/cm
Count	978.0	

Ambient Conductivity Data in St. Johns River near SECI Palatka Plant

Class III Water Quality Standard = 1,991 µmhos/cm

Station	Date	Time	Specific Conductivity (µmhos/cm)	Remark Code
SJRM70B	7/26/2000	9:10	1,056	
SJRM70B	7/26/2000	9:10	1,056	
SJRM70B	7/26/2000	9:10	1,056	
SJRM70B	8/2/2000	7:55	1,028	
SJRM70B	8/2/2000	7:55	1,052	
SJRM70B	8/2/2000	7:55	1,040	
SJRM70B	8/23/2000	7:55	1,061	
SJRM70B	8/23/2000	7:55	1,062	
SJRM70B	8/23/2000	7:55	1,062	
SJRM70B	6/6/2001	8:30	1,279	
SJRM70B	6/6/2001	8:30	1,279	
SJRM70B	6/6/2001	8:30	1,279	
SJRM70B	6/27/2001	12:40	1,396	
SJRM70B	6/27/2001	12:40	1,397	
SJRM70B	6/27/2001	12:40	1,396	
SJRM70C	6/7/2000	10:20	996	
SJRM70C	6/7/2000	10:20	996	
SJRM70C	6/7/2000	10:20	996	
SJRM70C	6/14/2000	10:05	1,027	
SJRM70C	6/14/2000	10:05	1,024	
SJRM70C	6/14/2000	10:05	1,026	
SJRM70C	6/21/2000	9:15	1,029	
SJRM70C	6/21/2000	9:15	1,027	
SJRM70C	6/21/2000	9:15	1,028	
SJRM70C	6/28/2000	9:00	964	
SJRM70C	6/28/2000	9:00	968	
SJRM70C	6/28/2000	9:00	966	
SJRM70C	7/5/2000	10:35	1,062	
SJRM70C	7/5/2000	10:35	1,065	
SJRM70C	7/5/2000	10:35	1,064	
SJRM70C	7/12/2000	10:00	1,034	
SJRM70C	7/12/2000	10:00	1,034	
SJRM70C	7/12/2000	10:00	1,034	
SJRM70C	7/19/2000	10:40	1,046	
SJRM70C	7/19/2000	10:40	1,043	
SJRM70C	7/19/2000	10:40	1,045	
SJRM70C	7/26/2000	9:20	1,042	
SJRM70C	7/26/2000	9:20	1,050	
SJRM70C	7/26/2000	9:20	1,046	
SJRM70C	8/2/2000	8:10	1,047	
SJRM70C	8/2/2000	8:10	1,053	
SJRM70C	8/2/2000	8:10	1,050	

Average =	940.3	µmhos/cm
Maximum =	1,516.0	µmhos/cm
Standard Dev =	231.0	µmhos/cm
95 Percentile =	1,327.2	µmhos/cm
Count	978.0	

Ambient Conductivity Data in St. Johns River near SECI Palatka Plant

Class III Water Quality Standard = 1,991 µmhos/cm

Station	Date	Time	Specific Conductivity (µmhos/cm)	Remark Code
SJRM70C	8/23/2000	8:05	1,061	
SJRM70C	8/23/2000	8:05	1,060	
SJRM70C	8/23/2000	8:05	1,060	
SJRM70C	6/6/2001	8:40	1,270	
SJRM70C	6/6/2001	8:40	1,272	
SJRM70C	6/6/2001	8:40	1,271	
SJRM70C	6/27/2001	12:50	1,401	
SJRM70C	6/27/2001	12:50	1,407	
SJRM70C	6/27/2001	12:50	1,404	
SJRM70D	6/7/2000	10:35	996	
SJRM70D	6/7/2000	10:35	995	
SJRM70D	6/7/2000	10:35	996	
SJRM70D	6/14/2000	10:15	1,026	
SJRM70D	6/14/2000	10:15	1,027	
SJRM70D	6/14/2000	10:15	1,026	
SJRM70D	6/21/2000	9:25	1,030	
SJRM70D	6/21/2000	9:25	1,027	
SJRM70D	6/21/2000	9:25	1,028	
SJRM70D	6/28/2000	9:10	975	
SJRM70D	6/28/2000	9:10	979	
SJRM70D	6/28/2000	9:10	977	
SJRM70D	7/5/2000	10:45	1,046	
SJRM70D	7/5/2000	10:45	1,050	
SJRM70D	7/5/2000	10:45	1,048	
SJRM70D	7/12/2000	10:15	1,037	
SJRM70D	7/12/2000	10:15	1,032	
SJRM70D	7/12/2000	10:15	1,035	
SJRM70D	7/19/2000	10:50	1,044	
SJRM70D	7/19/2000	10:50	1,041	
SJRM70D	7/19/2000	10:50	1,043	
SJRM70D	7/26/2000	9:30	1,036	
SJRM70D	7/26/2000	9:30	1,036	
SJRM70D	7/26/2000	9:30	1,036	
SJRM70D	7/26/2000	9:30	1,036	
SJRM70D	8/2/2000	8:20	1,034	
SJRM70D	8/2/2000	8:20	1,027	
SJRM70D	8/2/2000	8:20	1,030	
SJRM70D	8/23/2000	8:15	1,069	
SJRM70D	8/23/2000	8:15	1,070	
SJRM70D	8/23/2000	8:15	1,070	
SJRM70D	6/6/2001	8:50	1,291	
SJRM70D	6/6/2001	8:50	1,297	

Average =	940.3	µmhos/cm
Maximum =	1,516.0	µmhos/cm
Standard Dev =	231.0	µmhos/cm
95 Percentile =	1,327.2	µmhos/cm
Count	978.0	

Ambient Conductivity Data in St. Johns River near SECI Palatka Plant

Class III Water Quality Standard = 1,991 µmhos/cm

Station	Date	Time	Specific Conductivity (µmhos/cm)	Remark Code
SJRM70D	6/6/2001	8:50	1,294	
SJRM70D	6/27/2001	12:55	1,384	
SJRM70D	6/27/2001	12:55	1,386	
SJRM70D	6/27/2001	12:55	1,385	
SJRM70E	6/7/2000	10:45	994	
SJRM70E	6/14/2000	10:25	1,025	
SJRM70E	6/14/2000	10:25	1,025	
SJRM70E	6/21/2000	9:40	1,031	
SJRM70E	6/21/2000	9:40	1,031	
SJRM70E	6/28/2000	9:20	983	
SJRM70E	7/5/2000	10:55	1,035	
SJRM70E	7/5/2000	10:55	1,035	
SJRM70E	7/12/2000	10:30	1,038	
SJRM70E	7/19/2000	11:00	1,045	
SJRM70E	7/19/2000	11:00	1,045	
SJRM70E	7/26/2000	9:45	1,034	
SJRM70E	8/2/2000	8:30	1,032	
SJRM70E	8/23/2000	8:25	1,071	
SJRM70E	8/23/2000	8:25	981	
SJRM70E	8/23/2000	8:25	1,026	
SJRM70E	6/6/2001	9:05	1,338	
SJRM70E	6/27/2001	13:05	1,383	
SJRM70W	6/7/2000	10:00	991	
SJRM70W	6/14/2000	9:45	1,061	
SJRM70W	6/21/2000	9:00	1,032	
SJRM70W	6/28/2000	8:40	960	
SJRM70W	7/5/2000	10:10	1,063	
SJRM70W	7/12/2000	9:45	1,045	
SJRM70W	7/19/2000	10:20	1,050	
SJRM70W	7/26/2000	8:55	1,058	
SJRM70W	8/2/2000	7:35	1,024	
SJRM70W	8/23/2000	7:35	1,067	
SJRM70W	6/6/2001	8:10	1,288	
SJRM70W	6/27/2001	12:30	1,369	
SJRM74B	6/7/2000	9:20	1,004	
SJRM74B	6/7/2000	9:20	1,003	
SJRM74B	6/7/2000	9:20	1,004	
SJRM74B	6/14/2000	9:15	1,008	
SJRM74B	6/14/2000	9:15	1,007	
SJRM74B	6/14/2000	9:15	1,008	
SJRM74B	6/21/2000	8:30	957	
SJRM74B	6/21/2000	8:30	957	

Average =	940.3	µmhos/cm
Maximum =	1,516.0	µmhos/cm
Standard Dev =	231.0	µmhos/cm
95 Percentile =	1,327.2	µmhos/cm
Count	978.0	

Ambient Conductivity Data in St. Johns River near SECI Palatka Plant

Class III Water Quality Standard = 1,991 µmhos/cm

Station	Date	Time	Specific Conductivity (µmhos/cm)	Remark Code
SJRM74B	6/21/2000	8:30	957	
SJRM74B	6/28/2000	8:15	977	
SJRM74B	7/5/2000	9:35	1,010	
SJRM74B	7/5/2000	9:35	1,007	
SJRM74B	7/5/2000	9:35	1,008	
SJRM74B	7/12/2000	9:10	1,040	
SJRM74B	7/12/2000	9:10	1,030	
SJRM74B	7/12/2000	9:10	1,035	
SJRM74B	7/19/2000	9:45	1,079	
SJRM74B	7/19/2000	9:45	1,064	
SJRM74B	7/19/2000	9:45	1,072	
SJRM74B	7/26/2000	8:25	999	
SJRM74B	7/26/2000	8:25	998	
SJRM74B	7/26/2000	8:25	998	
SJRM74C	6/7/2000	9:10	1,004	
SJRM74C	6/7/2000	9:10	1,002	
SJRM74C	6/7/2000	9:10	1,003	
SJRM74C	6/14/2000	9:00	984	
SJRM74C	6/14/2000	9:00	984	
SJRM74C	6/14/2000	9:00	984	
SJRM74C	6/21/2000	8:20	940	
SJRM74C	6/21/2000	8:20	941	
SJRM74C	6/21/2000	8:20	940	
SJRM74C	6/28/2000	8:00	989	
SJRM74C	6/28/2000	8:00	996	
SJRM74C	6/28/2000	8:00	993	
SJRM74C	6/28/2000	8:15	975	
SJRM74C	6/28/2000	8:15	978	
SJRM74C	7/5/2000	9:15	1,014	
SJRM74C	7/5/2000	9:15	1,000	
SJRM74C	7/5/2000	9:25	1,007	
SJRM74C	7/12/2000	9:00	1,033	
SJRM74C	7/12/2000	9:00	1,029	
SJRM74C	7/12/2000	9:00	1,031	
SJRM74C	7/19/2000	9:30	1,068	
SJRM74C	7/19/2000	9:30	1,054	
SJRM74C	7/19/2000	9:30	1,061	
SJRM74C	7/26/2000	8:10	980	
SJRM74C	7/26/2000	8:10	981	
SJRM74C	7/26/2000	8:10	980	
SJRM74D	6/7/2000	9:00	989	
SJRM74D	6/7/2000	9:00	984	

Average =	940.3	µmhos/cm
Maximum =	1,516.0	µmhos/cm
Standard Dev =	231.0	µmhos/cm
95 Percentile =	1,327.2	µmhos/cm
Count	978.0	

Ambient Conductivity Data in St. Johns River near SECI Palatka Plant

Class III Water Quality Standard = 1,991 µmhos/cm

Station	Date	Time	Specific Conductivity (µmhos/cm)	Remark Code
SJRM74D	6/7/2000	9:00	986	
SJRM74D	6/14/2000	8:50	986	
SJRM74D	6/14/2000	8:50	983	
SJRM74D	6/14/2000	8:50	984	
SJRM74D	6/21/2000	8:05	936	
SJRM74D	6/21/2000	8:05	941	
SJRM74D	6/21/2000	8:05	938	
SJRM74D	6/28/2000	7:55	987	
SJRM74D	6/28/2000	7:55	985	
SJRM74D	6/28/2000	7:55	986	
SJRM74D	7/5/2000	9:15	999	
SJRM74D	7/5/2000	9:15	1,011	
SJRM74D	7/5/2000	9:15	1,005	
SJRM74D	7/12/2000	8:50	1,036	
SJRM74D	7/12/2000	8:50	1,029	
SJRM74D	7/12/2000	8:50	1,033	
SJRM74D	7/19/2000	9:15	1,047	
SJRM74D	7/19/2000	9:15	1,049	
SJRM74D	7/19/2000	9:15	1,048	
SJRM74D	7/26/2000	7:55	974	
SJRM74D	7/26/2000	7:55	973	
SJRM74D	7/26/2000	7:55	974	
SJRM74E	6/7/2000	8:45	988	
SJRM74E	6/14/2000	8:40	988	
SJRM74E	6/14/2000	8:40	990	
SJRM74E	6/14/2000	8:40	989	
SJRM74E	6/21/2000	7:50	929	
SJRM74E	6/21/2000	7:50	930	
SJRM74E	6/21/2000	7:50	930	
SJRM74E	6/28/2000	7:40	986	
SJRM74E	6/28/2000	7:40	978	
SJRM74E	6/28/2000	7:40	982	
SJRM74E	7/5/2000	9:05	988	
SJRM74E	7/5/2000	9:05	981	
SJRM74E	7/5/2000	9:05	984	
SJRM74E	7/12/2000	8:40	1,033	
SJRM74E	7/12/2000	8:40	1,033	
SJRM74E	7/12/2000	8:40	1,033	
SJRM74E	7/19/2000	9:00	1,050	
SJRM74E	7/19/2000	9:00	1,050	
SJRM74E	7/19/2000	9:00	1,049	
SJRM74E	7/19/2000	9:00	1,050	

Average =	940.3	µmhos/cm
Maximum =	1,516.0	µmhos/cm
Standard Dev =	231.0	µmhos/cm
95 Percentile =	1,327.2	µmhos/cm
Count	978.0	

Ambient Conductivity Data in St. Johns River near SECI Palatka Plant

Class III Water Quality Standard = 1,991 µmhos/cm

Station	Date	Time	Specific Conductivity (µmhos/cm)	Remark Code
SJRM74E	7/26/2000	7:30	989	
SJRM74W	6/7/2000	9:30	1,044	
SJRM74W	6/7/2000	9:30	1,044	
SJRM74W	6/14/2000	9:25	1,042	
SJRM74W	6/21/2000	8:35	977	
SJRM74W	6/21/2000	8:35	977	
SJRM74W	6/21/2000	8:35	977	
SJRM74W	6/28/2000	8:20	1,050	
SJRM74W	7/5/2000	9:45	1,018	
SJRM74W	7/5/2000	9:45	1,018	
SJRM74W	7/12/2000	9:20	1,064	
SJRM74W	7/19/2000	9:55	1,087	
SJRM74W	7/26/2000	8:35	1,005	

Average =	940.3	µmhos/cm
Maximum =	1,516.0	µmhos/cm
Standard Dev =	231.0	µmhos/cm
95 Percentile =	1,327.2	µmhos/cm
Count	978.0	

Source: SJRWMD, 2001.
SECI, 2001.
ECT, 2001.

Ambient Copper Data in St. Johns River near SECI Palatka Plant

Average MDL = 7.3 µg/L

Class III Water Quality Standard = 9.65 µg/L mg/L

Average =	1.75 µg/L
Maximum =	17.00 µg/L
Standard Dev =	1.99 µg/L
95 Percentile =	5.00 µg/L
Count	424.00

Station	Date	Time		Copper µg/L	Remark Code	Value used µg/L
SECI D-005	8/19/98		<	2.5	K	1.25
SECI D-005	10/20/98		<	2.5	K	1.25
SECI D-005	3/1/2000		<	10	K	4.823427827
SECI D-005	6/1/2000		<	10	K	4.823427827
SECI D-005	9/1/2000		<	1.4	K	0.7
SECI D-005	12/1/2000		<	6	K	3
SECI D-005	3/1/2001		<	0.9	K	0.45
SECI D-005	6/1/2001		<	0.9	K	0.45
SECI D-005	7/1/2001		<	0.9	K	0.45
SECI D-005	12/1/2001		<	0.9	K	0.45
SECI D-005	3/1/2002			1.8		1.8
SECI D-005	6/1/2002		<	0.9	K	0.45
SECI D-005	7/29/2002			1.9		1.9
SECI D-005	10/22/2002			3		3
SECI D-005	1/28/2003			0.9		0.9
SECI D-005	5/13/2003			2.8		2.8
SECI D-005	8/26/2003			1.7		1.7
FP41	9/22/1993	14:50		1	T	1
FP42	9/22/1993	15:00		1	T	1
FP42	11/27/2001	10:00		1.457	T	1.457
FP42	2/26/2002	10:50		0.737	T	0.737
FP42	3/25/2002	15:30		1.321	T	1.321
FP42	4/29/2002	14:55		1.049	T	1.049
FP42	5/29/2002	13:45		0.629	T	0.629
FP42	6/26/2002	15:10		0.624	T	0.624
FP42	7/30/2002	14:00		0.953	T	0.953
FP42	8/26/2002	10:00		0.633	T	0.633
FP42	9/25/2002	14:30		1.006	T	1.006
FP42	10/24/2002	14:35		0.898	T	0.898
FP42	11/25/2002	15:05		1.091	T	1.091
FP42	1/28/2003	9:45		1.224	T	1.224
FP43	9/22/1993	15:15		1	T	1
SJ6	5/16/2002	10:45		1.7	T	1.7
SJRCC	5/12/1993	13:40		0	T	3.65
SJRCC	6/8/1993	8:25		1	T	1
SJRCC	7/7/1993	11:20		0	T	3.65
SJRCC	9/22/1993	8:50		0	T	3.65
SJRCC	12/15/1993	11:30		1	T	1
SJRCC	1/20/1994	12:05		1	T	1
SJRCC	2/15/1994	10:15		0	T	3.65
SJRCC	3/14/1994	12:10		-1	T	3.65
SJRCC	4/12/1994	11:30		13		13
SJRCC	5/16/1994	12:05		1		1
SJRCC	6/14/1994	12:25		1		1
SJRCC	7/12/1994	11:40		7		7
SJRCC	8/16/1994	11:45		5		5
SJRCC	9/13/1994	11:55		4		4
SJRCC	10/17/1994	11:25		2		2
SJRCC	11/18/1994	10:40		0	T	3.65

Ambient Copper Data in St. Johns River near SECI Palatka Plant

Average MDL = 7.3 µg/L

Class III Water Quality Standard = 9.65 µg/L mg/L

Average =	1.75 µg/L
Maximum =	17.00 µg/L
Standard Dev =	1.99 µg/L
95 Percentile =	5.00 µg/L

Station	Date	Time	Copper µg/L	Remark Code	Value used µg/L
SJRCC	12/13/1994	12:10	6		6
SJRCC	1/19/1995	11:40	1	T	1
SJRCC	3/15/1995	10:40	1	T	1
SJRCC	4/11/1995	9:30	-1	T	3.65
SJRCC	5/16/1995	11:25	2		2
SJRCC	6/13/1995	10:00	1	T	1
SJRCC	7/11/1995	11:15	1	T	1
SJRCC	8/15/1995	12:15	1	T	1
SJRCC	9/13/1995	12:10	4		4
SJRCC	10/17/1995	11:00	2		2
SJRCC	11/16/1995	11:20	0	T	3.65
SJRCC	12/13/1995	10:40	3		3
SJRCC	1/16/1996	10:50	5		5
SJRCC	2/13/1996	11:25	1	T	1
SJRCC	3/13/1996	11:15	4		4
SJRCC	4/16/1996	10:40	2	T	2
SJRCC	5/14/1996	11:00	2		2
SJRCC	6/12/1996	11:15	1	T	1
SJRCC	7/16/1996	10:55	8		8
SJRCC	8/21/1996	11:20	8		8
SJRCC	9/17/1996	10:15	1	T	1
SJRCC	10/15/1996	10:15	1	T	1
SJRCC	11/13/1996	10:40	4		4
SJRCC	12/3/1996	10:40	1	T	1
SJRCC	1/14/1997	10:25	1	T	1
SJRCC	2/11/1997	10:25	1	T	1
SJRCC	3/11/1997	10:25	-1	T	3.65
SJRCC	4/15/1997	10:25	1	T	1
SJRCC	4/15/1997	10:25	1	T	1
SJRCC	5/13/1997	10:20	1	T	1
SJRCC	5/13/1997	10:20	1	T	1
SJRCC	6/10/1997	10:40	1	T	1
SJRCC	6/10/1997	10:40	1	T	1
SJRCC	7/8/1997	10:40	1	T	1
SJRCC	7/8/1997	10:40	1	T	1
SJRCC	8/5/1997	10:30	1	T	1
SJRCC	8/5/1997	10:30	1	T	1
SJRCC	9/16/1997	9:40	1.92	T	1.92
SJRCC	9/16/1997	9:40	1.92	T	1.92
SJRCC	10/9/1997	14:20	2		2
SJRCC	11/11/1997	9:50	0.68	T	0.68
SJRCC	12/9/1997	9:45	0.41	T	0.41
SJRCC	1/13/1998	10:10	0.74	T	0.74
SJRCC	2/10/1998	9:45	0.9	T	0.9
SJRCC	3/17/1998	10:20	1.38	T	1.38
SJRCC	4/14/1998	9:45	0.75	T	0.75
SJRCC	5/12/1998	13:40	1.78	T	1.78
SJRCC	6/9/1998	13:25	0.7	T	0.7
SJRCC	7/14/1998	14:00	0.72	T	0.72
SJRCC	8/18/1998	9:15	0.42	T	0.42
SJRCC	9/8/1998	13:30	0.53	T	0.53

Ambient Copper Data in St. Johns River near SECI Palatka Plant

Average MDL = 7.3 µg/L

Class III Water Quality Standard = 9.65 µg/L mg/L

Average =	1.75 µg/L
Maximum =	17.00 µg/L
Standard Dev =	1.99 µg/L
95 Percentile =	5.00 µg/L

Station	Date	Time	Copper µg/L	Remark Code	Value used µg/L
SJRCC	10/15/1998	14:00	0.28	T	0.28
SJRCC	12/15/1998	13:30	0.53	T	0.53
SJRCC	1/12/1999	9:50	0.41	T	0.41
SJRCC	2/9/1999	10:30	0.49	T	0.49
SJRCC	3/10/1999	13:35	0.79	T	0.79
SJRCC	4/27/1999	10:45	0.64	T	0.64
SJRCC	5/10/1999	10:30	0.45	T	0.45
SJRCC	6/7/1999	10:15	0.84	T	0.84
SJRCC	7/12/1999	13:10	0.44	T	0.44
SJRCC	8/10/1999	13:20	0.6	T	0.6
SJRCC	9/28/1999	14:30	1.99	T	1.99
SJRCC	10/12/1999	14:30	1.47	T	1.47
SJRCC	11/9/1999	11:40	1.31	T	1.31
SJRCC	12/6/1999	14:10	0.37	T	0.37
SJRCC	1/10/2000	14:20	0.86	T	0.86
SJRCC	2/7/2000	15:40	1.29	T	1.29
SJRCC	3/6/2000	15:10	0.41	T	0.41
SJRCC	4/10/2000	10:50	0.74	T	0.74
SJRCC	5/8/2000	11:15	0.97	T	0.97
SJRCC	6/12/2000	15:00	3.34		3.34
SJRCC	7/10/2000	10:30	1.26	T	1.26
SJRCC	8/7/2000	10:45	1.29	T	1.29
SJRCC	9/11/2000	9:55	1.46		1.46
SJRCC	10/11/2000	15:25	0.691	W	0.691
SJRCC	11/13/2000	9:40	0.56	T	0.56
SJRCC	12/14/2000	9:55	0.63	T	0.63
SJRCC	1/9/2001	11:40	-0.231	T	3.65
SJRCC	2/15/2001	10:00	0.444	T	0.444
SJRCC	3/15/2001	9:00	0.889	T	0.889
SJRCC	4/10/2001	8:50	0.069	T	0.069
SJRCC	5/14/2001	13:55	0.459	T	0.459
SJRCC	6/11/2001	13:50	-0.043	T	3.65
SJRCC	7/11/2001	12:34	0.264	T	0.264
SJRCC	8/9/2001	11:50	0.398	T	0.398
SJRCC	9/11/2001	14:40	0.512	T	0.512
SJRCC	10/9/2001	12:20	0.894	T	0.894
SJRCC	11/20/2001	13:10	0.929	T	0.929
SJRCC	12/5/2001	12:50	1.033	T	1.033
SJRCC	1/8/2002	12:15	0.421	T	0.421
SJRCC	2/11/2002	11:40	1.121	T	1.121
SJRCC	3/11/2002	9:20	0.287	T	0.287
SJRCC	4/8/2002	13:05	2	U	1
SJRCC	5/13/2002	12:10	1.3	T	1.3
SJRCC	6/10/2002	12:15	1.8	T	1.8
SJRCC	7/15/2002	12:50	1.19	T	1.19
SJRCC	8/12/2002	11:45	0.227	T	0.227
SJRCC	9/12/2002	11:30	-0.522	T	3.65
SJRCC	10/7/2002	12:20	1.23	T	1.23
SJRCC	11/11/2002	11:50	-0.604	T	3.65
SJRCC	12/9/2002	11:30	0.346	T	0.346
SJRCC	1/6/2003	11:20	-0.183	T	3.65

Ambient Copper Data in St. Johns River near SECI Palatka Plant

Average MDL = 7.3 µg/L

Class III Water Quality Standard = 9.65 µg/L mg/L

Average =	1.75 µg/L
Maximum =	17.00 µg/L
Standard Dev =	1.99 µg/L
95 Percentile =	5.00 µg/L

Station	Date	Time	Copper µg/L	Remark Code	Value used µg/L
SJRCC	2/11/2003	10:00	1.456	T	1.456
SJRCC	3/11/2003	13:10	0.77	T	0.77
SJRCC	3/11/2003	13:15	0.758	T	0.758
SJRCC	4/14/2003	12:15	1.242	T	1.242
SJRCC	4/14/2003	12:20	0.981	T	0.981
SJRCC	5/12/2003	12:50	0.865	T	0.865
SJRCC	5/12/2003	13:00	0.121	T	0.121
SJRCC	6/9/2003	12:20	0.941	T	0.941
SJRCC	6/9/2003	12:25	0.723	T	0.723
SJRCC	8/12/2003	12:50	0.513	T	0.513
SJRCC	8/12/2003	12:55	0.427	T	0.427
SJRCC	9/8/2003	12:10	0.19	T	0.19
SJRCC	10/7/2003	11:45	-1.78	T	3.65
SJRCC	11/12/2003	12:25	0.816	T	0.816
SJRCC	12/10/2003	13:30	-0.983	T	3.65
SJRCC	1/12/2004	13:30	1.37	T	1.37
SJRCC	2/9/2004	12:55	1.25	T	1.25
SJRCE	5/12/1993	13:50	0	T	3.65
SJRCE	6/8/1993	8:15	1	T	1
SJRCE	7/7/1993	11:10	0	T	3.65
SJRCE	9/22/1993	8:40	0	T	3.65
SJRCE	12/15/1993	11:20	0	T	3.65
SJRCE	1/20/1994	11:50	0	T	3.65
SJRCE	2/15/1994	10:30	0	T	3.65
SJRCE	3/14/1994	11:55	0	T	3.65
SJRCE	4/12/1994	11:20	13		13
SJRCE	5/16/1994	11:50	0	T	3.65
SJRCE	6/14/1994	12:05	2		2
SJRCE	7/12/1994	11:20	17		17
SJRCE	8/16/1994	11:35	5		5
SJRCE	9/13/1994	11:40	5		5
SJRCE	10/17/1994	11:10	0.01	W	0.01
SJRCE	11/18/1994	10:30	0	T	3.65
SJRCE	12/13/1994	12:00	1	T	1
SJRCE	1/19/1995	11:30	0	T	3.65
SJRCE	3/15/1995	10:30	2		2
SJRCE	4/11/1995	9:25	0	T	3.65
SJRCE	5/16/1995	11:15	2		2
SJRCE	6/13/1995	9:50	1	T	1
SJRCE	7/11/1995	10:55	2		2
SJRCE	8/15/1995	12:00	1	T	1
SJRCE	9/13/1995	11:55	2		2
SJRCE	10/17/1995	10:45	5		5
SJRCE	11/16/1995	11:05	0	T	3.65
SJRCE	12/13/1995	10:25	3		3
SJRCE	1/16/1996	10:45	5		5
SJRCE	2/13/1996	11:15	0	T	3.65
SJRCE	3/13/1996	11:05	5		5
SJRCE	4/16/1996	10:30	1	T	1
SJRCE	5/14/1996	10:50	2	T	2
SJRCE	6/12/1996	11:05	1	T	1

Ambient Copper Data in St. Johns River near SECI Palatka Plant

Average MDL = 7.3 µg/L

Class III Water Quality Standard = 9.65 µg/L

Average =	1.75 µg/L
Maximum =	17.00 µg/L
Standard Dev =	1.99 µg/L
95 Percentile =	5.00 µg/L

Station	Date	Time	Copper µg/L	Remark Code	Value used µg/L
SJRCE	7/16/1996	10:45	5		5
SJRCE	8/21/1996	11:05	6		6
SJRCE	9/17/1996	9:55	2		2
SJRCE	10/15/1996	10:30	1	T	1
SJRCE	11/13/1996	10:15	4		4
SJRCE	12/3/1996	10:25	1	T	1
SJRCE	1/14/1997	10:15	1	T	1
SJRCE	2/11/1997	10:15	2	T	2
SJRCE	3/11/1997	10:20	-1	T	3.65
SJRCE	4/15/1997	10:15	1	T	1
SJRCE	4/15/1997	10:15	1	T	1
SJRCE	5/13/1997	10:10	1	T	1
SJRCE	5/13/1997	10:10	1	T	1
SJRCE	6/10/1997	10:25	1	T	1
SJRCE	6/10/1997	10:25	1	T	1
SJRCE	7/8/1997	10:30	1	T	1
SJRCE	7/8/1997	10:30	1	T	1
SJRCE	8/5/1997	10:20	2		2
SJRCE	8/5/1997	10:20	2		2
SJRCE	9/16/1997	9:35	0.37	T	0.37
SJRCE	9/16/1997	9:35	0.37	T	0.37
SJRCE	10/9/1997	14:00	1	T	1
SJRCE	11/11/1997	9:45	0.64	T	0.64
SJRCE	12/9/1997	9:30	0.46	T	0.46
SJRCE	1/13/1998	9:55	0.74	T	0.74
SJRCE	2/10/1998	9:40	0.78	T	0.78
SJRCE	3/17/1998	10:15	0.8	T	0.8
SJRCE	4/14/1998	9:30	0.72	T	0.72
SJRCE	5/12/1998	13:45	1.25	T	1.25
SJRCE	6/9/1998	13:45	1.08	T	1.08
SJRCE	7/14/1998	13:45	0.81	T	0.81
SJRCE	8/18/1998	9:00	0.46	T	0.46
SJRCE	9/8/1998	13:20	0.81	T	0.81
SJRCE	10/15/1998	13:40	0.82	T	0.82
SJRCE	12/15/1998	13:40	0.46	T	0.46
SJRCE	1/12/1999	9:45	0.27	T	0.27
SJRCE	2/9/1999	10:15	0.68	T	0.68
SJRCE	3/10/1999	13:45	0.54	T	0.54
SJRCE	4/27/1999	10:20	0.66	T	0.66
SJRCE	5/10/1999	10:10	0.54	T	0.54
SJRCE	6/7/1999	10:00	0.54	T	0.54
SJRCE	7/12/1999	13:20	0.33	T	0.33
SJRCE	8/10/1999	13:35	0.51	T	0.51
SJRCE	9/28/1999	14:40	1.55	T	1.55
SJRCE	10/12/1999	14:40	1.3	T	1.3
SJRCE	11/9/1999	11:20	1.8	T	1.8
SJRCE	12/6/1999	14:20	0.18	T	0.18
SJRCE	1/10/2000	14:30	1.31	T	1.31
SJRCE	2/7/2000	15:50	1.6	T	1.6
SJRCE	3/6/2000	15:20	1.76	T	1.76
SJRCE	4/10/2000	10:40	0.6	T	0.6

Ambient Copper Data in St. Johns River near SECI Palatka Plant

Average MDL = 7.3 µg/L

Class III Water Quality Standard = 9.65 µg/L mg/L

Station	Date	Time	Copper µg/L	Remark Code	Value used µg/L
SJRCE	5/8/2000	10:55	2.5		2.5
SJRCE	6/12/2000	15:15	2.63		2.63
SJRCE	7/10/2000	10:15	1.56	T	1.56
SJRCE	8/7/2000	10:35	1.22	T	1.22
SJRCE	9/11/2000	9:45	1.76	T	1.76
SJRCE	10/11/2000	15:35	0.534	W	0.534
SJRCE	11/13/2000	9:30	0.71	T	0.71
SJRCE	12/14/2000	9:45	-0.223	T	3.65
SJRCE	1/9/2001	11:50	0.1	T	0.1
SJRCE	2/15/2001	9:50	0.334	T	0.334
SJRCE	3/15/2001	8:45	0.337	T	0.337
SJRCE	4/10/2001	8:45	0.138	T	0.138
SJRCE	5/14/2001	13:40	0.666	T	0.666
SJRCE	6/11/2001	13:40	-0.367	T	3.65
SJRCE	7/11/2001	12:45	0.614	T	0.614
SJRCE	8/9/2001	12:00	0.292	T	0.292
SJRCE	9/11/2001	14:50	0.237	T	0.237
SJRCE	10/9/2001	12:30	1.202	T	1.202
SJRCW	5/12/1993	13:30	1	T	1
SJRCW	6/8/1993	8:30	1	T	1
SJRCW	7/7/1993	11:30	1	T	1
SJRCW	9/22/1993	9:00	1	T	1
SJRCW	12/15/1993	11:45	0	T	3.65
SJRCW	1/20/1994	12:15	1	T	1
SJRCW	2/15/1994	9:50	8		8
SJRCW	3/14/1994	12:25	-1	T	3.65
SJRCW	4/12/1994	11:40	15		15
SJRCW	5/16/1994	12:20	2		2
SJRCW	6/14/1994	12:35	1		1
SJRCW	7/12/1994	11:55	6		6
SJRCW	8/16/1994	12:00	5		5
SJRCW	9/13/1994	11:55	5		5
SJRCW	10/17/1994	11:45	11		11
SJRCW	11/18/1994	10:50	0	T	3.65
SJRCW	12/13/1994	12:20	2		2
SJRCW	1/19/1995	11:50	1	T	1
SJRCW	3/15/1995	10:55	3		3
SJRCW	4/11/1995	9:40	-1	T	3.65
SJRCW	5/16/1995	11:35	3		3
SJRCW	6/13/1995	10:15	0	T	3.65
SJRCW	7/11/1995	11:30	1	T	1
SJRCW	8/15/1995	12:30	1	T	1
SJRCW	9/13/1995	12:25	2		2
SJRCW	10/17/1995	11:20	6		6
SJRCW	11/16/1995	11:35	1	T	1
SJRCW	12/13/1995	10:50	1	T	1
SJRCW	1/16/1996	11:00	4		4
SJRCW	2/13/1996	11:35	3		3

Average =	1.75 µg/L
Maximum =	17.00 µg/L
Standard Dev =	1.99 µg/L
95 Percentile =	5.00 µg/L

Ambient Cyanide Data in St. Johns River near SECI Palatka Plant

Class III Water Quality Standard = 5.2 µg/L

Average =	1.70 µg/L
Maximum =	4.00 µg/L
Standard Dev =	0.68 µg/L
95 Percentile =	2.60 µg/L
Count	33.00

Station	Date		Cyanide (µg/L)	Value used (µg/L)
SECI D-005	02/01/01	<	5	2.5
SECI D-005	06/19/01	<	10	2.6
SECI D-005	07/17/01	<	10	2.6
SECI D-005	11/19/01	<	10	2.6
SECI D-005	02/20/02	<	5	2.5
SECI D-005	06/12/02	<	4	2
SECI D-005	07/30/02	<	8	2.6
SECI D-005	10/22/02	<	4	2
SECI D-005	01/28/03		4	4
SECI D-005	05/13/03	<	4	2
SECI D-005	08/26/03	<	4	2
SECI D-005	10/28/03	<	0.4	0.2
sjrcc	3/24/2005	<	2.7	1.35
SJRM 74C	3/24/2005	<	2.7	1.35
SJ6	3/24/2005	<	2.7	1.35
SJRCC	4/26/2005	<	2.7	1.35
SJ6	4/26/2005	<	2.7	1.35
SJRM 74C	4/26/2005	<	2.7	1.35
SJRCC	5/17/2005	<	2.7	1.35
SJ6	5/17/2005	<	2.7	1.35
SJRM 74C	5/17/2005	<	2.7	1.35
SJRCC	6/20/2005	<	2.7	1.35
SJRM 74C	6/20/2005	<	2.7	1.35
SJ6	6/20/2005	<	2.7	1.35
SJRCC	7/25/2005	<	2.7	1.35
SJ6	7/25/2005	<	2.7	1.35
SJRM 74C	7/25/2005	<	2.7	1.35
SJRCC	8/31/2005	<	2.7	1.35
SJ6	8/31/2005	<	2.7	1.35
SJRM 74C	8/31/2005	<	2.7	1.35
SJ6	9/27/2005	<	2.7	1.35
SJRM 74C	9/27/2005	<	2.7	1.35
SJRCC	9/27/2005	<	2.7	1.35

Note: If non-detect was reported, half of the detection limit or half of the water quality standard was used, whichever was less.

Source: SJRWMD, 2004.
ECT, 2004.

Ambient Iron Data in St. Johns River near SECI Palatka Plant

Average MDL = 14 µg/L

Class III Water Quality Standard = 1,000 µg/L

Station	Date	Time	Iron (µg/L)	Remark Code	Value Used (µg/L)
SECI D-005	6/18/98		125.0		125.0
SECI D-005	3/1/2000		250.0		250.0
SECI D-005	6/1/2000		100.0		100.0
SECI D-005	9/1/2000		61.0		61.0
SECI D-005	12/11/2000		9.7		9.7
SECI D-005	3/1/2001		170.0		170.0
SECI D-005	6/1/2001		130.0		130.0
SECI D-005	7/1/2001		110.0		110.0
SECI D-005	12/1/2001		49.0		49.0
SECI D-005	3/1/2002		52.0		52.0
SECI D-005	6/1/2002		9.6		9.6
SECI D-005	7/29/2002		21.0		21.0
SECI D-005	10/22/2002		38.0		38.0
SECI D-005	1/28/2003		35.0		35.0
SECI D-005	5/13/2003		37.0		37.0
SECI D-005	8/26/2003		34.0		34.0
FP41	9/22/1993	14:50	60.0		60.0
FP42	9/22/1993	15:00	68.0		68.0
FP42	11/27/2001	10:00	492.4		492.4
FP42	2/26/2002	10:50	209.9		209.9
FP42	3/25/2002	15:30	270.4		270.4
FP42	4/29/2002	14:55	162.2		162.2
FP42	5/29/2002	13:45	85.6		85.6
FP42	6/26/2002	15:10	119.8		119.8
FP42	7/30/2002	14:00	205.9		205.9
FP42	8/26/2002	10:00	337.2		337.2
FP42	9/25/2002	14:30	396.6		396.6
FP42	10/24/2002	14:35	404.0		404.0
FP42	11/25/2002	15:05	293.9		293.9
FP42	1/28/2003	9:45	296.2		296.2
FP43	9/22/1993	15:15	73.0		73.0
SJ6	5/16/2002	10:45	126.8		126.8
SJRCC	4/13/1993	15:10	137.0		137.0
SJRCC	5/12/1993	13:40	191.0		191.0
SJRCC	6/8/1993	8:25	95.0		95.0
SJRCC	7/7/1993	11:20	57.0		57.0
SJRCC	8/12/1993	11:00	71.0		71.0
SJRCC	9/22/1993	8:50	106.0		106.0
SJRCC	11/15/1993	11:40	63.0		63.0
SJRCC	12/15/1993	11:30	107.0		107.0
SJRCC	1/20/1994	12:05	115.0		115.0
SJRCC	2/15/1994	10:15	95.0		95.0
SJRCC	3/14/1994	12:10	154.0		154.0
SJRCC	4/12/1994	11:30	100.0		100.0
SJRCC	5/16/1994	12:05	74.0		74.0
SJRCC	6/14/1994	12:25	52.0		52.0
SJRCC	7/12/1994	11:40	73.0		73.0
SJRCC	8/16/1994	11:45	339.0		339.0
SJRCC	9/13/1994	11:55	247.0		247.0

Average =	203.6 µg/L
Maximum =	1,520.0 µg/L
Standard Dev =	136.6 µg/L
95 Percentile =	427.7 µg/L
Count	433.0

Ambient Iron Data in St. Johns River near SECI Palatka Plant

Average MDL = 14 µg/L

Class III Water Quality Standard = 1,000 µg/L

Station	Date	Time	Iron (µg/L)	Remark Code	Value Used (µg/L)
SJRCC	10/17/1994	11:25	311.0		311.0
SJRCC	11/18/1994	10:40	514.0		514.0
SJRCC	12/13/1994	12:10	436.0		436.0
SJRCC	1/19/1995	11:40	414.0		414.0
SJRCC	3/15/1995	10:40	255.0		255.0
SJRCC	5/16/1995	11:25	50.0		50.0
SJRCC	6/13/1995	10:00	181.0		181.0
SJRCC	7/11/1995	11:15	103.0		103.0
SJRCC	8/15/1995	12:15	73.0		73.0
SJRCC	9/13/1995	12:10	263.0		263.0
SJRCC	10/17/1995	11:00	541.0		541.0
SJRCC	11/16/1995	11:20	285.0		285.0
SJRCC	12/13/1995	10:40	297.0		297.0
SJRCC	1/16/1996	10:50	334.0		334.0
SJRCC	2/13/1996	11:25	348.0		348.0
SJRCC	3/13/1996	11:15	298.0		298.0
SJRCC	4/16/1996	10:40	342.0		342.0
SJRCC	5/14/1996	11:00	186.0		186.0
SJRCC	6/12/1996	11:15	107.0		107.0
SJRCC	7/16/1996	10:55	246.0		246.0
SJRCC	8/21/1996	11:20	112.0		112.0
SJRCC	9/17/1996	10:15	152.0		152.0
SJRCC	10/15/1996	10:15	250.0		250.0
SJRCC	11/13/1996	10:40	213.0		213.0
SJRCC	12/3/1996	10:40	186.0		186.0
SJRCC	1/14/1997	10:25	187.0		187.0
SJRCC	2/11/1997	10:25	158.0		158.0
SJRCC	3/11/1997	10:25	134.0		134.0
SJRCC	4/15/1997	10:25	112.0		112.0
SJRCC	4/15/1997	10:25	112.0		112.0
SJRCC	5/13/1997	10:20	181.6		181.6
SJRCC	5/13/1997	10:20	181.6		181.6
SJRCC	6/10/1997	10:40	99.7		99.7
SJRCC	6/10/1997	10:40	99.7		99.7
SJRCC	7/8/1997	10:40	143.6		143.6
SJRCC	7/8/1997	10:40	143.6		143.6
SJRCC	8/5/1997	10:30	114.0		114.0
SJRCC	8/5/1997	10:30	114.0		114.0
SJRCC	9/16/1997	9:40	127.7		127.7
SJRCC	9/16/1997	9:40	127.7		127.7
SJRCC	10/9/1997	14:20	145.8		145.8
SJRCC	11/11/1997	9:50	153.5		153.5
SJRCC	12/9/1997	9:45	217.2		217.2
SJRCC	1/13/1998	10:10	262.3		262.3
SJRCC	2/10/1998	9:45	269.5		269.5
SJRCC	3/17/1998	10:20	294.9		294.9
SJRCC	4/14/1998	9:45	354.1		354.1
SJRCC	5/12/1998	13:40	215.3		215.3
SJRCC	6/9/1998	13:25	171.7		171.7
SJRCC	7/14/1998	14:00	49.9	T	49.9

Average =	203.6 µg/L
Maximum =	1,520.0 µg/L
Standard Dev =	136.6 µg/L
95 Percentile =	427.7 µg/L
Count	433.0

Ambient Iron Data in St. Johns River near SECI Palatka Plant

Average MDL = 14 µg/L

Class III Water Quality Standard = 1,000 µg/L

Station	Date	Time	Iron (µg/L)	Remark Code	Value Used (µg/L)
SJRCC	8/18/1998	9:15	67.8		67.8
SJRCC	9/8/1998	13:30	73.1		73.1
SJRCC	10/15/1998	14:00	174.6		174.6
SJRCC	12/15/1998	13:30	188.9		188.9
SJRCC	1/12/1999	9:50	121.2		121.2
SJRCC	2/9/1999	10:30	160.2		160.2
SJRCC	3/10/1999	13:35	148.2		148.2
SJRCC	4/27/1999	10:45	86.6		86.6
SJRCC	5/10/1999	10:30	82.6		82.6
SJRCC	6/7/1999	10:15	79.8		79.8
SJRCC	7/12/1999	13:10	88.0		88.0
SJRCC	8/10/1999	13:20	114.5		114.5
SJRCC	9/28/1999	14:30	87.3		87.3
SJRCC	10/12/1999	14:30	84.3		84.3
SJRCC	11/9/1999	11:40	166.5		166.5
SJRCC	12/6/1999	14:10	314.9		314.9
SJRCC	1/10/2000	14:20	335.2		335.2
SJRCC	2/7/2000	15:40	275.7		275.7
SJRCC	3/6/2000	15:10	196.6		196.6
SJRCC	4/10/2000	10:50	172.0		172.0
SJRCC	5/8/2000	11:15	147.0		147.0
SJRCC	6/12/2000	15:00	45.7	T	45.7
SJRCC	7/10/2000	10:30	68.2		68.2
SJRCC	8/7/2000	10:45	42.0	T	42.0
SJRCC	9/11/2000	9:55	156.0		156.0
SJRCC	10/11/2000	15:25	334.0		334.0
SJRCC	11/13/2000	9:40	127.5		127.5
SJRCC	12/14/2000	9:55	98.2		98.2
SJRCC	1/9/2001	11:40	98.8		98.8
SJRCC	2/15/2001	10:00	81.9		81.9
SJRCC	3/15/2001	9:00	92.7		92.7
SJRCC	4/10/2001	8:50	63.1		63.1
SJRCC	5/14/2001	13:55	81.1		81.1
SJRCC	6/11/2001	13:50	57.6		57.6
SJRCC	7/11/2001	12:34	111.3		111.3
SJRCC	8/9/2001	11:50	193.2		193.2
SJRCC	9/11/2001	14:40	150.9		150.9
SJRCC	10/9/2001	12:20	440.1		440.1
SJRCC	11/20/2001	13:10	532.1		532.1
SJRCC	12/5/2001	12:50	421.5		421.5
SJRCC	1/8/2002	12:15	341.4		341.4
SJRCC	2/11/2002	11:40	219.8		219.8
SJRCC	3/11/2002	9:20	255.7		255.7
SJRCC	4/8/2002	13:05	258.3		258.3
SJRCC	5/13/2002	12:10	84.4		84.4
SJRCC	6/10/2002	12:15	96.1		96.1
SJRCC	7/15/2002	12:50	101.6		101.6
SJRCC	8/12/2002	11:45	89.6		89.6
SJRCC	9/12/2002	11:30	366.4		366.4
SJRCC	10/7/2002	12:20	412.2		412.2

Average =	203.6 µg/L
Maximum =	1,520.0 µg/L
Standard Dev =	136.6 µg/L
95 Percentile =	427.7 µg/L
Count	433.0

Ambient Iron Data in St. Johns River near SECI Palatka Plant

Average MDL = 14 µg/L

Class III Water Quality Standard = 1,000 µg/L

Average =	203.6 µg/L
Maximum =	1,520.0 µg/L
Standard Dev =	136.6 µg/L
95 Percentile =	427.7 µg/L
Count	433.0

Station	Date	Time	Iron (µg/L)	Remark Code	Value Used (µg/L)
SJRCC	11/11/2002	11:50	380.4		380.4
SJRCC	12/9/2002	11:30	296.5		296.5
SJRCC	1/6/2003	11:20	437.0		437.0
SJRCC	2/11/2003	10:00	298.6		298.6
SJRCC	3/11/2003	13:10	496.9		496.9
SJRCC	3/11/2003	13:15	489.4		489.4
SJRCC	4/14/2003	12:15	302.4		302.4
SJRCC	4/14/2003	12:20	302.7		302.7
SJRCC	5/12/2003	12:50	328.8		328.8
SJRCC	5/12/2003	13:00	223.4	I	223.4
SJRCC	6/9/2003	12:20	165.0		165.0
SJRCC	6/9/2003	12:25	147.2		147.2
SJRCC	7/17/2003	12:50	220.1	I	220.1
SJRCC	7/17/2003	12:55	141.3	I	141.3
SJRCC	8/12/2003	12:50	228.8		228.8
SJRCC	8/12/2003	12:55	226.1		226.1
SJRCC	9/8/2003	12:10	279.7		279.7
SJRCC	10/7/2003	11:45	193.0	I	193.0
SJRCC	11/12/2003	12:25	264.0		264.0
SJRCC	12/10/2003	13:30	280.0		280.0
SJRCC	1/12/2004	13:30	393.0		393.0
SJRCC	2/9/2004	12:55	232.0	I	232.0
SJRCE	4/13/1993	15:15	133.0		133.0
SJRCE	5/12/1993	13:50	160.0		160.0
SJRCE	6/8/1993	8:15	87.0		87.0
SJRCE	7/7/1993	11:10	43.0	T	43.0
SJRCE	8/12/1993	10:50	112.0		112.0
SJRCE	9/22/1993	8:40	98.0		98.0
SJRCE	11/15/1993	11:30	61.0		61.0
SJRCE	12/15/1993	11:20	111.0		111.0
SJRCE	1/20/1994	11:50	111.0		111.0
SJRCE	2/15/1994	10:30	181.0		181.0
SJRCE	3/14/1994	11:55	102.0		102.0
SJRCE	4/12/1994	11:20	93.0		93.0
SJRCE	5/16/1994	11:50	99.0		99.0
SJRCE	6/14/1994	12:05	44.0		44.0
SJRCE	8/16/1994	11:35	215.0		215.0
SJRCE	9/13/1994	11:40	233.0		233.0
SJRCE	10/17/1994	11:10	315.0		315.0
SJRCE	11/18/1994	10:30	428.0		428.0
SJRCE	12/13/1994	12:00	381.0		381.0
SJRCE	1/19/1995	11:30	359.0		359.0
SJRCE	3/15/1995	10:30	303.0		303.0
SJRCE	4/11/1995	9:25	160.0		160.0
SJRCE	5/16/1995	11:15	61.0		61.0
SJRCE	6/13/1995	9:50	147.0		147.0
SJRCE	7/11/1995	10:55	127.0		127.0
SJRCE	8/15/1995	12:00	74.0		74.0
SJRCE	9/13/1995	11:55	412.0		412.0
SJRCE	10/17/1995	10:45	448.0		448.0

Ambient Iron Data in St. Johns River near SECI Palatka Plant

Average MDL = 14 µg/L

Class III Water Quality Standard = 1,000 µg/L

Station	Date	Time	Iron (µg/L)	Remark Code	Value Used (µg/L)
SJRCE	11/16/1995	11:05	278.0		278.0
SJRCE	12/13/1995	10:25	274.0		274.0
SJRCE	1/16/1996	10:45	1520.0		1520.0
SJRCE	2/13/1996	11:15	321.0		321.0
SJRCE	3/13/1996	11:05	288.0		288.0
SJRCE	4/16/1996	10:30	348.0		348.0
SJRCE	5/14/1996	10:50	420.0		420.0
SJRCE	6/12/1996	11:05	79.0		79.0
SJRCE	7/16/1996	10:45	274.0		274.0
SJRCE	8/21/1996	11:05	114.0		114.0
SJRCE	9/17/1996	9:55	177.0		177.0
SJRCE	10/15/1996	10:30	297.0		297.0
SJRCE	11/13/1996	10:15	176.0		176.0
SJRCE	12/3/1996	10:25	181.0		181.0
SJRCE	1/14/1997	10:15	216.0		216.0
SJRCE	2/11/1997	10:15	154.0		154.0
SJRCE	3/11/1997	10:20	175.0		175.0
SJRCE	4/15/1997	10:15	125.0		125.0
SJRCE	4/15/1997	10:15	125.0		125.0
SJRCE	5/13/1997	10:10	145.5		145.5
SJRCE	5/13/1997	10:10	145.5		145.5
SJRCE	6/10/1997	10:25	135.4		135.4
SJRCE	6/10/1997	10:25	135.4		135.4
SJRCE	7/8/1997	10:30	82.3		82.3
SJRCE	7/8/1997	10:30	82.3		82.3
SJRCE	8/5/1997	10:20	141.0		141.0
SJRCE	8/5/1997	10:20	141.0		141.0
SJRCE	9/16/1997	9:35	169.8		169.8
SJRCE	9/16/1997	9:35	169.8		169.8
SJRCE	10/9/1997	14:00	122.3		122.3
SJRCE	11/11/1997	9:45	163.9		163.9
SJRCE	12/9/1997	9:30	210.9		210.9
SJRCE	1/13/1998	9:55	275.3		275.3
SJRCE	2/10/1998	9:40	267.3		267.3
SJRCE	3/17/1998	10:15	297.6		297.6
SJRCE	4/14/1998	9:30	254.7		254.7
SJRCE	5/12/1998	13:45	197.1		197.1
SJRCE	6/9/1998	13:45	161.4		161.4
SJRCE	7/14/1998	13:45	82.7		82.7
SJRCE	8/18/1998	9:00	100.7		100.7
SJRCE	9/8/1998	13:20	89.6		89.6
SJRCE	10/15/1998	13:40	173.1		173.1
SJRCE	12/15/1998	13:40	165.7		165.7
SJRCE	1/12/1999	9:45	128.0		128.0
SJRCE	2/9/1999	10:15	165.5		165.5
SJRCE	3/10/1999	13:45	147.4		147.4
SJRCE	4/27/1999	10:20	102.4		102.4
SJRCE	5/10/1999	10:10	96.3		96.3
SJRCE	6/7/1999	10:00	108.8		108.8
SJRCE	7/12/1999	13:20	64.3		64.3

Average =	203.6 µg/L
Maximum =	1,520.0 µg/L
Standard Dev =	136.6 µg/L
95 Percentile =	427.7 µg/L
Count	433.0

Ambient Iron Data in St. Johns River near SECI Palatka Plant

Average MDL = 14 µg/L

Class III Water Quality Standard = 1,000 µg/L

Station	Date	Time	Iron (µg/L)	Remark Code	Value Used (µg/L)
SJRCE	8/10/1999	13:35	75.1		75.1
SJRCE	9/28/1999	14:40	108.2		108.2
SJRCE	10/12/1999	14:40	101.0		101.0
SJRCE	11/9/1999	11:20	162.8		162.8
SJRCE	12/6/1999	14:20	321.8		321.8
SJRCE	1/10/2000	14:30	310.3		310.3
SJRCE	2/7/2000	15:50	267.0		267.0
SJRCE	3/6/2000	15:20	190.1		190.1
SJRCE	4/10/2000	10:40	166.0		166.0
SJRCE	5/8/2000	10:55	120.0		120.0
SJRCE	6/12/2000	15:15	46.0	T	46.0
SJRCE	7/10/2000	10:15	85.6		85.6
SJRCE	8/7/2000	10:35	90.0		90.0
SJRCE	9/11/2000	9:45	98.0		98.0
SJRCE	10/11/2000	15:35	327.0		327.0
SJRCE	11/13/2000	9:30	160.6		160.6
SJRCE	12/14/2000	9:45	166.1		166.1
SJRCE	1/9/2001	11:50	107.2		107.2
SJRCE	2/15/2001	9:50	89.7		89.7
SJRCE	3/15/2001	8:45	95.1		95.1
SJRCE	4/10/2001	8:45	60.1		60.1
SJRCE	5/14/2001	13:40	79.4		79.4
SJRCE	6/11/2001	13:40	47.8	T	47.8
SJRCE	7/11/2001	12:45	83.6		83.6
SJRCE	8/9/2001	12:00	70.0		70.0
SJRCE	9/11/2001	14:50	135.8		135.8
SJRCE	10/9/2001	12:30	385.8		385.8
SJRCW	4/13/1993	15:05	155.0		155.0
SJRCW	5/12/1993	13:30	177.0		177.0
SJRCW	6/8/1993	8:30	87.0		87.0
SJRCW	7/7/1993	11:30	109.0		109.0
SJRCW	8/12/1993	11:10	71.0		71.0
SJRCW	9/22/1993	9:00	76.0		76.0
SJRCW	11/15/1993	11:50	292.0		292.0
SJRCW	12/15/1993	11:45	48.0	T	48.0
SJRCW	1/20/1994	12:15	167.0		167.0
SJRCW	2/15/1994	9:50	293.0		293.0
SJRCW	3/14/1994	12:25	169.0		169.0
SJRCW	4/12/1994	11:40	104.0		104.0
SJRCW	5/16/1994	12:20	88.0		88.0
SJRCW	6/14/1994	12:35	164.0		164.0
SJRCW	7/12/1994	11:55	325.0		325.0
SJRCW	8/16/1994	12:00	511.0		511.0
SJRCW	9/13/1994	11:55	282.0		282.0
SJRCW	10/17/1994	11:45	662.0		662.0
SJRCW	11/18/1994	10:50	364.0		364.0
SJRCW	12/13/1994	12:20	490.0		490.0
SJRCW	1/19/1995	11:50	432.0		432.0
SJRCW	3/15/1995	10:55	293.0		293.0
SJRCW	4/11/1995	9:40	266.0		266.0

Average =	203.6 µg/L
Maximum =	1,520.0 µg/L
Standard Dev =	136.6 µg/L
95 Percentile =	427.7 µg/L
Count	433.0

Ambient Iron Data in St. Johns River near SECI Palatka Plant

Average MDL = 14 µg/L

Class III Water Quality Standard = 1,000 µg/L

Station	Date	Time	Iron (µg/L)	Remark Code	Value Used (µg/L)
SJRCW	5/16/1995	11:35	106.0		106.0
SJRCW	6/13/1995	10:15	272.0		272.0
SJRCW	7/11/1995	11:30	212.0		212.0
SJRCW	8/15/1995	12:30	201.0		201.0
SJRCW	9/13/1995	12:25	345.0		345.0
SJRCW	10/17/1995	11:20	685.0		685.0
SJRCW	11/16/1995	11:35	323.0		323.0
SJRCW	12/13/1995	10:50	327.0		327.0
SJRCW	1/16/1996	11:00	330.0		330.0
SJRCW	2/13/1996	11:35	355.0		355.0
SJRCW	3/13/1996	11:25	366.0		366.0
SJRCW	4/16/1996	10:50	379.0		379.0
SJRCW	5/14/1996	11:15	254.0		254.0
SJRCW	6/12/1996	11:30	82.0		82.0
SJRCW	7/16/1996	11:10	219.0		219.0
SJRCW	8/21/1996	11:35	136.0		136.0
SJRCW	9/17/1996	10:30	110.0		110.0
SJRCW	10/15/1996	10:00	268.0		268.0
SJRCW	11/13/1996	11:00	181.0		181.0
SJRCW	12/3/1996	10:55	193.0		193.0
SJRCW	1/14/1997	10:40	364.0		364.0
SJRCW	2/11/1997	10:40	138.0		138.0
SJRCW	3/11/1997	10:45	205.0		205.0
SJRCW	4/15/1997	10:35	111.0		111.0
SJRCW	4/15/1997	10:35	111.0		111.0
SJRCW	5/13/1997	10:25	197.9		197.9
SJRCW	5/13/1997	10:25	197.9		197.9
SJRCW	6/10/1997	10:50	113.7		113.7
SJRCW	6/10/1997	10:50	113.7		113.7
SJRCW	7/8/1997	10:45	125.1		125.1
SJRCW	7/8/1997	10:45	125.1		125.1
SJRCW	8/5/1997	10:40	287.0		287.0
SJRCW	8/5/1997	10:40	287.0		287.0
SJRCW	9/16/1997	9:50	166.7		166.7
SJRCW	9/16/1997	9:50	166.7		166.7
SJRCW	10/9/1997	14:50	261.8		261.8
SJRCW	11/11/1997	10:00	314.7		314.7
SJRCW	12/9/1997	10:00	174.7		174.7
SJRCW	1/13/1998	10:20	299.3		299.3
SJRCW	2/10/1998	10:00	408.6		408.6
SJRCW	3/17/1998	10:35	307.6		307.6
SJRCW	4/14/1998	10:10	294.0		294.0
SJRCW	5/12/1998	13:20	213.3		213.3
SJRCW	6/9/1998	13:20	180.2		180.2
SJRCW	7/14/1998	14:15	54.1		54.1
SJRCW	8/18/1998	9:30	142.9		142.9
SJRCW	9/8/1998	10:45	111.5		111.5
SJRCW	9/8/1998	13:45	166.5		166.5
SJRCW	10/15/1998	14:15	200.7		200.7
SJRCW	11/10/1998	13:30	217.9		217.9

Average =	203.6 µg/L
Maximum =	1,520.0 µg/L
Standard Dev =	136.6 µg/L
95 Percentile =	427.7 µg/L
Count	433.0

Ambient Iron Data in St. Johns River near SECI Palatka Plant

Average MDL = 14 µg/L

Class III Water Quality Standard = 1,000 µg/L

Station	Date	Time	Iron (µg/L)	Remark Code	Value Used (µg/L)
SJRCW	12/15/1998	13:15	190.8		190.8
SJRCW	1/12/1999	10:15	168.4		168.4
SJRCW	2/9/1999	10:40	235.1		235.1
SJRCW	3/10/1999	13:20	184.9		184.9
SJRCW	4/27/1999	11:00	99.2		99.2
SJRCW	5/10/1999	11:00	95.7		95.7
SJRCW	6/7/1999	10:30	76.1		76.1
SJRCW	7/12/1999	13:00	93.5		93.5
SJRCW	8/10/1999	13:15	108.3		108.3
SJRCW	9/28/1999	14:20	83.0		83.0
SJRCW	10/12/1999	14:20	95.8		95.8
SJRCW	11/9/1999	12:00	164.2		164.2
SJRCW	12/6/1999	14:00	303.9		303.9
SJRCW	1/10/2000	14:10	329.7		329.7
SJRCW	2/7/2000	15:30	257.0		257.0
SJRCW	3/6/2000	15:00	188.6		188.6
SJRCW	4/10/2000	11:00	159.0		159.0
SJRCW	5/8/2000	11:25	142.0		142.0
SJRCW	6/12/2000	14:55	44.8	T	44.8
SJRCW	7/10/2000	10:50	60.0		60.0
SJRCW	8/7/2000	11:00	67.0		67.0
SJRCW	9/11/2000	10:05	401.0		401.0
SJRCW	10/11/2000	15:15	264.0		264.0
SJRCW	11/13/2000	9:50	103.4		103.4
SJRCW	12/14/2000	10:05	115.8		115.8
SJRCW	1/9/2001	11:30	152.7		152.7
SJRCW	2/15/2001	10:10	83.5		83.5
SJRCW	3/15/2001	9:15	140.0		140.0
SJRCW	4/10/2001	8:55	87.1		87.1
SJRCW	5/14/2001	14:10	62.7		62.7
SJRCW	6/11/2001	13:55	58.8		58.8
SJRCW	7/11/2001	12:25	64.9		64.9
SJRCW	8/9/2001	11:40	171.5		171.5
SJRCW	9/11/2001	14:30	191.2		191.2
SJRCW	10/9/2001	12:05	437.2		437.2
SJRCW	11/20/2001	12:55	427.5		427.5
SJRCW	12/5/2001	12:40	466.1		466.1
SJRCW	1/8/2002	12:00	309.2		309.2
SJRCW	2/11/2002	11:25	242.7		242.7
SJRCW	3/11/2002	9:35	240.4		240.4
SJRCW	4/8/2002	12:55	356.2		356.2
SJRCW	5/13/2002	12:00	113.7		113.7
SJRCW	6/10/2002	12:10	98.9		98.9
SJRCW	7/15/2002	12:30	189.5		189.5
SJRCW	8/12/2002	11:35	185.3		185.3
SJRCW	9/12/2002	11:20	349.2		349.2
SJRCW	10/7/2002	12:10	439.3		439.3
SJRCW	11/11/2002	11:40	355.5		355.5
SJRCW	12/9/2002	11:15	305.6		305.6
SJRCW	1/6/2003	11:10	479.0		479.0

Average =	203.6 µg/L
Maximum =	1,520.0 µg/L
Standard Dev =	136.6 µg/L
95 Percentile =	427.7 µg/L
Count	433.0

Ambient Iron Data in St. Johns River near SECI Palatka Plant

Average MDL = 14 µg/L

Class III Water Quality Standard = 1,000 µg/L

Station	Date	Time	Iron (µg/L)	Remark Code	Value Used (µg/L)
SJRCW	2/11/2003	9:50	303.9		303.9
SJRCW	3/11/2003	13:05	417.4		417.4
SJRCW	4/14/2003	12:00	329.8		329.8
SJRCW	5/12/2003	12:40	298.9		298.9
SJRCW	6/9/2003	12:15	159.1		159.1
SJRCW	7/17/2003	12:40	192.9	I	192.9
SJRCW	8/12/2003	12:45	282.9		282.9
SJRCW	9/8/2003	12:00	239.1	I	239.1
SJRCW	10/7/2003	11:35	237.0	I	237.0
SJRCW	11/12/2003	12:20	267.0		267.0
SJRCW	12/10/2003	13:40	875.0		875.0
SJRCW	1/12/2004	13:25	243.0		243.0
SJRCW	2/9/2004	12:45	270.0		270.0
sjrcc	3/24/2005	10:16	280		280.0
SJRM 74C	3/24/2005	2:15	270		270.0
SJ6	3/24/2005	3:00	270		270.0
SJRCC	4/26/2005	1:00	270		270.0
SJ6	4/26/2005	4:45	200		200.0
SJRM 74C	4/26/2005	5:15	210		210.0
SJRCC	5/17/2005	9:00	210		210.0
SJ6	5/17/2005	10:45	200		200.0
SJRM 74C	5/17/2005	11:15	190		190.0
SJRCC	6/20/2005	10:00	180		180.0
SJRM 74C	6/20/2005	3:15	280		280.0
SJ6	6/20/2005	2:45	190		190.0
SJRCC	7/25/2005	7:30	290		290.0
SJ6	7/25/2005	2:00	320		320.0
SJRM 74C	7/25/2005	2:15	270		270.0
SJRCC	8/31/2005	9:30	240	V	240.0
SJ6	8/31/2005	1:30	220	V	220.0
SJRM 74C	8/31/2005	2:00	230	V	230.0
SJ6	9/27/2005	12:45	320		320.0
SJRM 74C	9/27/2005	1:30	270		270.0
SJRCC	9/27/2005	2:00	270		270.0

Average =	203.6 µg/L
Maximum =	1,520.0 µg/L
Standard Dev =	136.6 µg/L
95 Percentile =	427.7 µg/L
Count	433.0

Note: If non-detect was reported, half of the detection limit or half of the water quality standard was used, whichever was less.

Source: SJRWMD, 2004.
ECT, 2004.

Ambient Lead Data in St. Johns River near SECI Palatka Plant

Average MDL = 40.7 µg/L

Class III Water Quality Standard = 3.34 µg/L

Station	Date	Time	Lead (µg/L)	Remark Code	Value Used (µg/L)
FP41	9/22/1993	14:50	0	T	1.67
FP42	9/22/1993	15:00	0	T	1.67
FP42	11/27/2001	10:00	0.67	T	0.67
FP43	9/22/1993	15:15	0	T	1.67
SJ6	5/16/2002	10:45	0.55	T	0.55
SJRCC	5/12/1993	13:40	2		2.00
SJRCC	6/8/1993	8:25	0	T	1.67
SJRCC	7/7/1993	11:20	0	T	1.67
SJRCC	9/22/1993	8:50	0	T	1.67
SJRCC	12/15/1993	11:30	0	T	1.67
SJRCC	1/20/1994	12:05	0	T	1.67
SJRCC	2/15/1994	10:15	-1	T	1.67
SJRCC	3/14/1994	12:10	-1	T	1.67
SJRCC	4/12/1994	11:30	0	T	1.67
SJRCC	5/16/1994	12:05	-1	T	1.67
SJRCC	6/14/1994	12:25	-1	T	1.67
SJRCC	7/12/1994	11:40	4		4.00
SJRCC	8/16/1994	11:45	4		4.00
SJRCC	9/13/1994	11:55	3		3.00
SJRCC	10/17/1994	11:25	0.1	T	0.10
SJRCC	11/18/1994	10:40	2	T	2.00
SJRCC	12/13/1994	12:10	2		2.00
SJRCC	1/19/1995	11:40	2	T	2.00
SJRCC	3/15/1995	10:40	1	T	1.00
SJRCC	4/11/1995	9:30	0	T	1.67
SJRCC	5/16/1995	11:25	1	T	1.00
SJRCC	6/13/1995	10:00	0	T	1.67
SJRCC	7/11/1995	11:15	-1	T	1.67
SJRCC	8/15/1995	12:15	0	T	1.67
SJRCC	9/13/1995	12:10	1	T	1.00
SJRCC	10/17/1995	11:00	2		2.00
SJRCC	11/16/1995	11:20	1	T	1.00
SJRCC	12/13/1995	10:40	0	T	1.67
SJRCC	1/16/1996	10:50	1	T	1.00
SJRCC	2/13/1996	11:25	0	T	1.67
SJRCC	3/13/1996	11:15	1	T	1.00
SJRCC	4/16/1996	10:40	1	T	1.00
SJRCC	5/14/1996	11:00	0	T	1.67
SJRCC	6/12/1996	11:15	0	T	1.67
SJRCC	7/16/1996	10:55	0	T	1.67
SJRCC	8/21/1996	11:20	0	T	1.67
SJRCC	9/17/1996	10:15	0	T	1.67
SJRCC	10/15/1996	10:15	0	T	1.67
SJRCC	11/13/1996	10:40	0	T	1.67
SJRCC	12/3/1996	10:40	0	T	1.67

Average =	1.17 µg/L
Maximum =	10.00 µg/L
Standard Dev =	0.89 µg/L
95 Percentile =	2.00 µg/L
Count	375.00

Ambient Lead Data in St. Johns River near SECI Palatka Plant

Average MDL = 40.7 µg/L

Class III Water Quality Standard = 3.34 µg/L

Station	Date	Time	Lead (µg/L)	Remark Code	Value Used (µg/L)
SJRCC	1/14/1997	10:25	2	T	2.00
SJRCC	2/11/1997	10:25	0	T	1.67
SJRCC	3/11/1997	10:25	0	T	1.67
SJRCC	4/15/1997	10:25	2		2.00
SJRCC	4/15/1997	10:25	2		2.00
SJRCC	5/13/1997	10:20	0	T	1.67
SJRCC	5/13/1997	10:20	0	T	1.67
SJRCC	6/10/1997	10:40	0	T	1.67
SJRCC	6/10/1997	10:40	0	T	1.67
SJRCC	7/8/1997	10:40	0	T	1.67
SJRCC	7/8/1997	10:40	0	T	1.67
SJRCC	8/5/1997	10:30	0	T	1.67
SJRCC	8/5/1997	10:30	0	T	1.67
SJRCC	9/16/1997	9:40	-0.12	T	1.67
SJRCC	9/16/1997	9:40	-0.12	T	1.67
SJRCC	10/9/1997	14:20	0	T	1.67
SJRCC	11/11/1997	9:50	0.33	T	0.33
SJRCC	12/9/1997	9:45	0.12	T	0.12
SJRCC	1/13/1998	10:10	0.29	T	0.29
SJRCC	2/10/1998	9:45	0.2	T	0.20
SJRCC	3/17/1998	10:20	0.34	T	0.34
SJRCC	4/14/1998	9:45	0.34	T	0.34
SJRCC	5/12/1998	13:40	0.26	T	0.26
SJRCC	6/9/1998	13:25	0.43	T	0.43
SJRCC	7/14/1998	14:00	0.1	T	0.10
SJRCC	8/18/1998	9:15	-0.03	T	1.67
SJRCC	9/8/1998	13:30	0.46	T	0.46
SJRCC	10/15/1998	14:00	-0.15	T	1.67
SJRCC	12/15/1998	13:30	0.35	T	0.35
SJRCC	1/12/1999	9:50	0.15	T	0.15
SJRCC	2/9/1999	10:30	0.15	T	0.15
SJRCC	3/10/1999	13:35	-0.03	T	1.67
SJRCC	4/27/1999	10:45	-0.06	T	1.67
SJRCC	5/10/1999	10:30	0.11	T	0.11
SJRCC	6/7/1999	10:15	-0.06	T	1.67
SJRCC	7/12/1999	13:10	0.09	T	0.09
SJRCC	8/10/1999	13:20	0.06	T	0.06
SJRCC	9/28/1999	14:30	0.24	T	0.24
SJRCC	10/12/1999	14:30	0.44	T	0.44
SJRCC	11/9/1999	11:40	0.5	T	0.50
SJRCC	12/6/1999	14:10	0.45	T	0.45
SJRCC	1/10/2000	14:20	0.36	T	0.36
SJRCC	2/7/2000	15:40	0.8	T	0.80
SJRCC	3/6/2000	15:10	0.49	T	0.49
SJRCC	4/10/2000	10:50	0.63	T	0.63

Average =	1.17 µg/L
Maximum =	10.00 µg/L
Standard Dev =	0.89 µg/L
95 Percentile =	2.00 µg/L
Count	375.00

Ambient Lead Data in St. Johns River near SECI Palatka Plant

Average MDL = 40.7 µg/L

Class III Water Quality Standard = 3.34 µg/L

Station	Date	Time	Lead (µg/L)	Remark Code	Value Used (µg/L)
SJRCC	5/8/2000	11:15	0.56	T	0.56
SJRCC	6/12/2000	15:00	0.27	T	0.27
SJRCC	7/10/2000	10:30	4.11		4.11
SJRCC	8/7/2000	10:45	1.14	T	1.14
SJRCC	9/11/2000	9:55	0.48	T	0.48
SJRCC	10/11/2000	15:25	1.14	T	1.14
SJRCC	11/13/2000	9:40	1.45	T	1.45
SJRCC	12/14/2000	9:55	0.504	T	0.50
SJRCC	1/9/2001	11:40	-0.115	T	1.67
SJRCC	2/15/2001	10:00	0.439	T	0.44
SJRCC	3/15/2001	9:00	0.143	T	0.14
SJRCC	4/10/2001	8:50	0.769		0.77
SJRCC	5/14/2001	13:55	0.385	T	0.39
SJRCC	6/11/2001	13:50	0.486	T	0.49
SJRCC	7/11/2001	12:34	-0.066	T	1.67
SJRCC	8/9/2001	11:50	0.723	T	0.72
SJRCC	9/11/2001	14:40	0.907	T	0.91
SJRCC	10/9/2001	12:20	0.442	T	0.44
SJRCC	11/20/2001	13:10	0.502	T	0.50
SJRCC	12/5/2001	12:50	0.396	T	0.40
SJRCC	1/8/2002	12:15	0.596	T	0.60
SJRCC	2/11/2002	11:40	0.096	T	0.10
SJRCC	3/11/2002	9:20	1.033	T	1.03
SJRCC	4/8/2002	13:05	1	U	0.50
SJRCC	5/13/2002	12:10	0.18	T	0.18
SJRCC	6/10/2002	12:15	0.55	T	0.55
SJRCC	7/15/2002	12:50	0.28	T	0.28
SJRCC	8/12/2002	11:45	-0.022	T	1.67
SJRCC	9/12/2002	11:30	-0.13	T	1.67
SJRCC	10/7/2002	12:20	0.485	T	0.49
SJRCC	11/11/2002	11:50	0.37	T	0.37
SJRCC	12/9/2002	11:30	1.475	T	1.48
SJRCC	1/6/2003	11:20	1.878	T	1.88
SJRCC	2/11/2003	10:00	1.187		1.19
SJRCC	3/11/2003	13:10	0.068	T	0.07
SJRCC	3/11/2003	13:15	0.483	T	0.48
SJRCC	4/14/2003	12:15	0.558	T	0.56
SJRCC	4/14/2003	12:20	0.566	T	0.57
SJRCC	5/12/2003	12:50	1.205	T	1.21
SJRCC	5/12/2003	13:00	1.514	T	1.51
SJRCC	6/9/2003	12:20	1.192	T	1.19
SJRCC	6/9/2003	12:25	4.421		4.42
SJRCC	8/12/2003	12:50	1.28		1.28
SJRCC	8/12/2003	12:55	1.156		1.16
SJRCC	9/8/2003	12:10	1.6	T	1.60

Average =	1.17 µg/L
Maximum =	10.00 µg/L
Standard Dev =	0.89 µg/L
95 Percentile =	2.00 µg/L
Count	375.00

Ambient Lead Data in St. Johns River near SECI Palatka Plant

Average MDL = 40.7 µg/L

Class III Water Quality Standard = 3.34 µg/L

Average =	1.17 µg/L
Maximum =	10.00 µg/L
Standard Dev =	0.89 µg/L
95 Percentile =	2.00 µg/L
Count	375.00

Station	Date	Time	Lead (µg/L)	Remark Code	Value Used (µg/L)
SJRCC	10/7/2003	11:45	0.788	T	0.79
SJRCC	11/12/2003	12:25	0.432	T	0.43
SJRCC	12/10/2003	13:30	0.457	T	0.46
SJRCC	1/12/2004	13:30	0.52	T	0.52
SJRCC	2/9/2004	12:55	0.693	T	0.69
SJRCE	5/12/1993	13:50	3		3.00
SJRCE	6/8/1993	8:15	1	T	1.00
SJRCE	7/7/1993	11:10	1	T	1.00
SJRCE	9/22/1993	8:40	0	T	1.67
SJRCE	12/15/1993	11:20	0	T	1.67
SJRCE	1/20/1994	11:50	0	T	1.67
SJRCE	2/15/1994	10:30	-1	T	1.67
SJRCE	3/14/1994	11:55	-1	T	1.67
SJRCE	4/12/1994	11:20	0	T	1.67
SJRCE	5/16/1994	11:50	-2	T	1.67
SJRCE	6/14/1994	12:05	-1	T	1.67
SJRCE	7/12/1994	11:20	4		4.00
SJRCE	8/16/1994	11:35	3		3.00
SJRCE	9/13/1994	11:40	10		10.00
SJRCE	10/17/1994	11:10	0.3	T	0.30
SJRCE	11/18/1994	10:30	2	T	2.00
SJRCE	12/13/1994	12:00	0	T	1.67
SJRCE	1/19/1995	11:30	1	T	1.00
SJRCE	3/15/1995	10:30	1	T	1.00
SJRCE	4/11/1995	9:25	0	T	1.67
SJRCE	5/16/1995	11:15	0	T	1.67
SJRCE	6/13/1995	9:50	0	T	1.67
SJRCE	7/11/1995	10:55	-2	T	1.67
SJRCE	8/15/1995	12:00	0	T	1.67
SJRCE	9/13/1995	11:55	1	T	1.00
SJRCE	10/17/1995	10:45	3		3.00
SJRCE	11/16/1995	11:05	0	T	1.67
SJRCE	12/13/1995	10:25	0	T	1.67
SJRCE	1/16/1996	10:45	0	T	1.67
SJRCE	2/13/1996	11:15	0	T	1.67
SJRCE	3/13/1996	11:05	0	T	1.67
SJRCE	4/16/1996	10:30	1	T	1.00
SJRCE	5/14/1996	10:50	0	T	1.67
SJRCE	6/12/1996	11:05	0	T	1.67
SJRCE	7/16/1996	10:45	1	T	1.00
SJRCE	8/21/1996	11:05	0	T	1.67
SJRCE	9/17/1996	9:55	0	T	1.67
SJRCE	10/15/1996	10:30	0	T	1.67
SJRCE	11/13/1996	10:15	0	T	1.67
SJRCE	12/3/1996	10:25	0	T	1.67

Ambient Lead Data in St. Johns River near SECI Palatka Plant

Average MDL = 40.7 µg/L

Class III Water Quality Standard = 3.34 µg/L

Station	Date	Time	Lead (µg/L)	Remark Code	Value Used (µg/L)
SJRCE	1/14/1997	10:15	0	T	1.67
SJRCE	2/11/1997	10:15	0	T	1.67
SJRCE	3/11/1997	10:20	0	T	1.67
SJRCE	4/15/1997	10:15	1	T	1.00
SJRCE	4/15/1997	10:15	1	T	1.00
SJRCE	5/13/1997	10:10	0	T	1.67
SJRCE	5/13/1997	10:10	0	T	1.67
SJRCE	6/10/1997	10:25	0	T	1.67
SJRCE	6/10/1997	10:25	0	T	1.67
SJRCE	7/8/1997	10:30	0	T	1.67
SJRCE	7/8/1997	10:30	0	T	1.67
SJRCE	8/5/1997	10:20	1	T	1.00
SJRCE	8/5/1997	10:20	1	T	1.00
SJRCE	9/16/1997	9:35	0.12	T	0.12
SJRCE	9/16/1997	9:35	0.12	T	0.12
SJRCE	10/9/1997	14:00	0	T	1.67
SJRCE	11/11/1997	9:45	0.32	T	0.32
SJRCE	12/9/1997	9:30	0.21	T	0.21
SJRCE	1/13/1998	9:55	0.53	T	0.53
SJRCE	2/10/1998	9:40	0.06	T	0.06
SJRCE	3/17/1998	10:15	0.26	T	0.26
SJRCE	4/14/1998	9:30	0.16	T	0.16
SJRCE	5/12/1998	13:45	0.31	T	0.31
SJRCE	6/9/1998	13:45	0.29	T	0.29
SJRCE	7/14/1998	13:45	0.14	T	0.14
SJRCE	8/18/1998	9:00	0.14	T	0.14
SJRCE	9/8/1998	13:20	0.06	T	0.06
SJRCE	10/15/1998	13:40	-0.21	T	1.67
SJRCE	12/15/1998	13:40	0.05	T	0.05
SJRCE	1/12/1999	9:45	0.19	T	0.19
SJRCE	2/9/1999	10:15	0.15	T	0.15
SJRCE	3/10/1999	13:45	0.01	T	0.01
SJRCE	4/27/1999	10:20	0.05	T	0.05
SJRCE	5/10/1999	10:10	0.05	T	0.05
SJRCE	6/7/1999	10:00	0.07	T	0.07
SJRCE	7/12/1999	13:20	-0.03	T	1.67
SJRCE	8/10/1999	13:35	0.09	T	0.09
SJRCE	9/28/1999	14:40	0.42	T	0.42
SJRCE	10/12/1999	14:40	0.41	T	0.41
SJRCE	11/9/1999	11:20	0.69	T	0.69
SJRCE	12/6/1999	14:20	0.56	T	0.56
SJRCE	1/10/2000	14:30	0.91	T	0.91
SJRCE	2/7/2000	15:50	0.82	T	0.82
SJRCE	3/6/2000	15:20	0.66	T	0.66
SJRCE	4/10/2000	10:40	0.7	T	0.70

Average =	1.17 µg/L
Maximum =	10.00 µg/L
Standard Dev =	0.89 µg/L
95 Percentile =	2.00 µg/L
Count	375.00

Ambient Lead Data in St. Johns River near SECI Palatka Plant

Average MDL = 40.7 µg/L

Class III Water Quality Standard = 3.34 µg/L

Station	Date	Time	Lead (µg/L)	Remark Code	Value Used (µg/L)
SJRCE	5/8/2000	10:55	0.53	T	0.53
SJRCE	6/12/2000	15:15	1.017	W	1.02
SJRCE	7/10/2000	10:15	0.25	T	0.25
SJRCE	8/7/2000	10:35	1.03	T	1.03
SJRCE	9/11/2000	9:45	0.784	T	0.78
SJRCE	10/11/2000	15:35	1.27	T	1.27
SJRCE	11/13/2000	9:30	1.58	T	1.58
SJRCE	12/14/2000	9:45	0.745	T	0.75
SJRCE	1/9/2001	11:50	0.08	T	0.08
SJRCE	2/15/2001	9:50	0.678	T	0.68
SJRCE	3/15/2001	8:45	-0.883	T	1.67
SJRCE	4/10/2001	8:45	-0.329	T	1.67
SJRCE	5/14/2001	13:40	0.742	T	0.74
SJRCE	6/11/2001	13:40	1.112	T	1.11
SJRCE	7/11/2001	12:45	0.35	T	0.35
SJRCE	8/9/2001	12:00	-0.894	T	1.67
SJRCE	9/11/2001	14:50	1.088	T	1.09
SJRCE	10/9/2001	12:30	0.779	T	0.78
SJRCW	5/12/1993	13:30	2		2.00
SJRCW	6/8/1993	8:30	0	T	1.67
SJRCW	7/7/1993	11:30	0	T	1.67
SJRCW	9/22/1993	9:00	0	T	1.67
SJRCW	12/15/1993	11:45	0	T	1.67
SJRCW	1/20/1994	12:15	0	T	1.67
SJRCW	2/15/1994	9:50	-1	T	1.67
SJRCW	3/14/1994	12:25	-2	T	1.67
SJRCW	4/12/1994	11:40	0	T	1.67
SJRCW	5/16/1994	12:20	-2	T	1.67
SJRCW	6/14/1994	12:35	0	T	1.67
SJRCW	7/12/1994	11:55	2		2.00
SJRCW	8/16/1994	12:00	2		2.00
SJRCW	9/13/1994	11:55	3		3.00
SJRCW	10/17/1994	11:45	0.7		0.70
SJRCW	11/18/1994	10:50	3		3.00
SJRCW	12/13/1994	12:20	3		3.00
SJRCW	1/19/1995	11:50	1	T	1.00
SJRCW	3/15/1995	10:55	1	T	1.00
SJRCW	4/11/1995	9:40	0	T	1.67
SJRCW	5/16/1995	11:35	0	T	1.67
SJRCW	6/13/1995	10:15	0	T	1.67
SJRCW	7/11/1995	11:30	-2	T	1.67
SJRCW	8/15/1995	12:30	0	T	1.67
SJRCW	9/13/1995	12:25	1	T	1.00
SJRCW	10/17/1995	11:20	1	T	1.00
SJRCW	11/16/1995	11:35	0	T	1.67

Average =	1.17 µg/L
Maximum =	10.00 µg/L
Standard Dev =	0.89 µg/L
95 Percentile =	2.00 µg/L
Count	375.00

Ambient Lead Data in St. Johns River near SECI Palatka Plant

Average MDL = 40.7 µg/L

Class III Water Quality Standard = 3.34 µg/L

Station	Date	Time	Lead (µg/L)	Remark Code	Value Used (µg/L)
SJRCW	12/13/1995	10:50	0	T	1.67
SJRCW	1/16/1996	11:00	1	T	1.00
SJRCW	2/13/1996	11:35	1	T	1.00
SJRCW	3/13/1996	11:25	0	T	1.67
SJRCW	4/16/1996	10:50	1	T	1.00
SJRCW	5/14/1996	11:15	0	T	1.67
SJRCW	6/12/1996	11:30	0	T	1.67
SJRCW	7/16/1996	11:10	0	T	1.67
SJRCW	8/21/1996	11:35	0	T	1.67
SJRCW	9/17/1996	10:30	0	T	1.67
SJRCW	10/15/1996	10:00	0	T	1.67
SJRCW	11/13/1996	11:00	0	T	1.67
SJRCW	12/3/1996	10:55	2	T	2.00
SJRCW	1/14/1997	10:40	0	T	1.67
SJRCW	2/11/1997	10:40	0	T	1.67
SJRCW	3/11/1997	10:45	0	T	1.67
SJRCW	4/15/1997	10:35	1	T	1.00
SJRCW	4/15/1997	10:35	1	T	1.00
SJRCW	5/13/1997	10:25	0	T	1.67
SJRCW	5/13/1997	10:25	0	T	1.67
SJRCW	6/10/1997	10:50	0	T	1.67
SJRCW	6/10/1997	10:50	0	T	1.67
SJRCW	7/8/1997	10:45	0	T	1.67
SJRCW	7/8/1997	10:45	0	T	1.67
SJRCW	8/5/1997	10:40	0	T	1.67
SJRCW	8/5/1997	10:40	0	T	1.67
SJRCW	9/16/1997	9:50	-0.04	T	0.02
SJRCW	9/16/1997	9:50	-0.04	T	1.67
SJRCW	10/9/1997	14:50	0	T	1.67
SJRCW	11/11/1997	10:00	0.3	T	0.30
SJRCW	12/9/1997	10:00	0.63	T	0.63
SJRCW	1/13/1998	10:20	0.43	T	0.43
SJRCW	2/10/1998	10:00	0.12	T	0.12
SJRCW	3/17/1998	10:35	0.17	T	0.17
SJRCW	4/14/1998	10:10	0.13	T	0.13
SJRCW	5/12/1998	13:20	-0.05	T	1.67
SJRCW	6/9/1998	13:20	0.18	T	0.18
SJRCW	7/14/1998	14:15	0.22	T	0.22
SJRCW	8/18/1998	9:30	-0.07	T	1.67
SJRCW	9/8/1998	10:45	0.15	T	0.15
SJRCW	9/8/1998	13:45	0.29	T	0.29
SJRCW	10/15/1998	14:15	0.34	T	0.34
SJRCW	11/10/1998	13:30	0.19	T	0.19
SJRCW	12/15/1998	13:15	0.42	T	0.42
SJRCW	1/12/1999	10:15	0.18	T	0.18

Average =	1.17 µg/L
Maximum =	10.00 µg/L
Standard Dev =	0.89 µg/L
95 Percentile =	2.00 µg/L
Count	375.00

Ambient Lead Data in St. Johns River near SECI Palatka Plant

Average MDL = 40.7 µg/L

Class III Water Quality Standard = 3.34 µg/L

Station	Date	Time	Lead (µg/L)	Remark Code	Value Used (µg/L)
SJRCW	2/9/1999	10:40	0.59	T	0.59
SJRCW	3/10/1999	13:20	0.16	T	0.16
SJRCW	4/27/1999	11:00	-0.01	T	1.67
SJRCW	5/10/1999	11:00	0.24	T	0.24
SJRCW	6/7/1999	10:30	0	T	1.67
SJRCW	7/12/1999	13:00	-0.21	T	1.67
SJRCW	8/10/1999	13:15	0.18	T	0.18
SJRCW	9/28/1999	14:20	1.25	T	1.25
SJRCW	10/12/1999	14:20	0.74	T	0.74
SJRCW	11/9/1999	12:00	0.56	T	0.56
SJRCW	12/6/1999	14:00	0.37	T	0.37
SJRCW	1/10/2000	14:10	1.03	T	1.03
SJRCW	2/7/2000	15:30	0.85	T	0.85
SJRCW	3/6/2000	15:00	0.52	T	0.52
SJRCW	4/10/2000	11:00	0.7	T	0.70
SJRCW	5/8/2000	11:25	0.65	T	0.65
SJRCW	6/12/2000	14:55	0.24	T	0.24
SJRCW	7/10/2000	10:50	0.13	T	0.13
SJRCW	8/7/2000	11:00	0.99	T	0.99
SJRCW	9/11/2000	10:05	0.6	T	0.60
SJRCW	10/11/2000	15:15	0.39	T	0.39
SJRCW	11/13/2000	9:50	1.22	T	1.22
SJRCW	12/14/2000	10:05	0.582	T	0.58
SJRCW	1/9/2001	11:30	-0.024	T	1.67
SJRCW	2/15/2001	10:10	0.19	T	0.19
SJRCW	3/15/2001	9:15	-0.177	T	1.67
SJRCW	4/10/2001	8:55	0.062	T	0.06
SJRCW	5/14/2001	14:10	1.02	T	1.02
SJRCW	6/11/2001	13:55	-0.401	T	1.67
SJRCW	7/11/2001	12:25	0.25	T	0.25
SJRCW	8/9/2001	11:40	-0.446	T	1.67
SJRCW	9/11/2001	14:30	1.634	T	1.63
SJRCW	10/9/2001	12:05	1.328	T	1.33
SJRCW	11/20/2001	12:55	0.501	T	0.50
SJRCW	12/5/2001	12:40	0.481	T	0.48
SJRCW	1/8/2002	12:00	1.353	T	1.35
SJRCW	2/11/2002	11:25	0.267		0.27
SJRCW	3/11/2002	9:35	0.133	T	0.13
SJRCW	4/8/2002	12:55	1		1.00
SJRCW	5/13/2002	12:00	0.29	T	0.29
SJRCW	6/10/2002	12:10	2.5	T	2.50
SJRCW	7/15/2002	12:30	0.31	T	0.31
SJRCW	8/12/2002	11:35	0.471	T	0.47
SJRCW	9/12/2002	11:20	0.482	T	0.48
SJRCW	10/7/2002	12:10	0.614	T	0.61

Average =	1.17 µg/L
Maximum =	10.00 µg/L
Standard Dev =	0.89 µg/L
95 Percentile =	2.00 µg/L
Count	375.00

Ambient Lead Data in St. Johns River near SECI Palatka Plant

Average MDL = 40.7 µg/L

Class III Water Quality Standard = 3.34 µg/L

Station	Date	Time	Lead (µg/L)	Remark Code	Value Used (µg/L)
SJRCW	11/11/2002	11:40	-0.338	T	1.67
SJRCW	12/9/2002	11:15	1.202	T	1.20
SJRCW	1/6/2003	11:10	0.79	T	0.79
SJRCW	2/11/2003	9:50	1.473		1.47
SJRCW	3/11/2003	13:05	0.563	T	0.56
SJRCW	4/14/2003	12:00	0.507	T	0.51
SJRCW	5/12/2003	12:40	0.062	T	0.06
SJRCW	6/9/2003	12:15	0.397	T	0.40
SJRCW	8/12/2003	12:45	1.174		1.17
SJRCW	9/8/2003	12:00	0.105	T	0.11
SJRCW	10/7/2003	11:35	-1.52	T	1.67
SJRCW	11/12/2003	12:20	1.96	T	1.96
SJRCW	12/10/2003	13:40	2.01	I	2.01
SJRCW	1/12/2004	13:25	0.598	T	0.60
SJRCW	2/9/2004	12:45	0.614	T	0.61

Average =	1.17 µg/L
Maximum =	10.00 µg/L
Standard Dev =	0.89 µg/L
95 Percentile =	2.00 µg/L
Count	375.00

Note: If non-detect was reported, half of the detection limit or half of the water quality standard was used, whichever was less.

Source: SJRWMD, 2004.
ECT, 2004.

Ambient Mercury Data in St. Johns River near SECI Palatka Plant

Class III Water Quality Standard = 0.012 µg/L

Station	Date	Time	Mercury (µg/L)		Value Used (µg/L)
SECI D-005	12/4/2000		0.00175		0.00175
SECI D-005	01/24/01		0.001	*	0.001
SECI D-005	03/21/01		0.0101	*	0.0101
SECI D-005	04/09/01		0.0021	*	0.0021
SECI D-005	05/07/01		0.0092	*	0.0092
SECI D-005	06/06/01		0.0128	*	0.0128
SECI D-005	07/02/01		0.0041	*	0.0041
SECI D-005	08/08/01		0.0091	*	0.0091
SECI D-005	09/05/01		0.017	*	0.017
SECI D-005	10/04/01		0.0055	*	0.0055
SECI D-005	11/19/01		0.0021	*	0.0021
SECI D-005	12/03/01		0.0013	*	0.0013
SECI D-005	01/14/02		0.009	*	0.009
SECI D-005	02/11/02		0.0032	*	0.0032
SECI D-005	03/11/02		0.0017	*	0.0017
SECI D-005	04/08/02		0.0032	*	0.0032
SECI D-005	05/13/02		0.0132	*	0.0132
SECI D-005	06/05/02		0.0003	*	0.0003
SECI D-005	07/09/02		0.0034	*	0.0034
SECI D-005	08/26/03		0.0022	*	0.0022
SECI D-005	10/30/03		0.00013	*	0.00013
SECI D-005	02/04/04		0.00057	*	0.00057
SECI D-005	04/27/04		0.0025		0.0025
SECI D-005	07/27/04		0.0013		0.0013
SECI D-005	10/12/04		0.0054		0.0054
SECI D-005	01/25/05		0.0042		0.0042
SECI D-005	02/23/05		0.0029		0.0029
SJRCC	02/23/05		0.0031		0.0031
Intake	02/23/05		0.0033		0.0033
SJ6	02/23/05		0.0029		0.0029
SJRM74C	02/23/05		0.0026		0.0026
SECI D-005	3/24/2005		0.0034		0.0034
Intake	3/24/2005		0.0035		0.0035
sjrcc	3/24/2005	10:16	0.0026	*	0.0026
SJRM 74C	3/24/2005	2:15	0.0029	*	0.0029
SJ6	3/24/2005	3:00	0.0033	*	0.0033
SECI D-005	4/26/2005		0.0028		0.0028
Intake	4/26/2005		0.0032		0.0032
SJRCC	4/26/2005	1:00	0.0031	*	0.0031
SJ6	4/26/2005	4:45	0.0029	*	0.0029
SJRM 74C	4/26/2005	5:15	0.003	*	0.003
SECI D-005	5/17/2005		0.0026		0.0026
SJRCC	5/17/2005	9:00	0.0028	*	0.0028
SJ6	5/17/2005	10:45	0.0025	*	0.0025
SJRM 74C	5/17/2005	11:15	0.0023	*	0.0023
SECI D-005	6/20/2005		0.0033		0.0033
SJRCC	6/20/2005	10:00	0.0031	*	0.0031

Average =	0.0038 µg/L
Maximum =	0.0170 µg/L
Standard Dev =	0.0031 µg/L
95 Percentile =	0.0101 µg/L
Count	61.0000

SJRM 74C	6/20/2005	3:15	0.0039	*	0.0039
SJ6	6/20/2005	2:45	0.0039	*	0.0039
SECI D-005	7/25/2005		0.0031		0.0031
SJRCC	7/25/2005	7:30	0.0032	*	0.0032
SJ6	7/25/2005	2:00	0.0031	*	0.0031
SJRM 74C	7/25/2005	2:15	0.003	*	0.003
SECI D-005	8/31/2005		0.0037		0.0037
SJRCC	8/31/2005	9:30	0.0028	*	0.0028
SJ6	8/31/2005	1:30	0.0029	*	0.0029
SJRM 74C	8/31/2005	2:00	0.0032	*	0.0032
SECI D-005	9/27/2005		0.0034		0.0034
SJ6	9/27/2005	12:45	0.004	*	0.004
SJRM 74C	9/27/2005	1:30	0.0028	*	0.0028
SJRCC	9/27/2005	2:00	0.0028	*	0.0028

* -- Low level analysis

Source: SECI, 2004.
ECT, 2004.

Ambient Selenium Data in St. Johns River near SECI Palatka Plant

Class III Water Quality Standard = 5 µg/L

Average MDL = 14.7 µg/L

Average =	1.16 µg/L
Maximum =	4.90 µg/L
Standard Dev =	1.04 µg/L
95 Percentile =	2.50 µg/L
Count	75.00

Station	Date	Time		Selenium (µg/L)	Remark Code	Value Used (µg/L)
SECI D-005	6/18/98		<	1		0.50
SECI D-005	3/1/2000		<	10		2.50
SECI D-005	6/1/2000		<	10		2.50
SECI D-005	9/1/2000		<	2		1.00
SECI D-005	12/1/2000		<	2		1.00
SECI D-005	3/1/2001			4.9		4.90
SECI D-005	6/1/2001		<	4.2		2.10
SECI D-005	7/1/2001		<	4.2		2.10
SECI D-005	12/1/2001		<	4.2		2.10
SECI D-005	3/1/2002		<	3.3		1.65
SECI D-005	6/1/2002		<	3.3		1.65
SECI D-005	7/29/2002		<	4.2		2.10
SECI D-005	10/22/2002		<	4.2		2.10
SECI D-005	1/28/2003		<	4.2		2.10
SECI D-005	5/13/2003		<	4.2		2.10
SECI D-005	8/26/2003		<	4.2		2.10
SJ6	5/16/2002	10:45		0.12	T	0.12
SJRCC	11/20/2001	13:10		0.281	T	0.28
SJRCC	12/5/2001	12:50		-0.69	T	2.50
SJRCC	1/8/2002	12:15		1.442	T	1.44
SJRCC	2/11/2002	11:40		-1.534	T	2.50
SJRCC	3/11/2002	9:20		-0.976	T	2.50
SJRCC	4/8/2002	13:05		2	U	1.00
SJRCC	5/13/2002	12:10		0.22	T	0.22
SJRCC	6/10/2002	12:15		0.71	T	0.71
SJRCC	7/15/2002	12:50		0.15	T	0.15
SJRCC	8/12/2002	11:45		0.323	T	0.32
SJRCC	9/12/2002	11:30		0.186	T	0.19
SJRCC	10/7/2002	12:20		0.078	T	0.08
SJRCC	11/11/2002	11:50		1.57	T	1.57
SJRCC	12/9/2002	11:30		0.12	T	0.12
SJRCC	1/6/2003	11:20		0.318	T	0.32
SJRCC	2/11/2003	10:00		0.305	T	0.31
SJRCC	3/11/2003	13:10		0.485	T	0.49
SJRCC	3/11/2003	13:15		0.511	T	0.51
SJRCC	4/14/2003	12:15		-0.095	T	2.50
SJRCC	4/14/2003	12:20		-0.126	T	2.50
SJRCC	5/12/2003	12:50		-1.231	T	2.50
SJRCC	5/12/2003	13:00		-1.128	T	2.50
SJRCC	6/9/2003	12:20		0.592	T	0.59
SJRCC	6/9/2003	12:25		0.298	T	0.30
SJRCC	8/12/2003	12:50		0.379	T	0.38
SJRCC	8/12/2003	12:55		0.269	T	0.27
SJRCC	9/8/2003	12:10		1.409	T	1.41
SJRCC	10/7/2003	11:45		0.105	T	0.11
SJRCC	11/12/2003	12:25		0.539	T	0.54
SJRCC	1/12/2004	13:30		0.14	T	0.14
SJRCC	2/9/2004	12:55		0.225	T	0.23
SJRCW	11/20/2001	12:55		0.589	T	0.59
SJRCW	12/5/2001	12:40		0.202	T	0.20
SJRCW	1/8/2002	12:00		0.698	T	0.70

SJRCW	2/11/2002	11:25	-0.47	T	2.50
SJRCW	3/11/2002	9:35	0.63	T	0.63
SJRCW	4/8/2002	12:55	2	U	1.00
SJRCW	5/13/2002	12:00	0.081	T	0.08
SJRCW	6/10/2002	12:10	0.001	T	0.00
SJRCW	7/15/2002	12:30	0.17	T	0.17
SJRCW	8/12/2002	11:35	0.066	T	0.07
SJRCW	9/12/2002	11:20	-0.211	T	2.50
SJRCW	10/7/2002	12:10	-0.046	T	2.50
SJRCW	11/11/2002	11:40	1.096	T	1.10
SJRCW	12/9/2002	11:15	0.128	T	0.13
SJRCW	1/6/2003	11:10	0.447	T	0.45
SJRCW	2/11/2003	9:50	0.515	T	0.52
SJRCW	3/11/2003	13:05	0.659	T	0.66
SJRCW	4/14/2003	12:00	0.084	T	0.08
SJRCW	5/12/2003	12:40	-1.347	T	2.50
SJRCW	6/9/2003	12:15	0.654	T	0.65
SJRCW	8/12/2003	12:45	0.27	T	0.27
SJRCW	9/8/2003	12:00	2.01	T	2.01
SJRCW	10/7/2003	11:35	0.427	T	0.43
SJRCW	11/12/2003	12:20	0.106	T	0.11
SJRCW	12/10/2003	13:40	-0.376	T	2.50
SJRCW	1/12/2004	13:25	0.278	T	0.28
SJRCW	2/9/2004	12:45	-0.088	T	2.50
sjrcc	3/24/2005	10:16	0.16	I	0.16
SJRM 74C	3/24/2005	2:15	0.13	U	0.07
SJ6	3/24/2005	3:00	0.14	I	0.14
SJRCC	4/26/2005	1:00	0.65	IV	0.65
SJ6	4/26/2005	4:45	0.42	IV	0.42
SJRM 74C	4/26/2005	5:15	0.3	IV	0.30
SJRCC	5/17/2005	9:00	0.18	I	0.18
SJ6	5/17/2005	10:45	0.22	I	0.22
SJRM 74C	5/17/2005	11:15	0.13	U	0.07
SJRCC	6/20/2005	10:00	0.28	I	0.28
SJRM 74C	6/20/2005	3:15	0.18	I	0.18
SJ6	6/20/2005	2:45	0.28	I	0.28
SJRCC	7/25/2005	7:30	0.13	U	0.07
SJ6	7/25/2005	2:00	0.13	U	0.07
SJRM 74C	7/25/2005	2:15	0.13	U	0.07
SJRCC	8/31/2005	9:30	0.17	I	0.17
SJ6	8/31/2005	1:30	0.15	I	0.15
SJRM 74C	8/31/2005	2:00	0.14	I	0.14
SJ6	9/27/2005	12:45	0.13	U	0.07
SJRM 74C	9/27/2005	1:30	0.13	U	0.07
SJRCC	9/27/2005	2:00	0.13	U	0.07

Note: If non-detect was reported, half of the detection limit or half of the water quality standard was used, whichever was less.

Source: SJRWMD, 2004.
ECT, 2004.

Ambient Silver Data in St. Johns River near SECI Palatka Plant

Average MDL = 4.4 µg/L

Class III Water Quality Standard = 0.07 µg/L

Station	Date	Time	Silver (µg/L)	Remark Code	Value Used (µg/L)
20030235	7/29/2004		0.01	U	0.005
20030236	7/29/2004		0.01	U	0.005
20030237	7/29/2004		0.01	U	0.005
20030235	8/12/2004		0.01	U	0.005
20030236	8/12/2004		0.01	U	0.005
20030237	8/12/2004		0.01	U	0.005
20030235	10/12/2004		0.02	U	0.010
20030236	10/12/2004		0.02	U	0.010
20030237	10/12/2004		0.02	U	0.010
20030235	10/28/2004		0.02	U	0.010
20030236	10/28/2004		0.02	U	0.010
20030237	10/28/2004		0.02	U	0.010
SJRCC	2/23/2005		0.018	U	0.009
Intake	2/23/2005		0.018	U	0.009
SJ6	2/23/2005		0.018	U	0.009
SJRM 74C	2/23/2005		0.018	U	0.009
Intake	3/24/2005		0.018	U	0.009
SJ6	3/24/2005	3:00	0.018	U	0.009
sjrcc	3/24/2005	10:16	0.018	U	0.009
SJRM 74C	3/24/2005	2:15	0.018	U	0.009
Intake	4/26/2005		0.018	U	0.009
SJ6	4/26/2005	4:45	0.018	U	0.009
SJRCC	4/26/2005	1:00	0.018	U	0.009
SJRM 74C	4/26/2005	5:15	0.018	U	0.009
SJ6	5/17/2005	10:45	0.018	U	0.009
SJRCC	5/17/2005	9:00	0.018	U	0.009
SJRM 74C	5/17/2005	11:15	0.018	U	0.009
SJ6	6/20/2005	2:45	0.034	I	0.034
SJRCC	6/20/2005	10:00	0.045	I	0.045
SJRM 74C	6/20/2005	3:15	0.026	I	0.026
SJ6	7/25/2005	2:00	0.018	U	0.009
SJRCC	7/25/2005	7:30	0.018	U	0.009
SJRM 74C	7/25/2005	2:15	0.018	U	0.009
SJ6	8/31/2005	1:30	0.018	U	0.009
SJRCC	8/31/2005	9:30	0.018	U	0.009
SJRM 74C	8/31/2005	2:00	0.018	U	0.009
SJ6	9/27/2005	12:45	0.018	U	0.009
SJRCC	9/27/2005	2:00	0.018	U	0.009
SJRM 74C	9/27/2005	1:30	0.018	U	0.009
SJ6	10/31/2005		0.018	U	0.009
SJRCC	10/31/2005		0.018	U	0.009
SJRM 74C	10/31/2005		0.018	U	0.009
SJ6	11/29/2005		0.018	U	0.009
SJRCC	11/29/2005		0.018	U	0.009

Average =	0.010 (µg/L)
Maximum =	16.000 (µg/L)
Standard Dev =	0.915 (µg/L)
95 Percentile =	0.020 (µg/L)
Count	49.000

Ambient Silver Data in St. Johns River near SECI Palatka Plant

Average MDL = 4.4 µg/L

Class III Water Quality Standard = 0.07 µg/L

Station	Date	Time	Silver (µg/L)	Remark Code	Value Used (µg/L)
SJRM 74C	11/29/2005		0.018	U	0.009
SJ6	12/20/2005		0.018	U	0.009
SJRCC	12/20/2005		0.018	U	0.009
SJRM 74C	12/20/2005		0.018	U	0.009
20030235	9/23/2004		0.01	U	0.005

Average =	0.010 (µg/L)
Maximum =	16.000 (µg/L)
Standard Dev =	0.915 (µg/L)
95 Percentile =	0.020 (µg/L)
Count	49.000

Note: If non-detect was reported, half of the detection limit or half of the water quality standard was used, whichever was less.

Source: SJRWMD, 2004.
ECT, 2004.

Ambient Temperature Data in St. Johns River near SECI Palatka Plant

Station	Date	Time	Temperature (°C)	Remark Code
FP41	9/22/1993	14:50	30.64	
FP41	10/20/1993	13:20	27.17	
FP41	11/30/1993	13:40	17.89	
FP41	12/28/1993	13:05	12.13	
FP41	1/26/1994	12:35	13.83	
FP41	2/23/1994	11:40	20.57	
FP41	3/30/1994	13:01	21.81	
FP41	4/20/1994	12:09	26.09	
FP41	5/25/1994	12:02	26.65	
FP41	6/29/1994	12:15	30.25	
FP41	7/27/1994	12:15	28.3	
FP41	8/23/1994	11:34	28.4	
FP41	9/29/1994	11:45	26.26	
FP41	10/24/1994	9:45	24.15	
FP41	11/30/1994	10:05	20.68	
FP41	12/28/1994	10:00	14.77	
FP41	2/15/1995	10:00	15.18	
FP41	3/1/1995	11:10	18.61	
FP41	3/29/1995	12:15	23.51	
FP41	5/2/1995	12:05	26.76	
FP41	5/31/1995	12:15	29.88	
FP41	6/29/1995	12:45	29.08	
FP41	7/27/1995	11:45	30.59	
FP41	8/31/1995	15:30	27.97	
FP41	9/26/1995	14:55	27.87	
FP41	10/24/1995	14:25	24.83	
FP41	11/21/1995	13:00	17.51	
FP41	1/3/1996	14:00	13.42	
FP41	1/30/1996	14:10	17.39	
FP41	2/27/1996	14:00	20.68	
FP41	3/26/1996	14:05	21.41	
FP41	4/30/1996	14:45	25.87	
FP41	5/28/1996	14:50	29.19	
FP41	7/2/1996	15:40	30.1	
FP41	8/6/1996	13:50	30.94	
FP41	9/12/1996	13:35	29.47	
FP41	10/1/1996	13:30	27.73	
FP41	10/24/1996	13:30	23.17	
FP42	9/22/1993	15:00	30.02	
FP42	10/20/1993	13:35	25.9	
FP42	11/30/1993	13:55	18.28	
FP42	12/28/1993	13:20	12.22	
FP42	1/26/1994	12:45	13.65	
FP42	2/23/1994	11:49	20.53	
FP42	3/30/1994	13:14	22.66	

Average =	25.1 (°C)
Maximum =	33.5 (°C)
Standard Dev =	5.5 (°C)
95 Percentile =	14.0 (°C)
Count	947.0

Ambient Temperature Data in St. Johns River near SECI Palatka Plant

Station	Date	Time	Temperature (°C)	Remark Code
FP42	4/20/1994	12:00	26	
FP42	5/25/1994	12:20	25.73	
FP42	6/29/1994	12:20	31.36	
FP42	7/27/1994	12:10	28.29	
FP42	8/23/1994	11:40	28.26	
FP42	9/29/1994	11:55	26.05	
FP42	10/24/1994	10:00	23.89	
FP42	11/30/1994	10:12	20.71	
FP42	12/28/1994	10:20	14.5	
FP42	2/15/1995	10:10	15.01	
FP42	3/1/1995	11:20	18.84	
FP42	3/29/1995	12:30	23.34	
FP42	5/2/1995	12:15	26.28	
FP42	5/31/1995	12:26	30.3	
FP42	6/29/1995	13:00	28.09	
FP42	7/27/1995	11:55	30.68	
FP42	8/31/1995	15:45	27.91	
FP42	9/26/1995	14:50	27.9	
FP42	10/24/1995	14:35	24.64	
FP42	11/21/1995	13:10	17.38	
FP42	1/3/1996	14:10	13.14	
FP42	1/30/1996	14:25	15.48	
FP42	2/27/1996	14:10	20.94	
FP42	3/26/1996	14:10	18.33	
FP42	4/30/1996	15:00	26.32	
FP42	5/28/1996	15:00	29.27	
FP42	7/2/1996	15:55	30.68	
FP42	8/6/1996	14:00	31.44	
FP42	9/12/1996	13:20	29.23	
FP42	10/1/1996	13:55	28.13	
FP42	10/24/1996	13:20	23.02	
FP42	2/26/1997	13:30	19.1	
FP42	3/26/1997	13:10	22.4	
FP42	5/28/1997	13:45	27.29	
FP42	5/28/1997	13:45	27.29	
FP42	6/25/1997	13:40	29.86	
FP42	6/25/1997	13:40	29.86	
FP42	7/23/1997	13:35	30.99	
FP42	7/23/1997	13:35	30.99	
FP42	8/20/1997	13:40	31.7	
FP42	8/20/1997	13:40	31.7	
FP42	9/25/1997	13:20	29.7	
FP42	9/25/1997	13:20	29.7	
FP42	10/28/1997	14:05	22.21	
FP42	11/24/1997	13:10	17.99	

Average =	25.1 (°C)
Maximum =	33.5 (°C)
Standard Dev =	5.5 (°C)
95 Percentile =	14.0 (°C)
Count	947.0

Ambient Temperature Data in St. Johns River near SECI Palatka Plant

Station	Date	Time	Temperature (°C)	Remark Code
FP42	12/22/1997	12:15	14.66	
FP42	2/2/1998	9:30	15.15	
FP42	2/23/1998	14:40	17.52	
FP42	4/2/1998	12:40	23.88	
FP42	4/27/1998	12:20	23.79	
FP42	5/26/1998	13:10	29.73	
FP42	6/30/1998	13:50	31.11	
FP42	8/3/1998	12:15	29.08	
FP42	8/24/1998	12:00	29.52	
FP42	9/22/1998	13:40	27.99	
FP42	9/22/1998	13:40	28.12	
FP42	9/22/1998	13:40	28.24	
FP42	10/28/1998	13:35	23.22	
FP42	10/28/1998	13:35	24.64	
FP42	10/28/1998	13:35	26.06	
FP42	11/24/1998	13:25	23.05	
FP42	11/24/1998	13:25	23.17	
FP42	11/24/1998	13:25	23.29	
FP42	12/28/1998	14:55	17.45	
FP42	12/28/1998	14:55	17.54	
FP42	12/28/1998	14:55	17.63	
FP42	1/27/1999	10:10	18.5	
FP42	1/27/1999	10:10	18.52	
FP42	1/27/1999	10:10	18.54	
FP42	2/24/1999	14:55	14.99	
FP42	2/24/1999	14:55	16.1	
FP42	2/24/1999	14:55	17.2	
FP42	3/30/1999	10:30	20.86	
FP42	3/30/1999	10:30	21.25	
FP42	3/30/1999	10:30	21.63	
FP42	4/29/1999	10:00	25.56	
FP42	4/29/1999	10:00	25.66	
FP42	4/29/1999	10:00	25.76	
FP42	5/27/1999	14:50	27.52	
FP42	5/27/1999	14:50	27.58	
FP42	5/27/1999	14:50	27.64	
FP42	6/29/1999	16:30	27.99	
FP42	6/29/1999	16:30	27.99	
FP42	6/29/1999	16:30	27.99	
FP42	8/12/1999	9:35	29.37	
FP42	8/12/1999	9:35	29.4	
FP42	8/12/1999	9:35	29.43	
FP42	8/26/1999	14:45	30.43	
FP42	8/26/1999	14:45	31.08	
FP42	8/26/1999	14:45	31.73	

Average =	25.1 (°C)
Maximum =	33.5 (°C)
Standard Dev =	5.5 (°C)
95 Percentile =	14.0 (°C)
Count	947.0

Ambient Temperature Data in St. Johns River near SECI Palatka Plant

Station	Date	Time	Temperature (°C)	Remark Code
FP42	9/23/1999	15:40	25.37	
FP42	9/23/1999	15:40	25.38	
FP42	9/23/1999	15:40	25.39	
FP42	10/26/1999	16:30	21.65	
FP42	10/26/1999	16:30	21.66	
FP42	10/26/1999	16:30	21.66	
FP42	11/23/1999	14:10	19.99	
FP42	11/23/1999	14:10	20.66	
FP42	11/23/1999	14:10	21.32	
FP42	12/21/1999	10:15	17.26	
FP42	12/21/1999	10:15	17.38	
FP42	12/21/1999	10:15	17.49	
FP42	1/27/2000	14:50	11.69	
FP42	1/27/2000	14:50	12.1	
FP42	1/27/2000	14:50	12.51	
FP42	2/21/2000	13:50	18.41	
FP42	2/21/2000	13:50	18.46	
FP42	2/21/2000	13:50	18.51	
FP42	3/29/2000	10:10	21.33	
FP42	3/29/2000	10:10	21.64	
FP42	3/29/2000	10:10	21.96	
FP42	4/26/2000	9:30	22.92	
FP42	4/26/2000	9:30	22.96	
FP42	4/26/2000	9:30	23	
FP42	5/24/2000	14:45	28.5	
FP42	5/24/2000	14:45	28.84	
FP42	5/24/2000	14:45	29.18	
FP42	6/29/2000	9:10	28.7	
FP42	6/29/2000	9:10	28.75	
FP42	6/29/2000	9:10	28.8	
FP42	7/27/2000	14:55	29.5	
FP42	7/27/2000	14:55	29.56	
FP42	7/27/2000	14:55	29.62	
FP42	8/24/2000	14:00	29.57	
FP42	8/24/2000	14:00	30.05	
FP42	8/24/2000	14:00	30.53	
FP42	9/28/2000	13:45	26.97	
FP42	9/28/2000	13:45	26.98	
FP42	9/28/2000	13:45	26.98	
FP42	10/26/2000	13:15	22.14	
FP42	10/26/2000	13:15	22.19	
FP42	10/26/2000	13:15	22.24	
FP42	11/27/2000	15:15	18	
FP42	11/27/2000	15:15	18	
FP42	11/27/2000	15:15	18	

Average =	25.1 (°C)
Maximum =	33.5 (°C)
Standard Dev =	5.5 (°C)
95 Percentile =	14.0 (°C)
Count	947.0

Ambient Temperature Data in St. Johns River near SECI Palatka Plant

Station	Date	Time	Temperature (°C)	Remark Code
FP42	12/21/2000	12:55	13.01	
FP42	12/21/2000	12:55	13.3	
FP42	12/21/2000	12:55	13.59	
FP42	2/27/2001	15:20	21.62	
FP42	2/27/2001	15:20	22.2	
FP42	2/27/2001	15:20	22.78	
FP42	3/29/2001	15:00	18.52	
FP42	3/29/2001	15:00	18.54	
FP42	3/29/2001	15:00	18.55	
FP42	5/1/2001	10:20	22.62	
FP42	5/1/2001	10:20	22.64	
FP42	5/1/2001	10:20	22.67	
FP42	5/30/2001	13:50	27.73	
FP42	5/30/2001	13:50	28.66	
FP42	5/30/2001	13:50	29.58	
FP42	6/28/2001	14:45	28.47	
FP42	6/28/2001	14:45	28.5	
FP42	6/28/2001	14:45	28.52	
FP42	7/23/2001	14:55	29.29	
FP42	7/23/2001	14:55	29.3	
FP42	7/23/2001	14:55	29.3	
FP42	8/20/2001	10:00	30.91	
FP42	8/20/2001	10:00	30.96	
FP42	8/20/2001	10:00	31	
FP42	9/25/2001	10:25	26.92	
FP42	9/25/2001	10:25	26.94	
FP42	9/25/2001	10:25	26.95	
FP42	10/24/2001	14:55	24.35	
FP42	10/24/2001	14:55	24.48	
FP42	10/24/2001	14:55	24.61	
FP42	11/27/2001	10:00	21.54	
FP42	11/27/2001	10:00	21.88	
FP42	11/27/2001	10:00	22.23	
FP42	2/26/2002	10:50	16.36	
FP42	2/26/2002	10:50	16.94	
FP42	2/26/2002	10:50	17.33	
FP42	3/25/2002	15:30	22.72	
FP42	3/25/2002	15:30	22.8	
FP42	3/25/2002	15:30	22.87	
FP42	4/29/2002	14:55	27.52	
FP42	4/29/2002	14:55	27.62	
FP42	4/29/2002	14:55	27.71	
FP42	5/29/2002	13:45	26.3	
FP42	5/29/2002	13:45	26.36	
FP42	5/29/2002	13:45	26.41	

Average =	25.1 (°C)
Maximum =	33.5 (°C)
Standard Dev =	5.5 (°C)
95 Percentile =	14.0 (°C)
Count	947.0

Ambient Temperature Data in St. Johns River near SECI Palatka Plant

Station	Date	Time	Temperature (°C)	Remark Code
FP42	6/26/2002	15:10	27.29	
FP42	6/26/2002	15:10	28.29	
FP42	6/26/2002	15:10	29.29	
FP42	7/30/2002	14:00	30.5	
FP42	7/30/2002	14:00	30.8	
FP42	7/30/2002	14:00	31.11	
FP42	8/26/2002	10:00	30.03	
FP42	8/26/2002	10:00	30.14	
FP42	8/26/2002	10:00	30.24	
FP42	9/25/2002	14:30	28.13	
FP42	9/25/2002	14:30	28.68	
FP42	9/25/2002	14:30	29.22	
FP42	10/24/2002	14:35	24.9	
FP42	10/24/2002	14:35	26.8	
FP42	10/24/2002	14:35	28.71	
FP42	11/25/2002	15:05	17.53	
FP42	11/25/2002	15:05	18.24	
FP42	11/25/2002	15:05	18.95	
FP42	1/28/2003	9:45	10.72	
FP42	1/28/2003	9:45	10.74	
FP42	1/28/2003	9:45	10.75	
FP43	9/22/1993	15:15	31.1	
FP43	10/20/1993	13:50	25.16	
FP43	11/30/1993	14:05	18.18	
FP43	12/28/1993	13:32	11.55	
FP43	1/26/1994	12:53	13.63	
FP43	2/23/1994	12:00	20.72	
FP43	3/30/1994	13:45	22.45	
FP43	4/20/1994	11:55	25.49	
FP43	5/25/1994	12:30	25.84	
FP43	6/29/1994	12:30	30	
FP43	7/27/1994	12:00	28.34	
FP43	8/23/1994	11:45	27.97	
FP43	9/29/1994	12:10	26.65	
FP43	10/24/1994	10:05	23.82	
FP43	11/30/1994	10:24	20.84	
FP43	12/28/1994	10:30	14.37	
FP43	2/15/1995	10:15	14.8	
FP43	3/1/1995	11:30	18.99	
FP43	3/29/1995	12:40	23	
FP43	5/2/1995	12:25	26.43	
FP43	5/31/1995	12:40	29.8	
FP43	6/29/1995	13:08	29.22	
FP43	7/27/1995	12:05	30.78	
FP43	8/31/1995	15:55	27.91	

Average =	25.1 (°C)
Maximum =	33.5 (°C)
Standard Dev =	5.5 (°C)
95 Percentile =	14.0 (°C)
Count	947.0

Ambient Temperature Data in St. Johns River near SECI Palatka Plant

Station	Date	Time	Temperature (°C)	Remark Code
FP43	9/26/1995	14:40	27.68	
FP43	10/24/1995	14:40	23.91	
FP43	11/21/1995	13:20	17.04	
FP43	1/3/1996	14:20	13.42	
FP43	1/30/1996	14:30	16.68	
FP43	2/27/1996	14:20	19.98	
FP43	3/26/1996	14:20	17.75	
FP43	4/30/1996	15:10	26.2	
FP43	7/2/1996	16:00	30.46	
FP43	8/6/1996	14:10	30.35	
FP43	9/12/1996	13:10	29.19	
FP43	10/1/1996	14:05	28.43	
FP43	10/24/1996	13:10	22.85	
PA34	2/23/1994	11:22	21.37	
PA34	3/30/1994	12:35	22.5	
PA34	4/20/1994	11:43	26.46	
PA34	5/25/1994	11:45	25.74	
PA34	6/29/1994	11:55	29.95	
PA34	7/27/1994	11:47	27.98	
PA34	8/23/1994	11:20	28.23	
PA34	9/29/1994	11:20	26.23	
PA34	10/24/1994	9:30	23.8	
PA34	11/30/1994	9:49	20.84	
PA34	12/28/1994	9:40	14.35	
PA34	2/15/1995	9:50	15.01	
PA34	3/1/1995	11:00	18.94	
PA34	3/29/1995	11:55	22.78	
PA34	5/2/1995	11:50	25.53	
PA34	5/31/1995	12:00	30.41	
PA34	6/29/1995	12:28	28.4	
PA34	7/27/1995	11:28	29.81	
PA34	8/31/1995	16:10	27.83	
PA34	9/26/1995	15:10	28.14	
PA34	10/24/1995	15:00	23.95	
PA34	11/21/1995	13:30	17.61	
PA34	1/3/1996	14:40	13.19	
PA34	1/30/1996	14:55	16.63	
PA34	2/27/1996	14:30	20.21	
PA34	3/26/1996	14:35	22.23	
PA34	4/30/1996	15:45	26	
PA34	5/28/1996	15:40	29.12	
PA34	7/9/1996	10:20	27.9	
PA34	8/6/1996	14:20	33.49	
PA34	9/12/1996	12:55	29.11	
PA34	10/1/1996	13:10	27.67	

Average =	25.1 (°C)
Maximum =	33.5 (°C)
Standard Dev =	5.5 (°C)
95 Percentile =	14.0 (°C)
Count	947.0

Ambient Temperature Data in St. Johns River near SECI Palatka Plant

Station	Date	Time	Temperature (°C)	Remark Code
PA34	10/24/1996	12:50	22.95	
SJ6	5/16/2002	10:45	26.6	
SJ6	5/16/2002	10:45	26.69	
SJ6	5/16/2002	10:45	26.77	
SJRCC	3/9/1993	15:00	18.7	
SJRCC	4/13/1993	15:10	23	
SJRCC	5/12/1993	13:40	25.6	
SJRCC	7/7/1993	11:20	31.4	
SJRCC	8/12/1993	11:00	30.9	
SJRCC	9/22/1993	8:50	29.8	
SJRCC	10/20/1993	10:30	25.43	
SJRCC	11/15/1993	11:40	20.93	
SJRCC	12/15/1993	11:30	15.1	
SJRCC	1/20/1994	12:05	12.1	
SJRCC	2/15/1994	10:15	18.1	
SJRCC	3/14/1994	12:10	18.3	
SJRCC	4/12/1994	11:30	24.4	
SJRCC	5/16/1994	12:05	28.5	
SJRCC	6/14/1994	12:25	30.6	
SJRCC	7/12/1994	11:40	30.4	
SJRCC	8/16/1994	11:45	27.8	
SJRCC	9/13/1994	11:55	27.9	
SJRCC	10/17/1994	11:25	23.6	
SJRCC	11/18/1994	10:40	21.34	
SJRCC	12/13/1994	12:10	19.2	
SJRCC	1/19/1995	11:40	16.5	
SJRCC	2/15/1995	9:45	14.6	
SJRCC	3/15/1995	10:40	20.3	
SJRCC	4/11/1995	9:30	23.2	
SJRCC	5/16/1995	11:25	28.97	
SJRCC	6/13/1995	10:00	29.4	
SJRCC	7/11/1995	11:15	30.6	
SJRCC	8/15/1995	12:15	32	
SJRCC	9/13/1995	12:10	28	
SJRCC	10/17/1995	11:00	24.7	
SJRCC	11/16/1995	11:20	16.8	
SJRCC	12/13/1995	10:40	16.1	
SJRCC	1/16/1996	10:50	11.7	
SJRCC	2/13/1996	11:25	14	
SJRCC	3/13/1996	11:15	12.3	
SJRCC	4/16/1996	10:40	21.6	
SJRCC	5/14/1996	11:00	27.2	
SJRCC	6/12/1996	11:15	28.7	
SJRCC	7/16/1996	10:55	30.1	
SJRCC	8/21/1996	11:20	29.2	

Average =	25.1 (°C)
Maximum =	33.5 (°C)
Standard Dev =	5.5 (°C)
95 Percentile =	14.0 (°C)
Count	947.0

Ambient Temperature Data in St. Johns River near SECI Palatka Plant

Station	Date	Time	Temperature (°C)	Remark Code
SJRCC	9/17/1996	10:15	28.6	
SJRCC	10/15/1996	10:15	22.8	
SJRCC	11/13/1996	10:40	18.5	
SJRCC	12/3/1996	10:40	18.1	
SJRCC	1/14/1997	10:25	15.4	
SJRCC	2/11/1997	10:25	16.9	
SJRCC	3/11/1997	10:25	22.5	
SJRCC	4/15/1997	10:25	21.9	
SJRCC	4/15/1997	10:25	21.9	
SJRCC	5/13/1997	10:20	24.8	
SJRCC	5/13/1997	10:20	24.8	
SJRCC	6/10/1997	10:40	24.3	
SJRCC	6/10/1997	10:40	24.3	
SJRCC	7/8/1997	10:40	31	
SJRCC	7/8/1997	10:40	31	
SJRCC	8/5/1997	10:30	29.9	
SJRCC	8/5/1997	10:30	29.9	
SJRCC	9/16/1997	9:40	29.5	
SJRCC	9/16/1997	9:40	29.5	
SJRCC	10/9/1997	14:20	27.1	
SJRCC	11/11/1997	9:50	19	
SJRCC	12/9/1997	9:45	16.4	
SJRCC	1/13/1998	10:10	17	
SJRCC	2/10/1998	9:45	13.6	
SJRCC	3/17/1998	10:20	16.7	
SJRCC	4/14/1998	9:45	21.7	
SJRCC	5/12/1998	13:40	26	
SJRCC	6/9/1998	13:25	29.2	
SJRCC	7/14/1998	14:00	30.9	
SJRCC	8/18/1998	9:15	30.5	
SJRCC	9/8/1998	13:30	29.4	
SJRCC	10/15/1998	14:00	27.6	
SJRCC	12/15/1998	13:30	20.4	
SJRCC	1/12/1999	9:50	13.5	
SJRCC	2/9/1999	10:30	20.5	
SJRCC	3/10/1999	13:35	18.6	
SJRCC	4/27/1999	10:45	26.4	
SJRCC	5/10/1999	10:30	25.5	
SJRCC	6/7/1999	10:15	28.1	
SJRCC	7/12/1999	13:10	31.2	
SJRCC	8/10/1999	13:20	30.2	
SJRCC	9/28/1999	14:30	27.64	
SJRCC	10/12/1999	14:30	26.89	
SJRCC	11/9/1999	11:40	20.2	
SJRCC	12/6/1999	14:10	17.1	

Average =	25.1 (°C)
Maximum =	33.5 (°C)
Standard Dev =	5.5 (°C)
95 Percentile =	14.0 (°C)
Count	947.0

Ambient Temperature Data in St. Johns River near SECI Palatka Plant

Station	Date	Time	Temperature (°C)	Remark Code
SJRCC	1/10/2000	14:20	17.98	
SJRCC	2/7/2000	15:40	13.65	
SJRCC	3/6/2000	15:10	20.59	
SJRCC	4/10/2000	10:50	20.7	
SJRCC	5/8/2000	11:15	26.25	
SJRCC	6/12/2000	15:00	28.7	
SJRCC	7/10/2000	10:30	29.79	
SJRCC	8/7/2000	10:45	30.9	
SJRCC	9/11/2000	9:55	27.76	
SJRCC	10/11/2000	15:25	21.49	
SJRCC	11/13/2000	9:40	21.58	
SJRCC	12/14/2000	9:55	17.34	
SJRCC	1/9/2001	11:40	10.86	
SJRCC	2/15/2001	10:00	18.36	
SJRCC	3/15/2001	9:00	19.01	
SJRCC	4/10/2001	8:50	24.13	
SJRCC	5/14/2001	13:55	26.05	
SJRCC	6/11/2001	13:50	29.95	
SJRCC	7/11/2001	12:34	29.55	
SJRCC	8/9/2001	11:50	30.33	
SJRCC	9/11/2001	14:40	29.12	
SJRCC	10/9/2001	12:20	23.27	
SJRCC	11/20/2001	13:10	21.9	
SJRCC	12/5/2001	12:50	22.3	
SJRCC	1/8/2002	12:15	11.28	
SJRCC	2/11/2002	11:40	17.24	
SJRCC	3/11/2002	9:20	18.04	
SJRCC	4/8/2002	13:05	22.47	
SJRCC	5/13/2002	12:10	28.77	
SJRCC	6/10/2002	12:15	28.93	
SJRCC	7/15/2002	12:50	29.75	
SJRCC	8/12/2002	11:45	28.34	
SJRCC	9/12/2002	11:30	28.69	
SJRCC	10/7/2002	12:20	29.49	
SJRCC	11/11/2002	11:50	23.13	
SJRCC	12/9/2002	11:30	15.26	
SJRCC	1/6/2003	11:20	14.27	
SJRCC	2/11/2003	10:00	14.46	
SJRCC	3/11/2003	13:10	19.76	
SJRCC	3/11/2003	13:10	20.23	
SJRCC	3/11/2003	13:15	20.7	
SJRCC	4/14/2003	12:15	21.3	
SJRCC	4/14/2003	12:15	22.175	
SJRCC	4/14/2003	12:20	23.05	
SJRCC	8/12/2003	12:50	28.38	

Average =	25.1 (°C)
Maximum =	33.5 (°C)
Standard Dev =	5.5 (°C)
95 Percentile =	14.0 (°C)
Count	947.0

Ambient Temperature Data in St. Johns River near SECI Palatka Plant

Station	Date	Time	Temperature (°C)	Remark Code
SJRCC	8/12/2003	12:50	28.79	
SJRCC	8/12/2003	12:55	29.2	
SJRCC	9/8/2003	12:10	27.76	
SJRCC	9/8/2003	12:10	27.88	
SJRCC	10/7/2003	11:45	25.88	
SJRCC	11/12/2003	12:25	22.77	
SJRCC	11/12/2003	12:25	23.3	
SJRCC	11/12/2003	12:25	23.83	
SJRCC	12/10/2003	13:30	16.3	
SJRCC	12/10/2003	13:30	16.3	
SJRCC	12/10/2003	13:30	16.31	
SJRCC	1/12/2004	13:30	12.85	
SJRCC	2/9/2004	12:55	15.04	
SJRCC	2/9/2004	12:55	16.66	
SJRCC	2/9/2004	12:55	18.27	
SJRCE	3/9/1993	15:05	19.1	
SJRCE	4/13/1993	15:15	24.1	
SJRCE	5/12/1993	13:50	25.8	
SJRCE	7/7/1993	11:10	31.4	
SJRCE	8/12/1993	10:50	30.6	
SJRCE	9/22/1993	8:40	29.5	
SJRCE	10/20/1993	10:10	25.37	
SJRCE	11/15/1993	11:30	22.43	
SJRCE	12/15/1993	11:20	15.43	
SJRCE	1/20/1994	11:50	11.8	
SJRCE	2/15/1994	10:30	17.8	
SJRCE	3/14/1994	11:55	18.2	
SJRCE	4/12/1994	11:20	23.8	
SJRCE	5/16/1994	11:50	28.5	
SJRCE	6/14/1994	12:05	29.8	
SJRCE	7/12/1994	11:20	30.5	
SJRCE	8/16/1994	11:35	27.9	
SJRCE	9/13/1994	11:40	27.5	
SJRCE	10/17/1994	11:10	23.6	
SJRCE	11/18/1994	10:30	21.38	
SJRCE	12/13/1994	12:00	18.7	
SJRCE	1/19/1995	11:30	16.3	
SJRCE	2/15/1995	9:40	14.3	
SJRCE	3/15/1995	10:30	19	
SJRCE	4/11/1995	9:25	22.6	
SJRCE	5/16/1995	11:15	29.13	
SJRCE	6/13/1995	9:50	29.2	
SJRCE	7/11/1995	10:55	30.8	
SJRCE	8/15/1995	12:00	31.3	
SJRCE	9/13/1995	11:55	28	

Average =	25.1 (°C)
Maximum =	33.5 (°C)
Standard Dev =	5.5 (°C)
95 Percentile =	14.0 (°C)
Count	947.0

Ambient Temperature Data in St. Johns River near SECI Palatka Plant

Station	Date	Time	Temperature (°C)	Remark Code
SJRCE	10/17/1995	10:45	24.8	
SJRCE	11/16/1995	11:05	16.6	
SJRCE	12/13/1995	10:25	15.9	
SJRCE	1/16/1996	10:45	11.8	
SJRCE	2/13/1996	11:15	13.9	
SJRCE	3/13/1996	11:05	13	
SJRCE	4/16/1996	10:30	21.5	
SJRCE	5/14/1996	10:50	27	
SJRCE	6/12/1996	11:05	29.2	
SJRCE	7/16/1996	10:45	29.7	
SJRCE	8/21/1996	11:05	28.9	
SJRCE	9/17/1996	9:55	28.6	
SJRCE	10/15/1996	10:30	22.8	
SJRCE	11/13/1996	10:15	18.4	
SJRCE	12/3/1996	10:25	18	
SJRCE	1/14/1997	10:15	14.7	
SJRCE	2/11/1997	10:15	16.5	
SJRCE	3/11/1997	10:20	22.9	
SJRCE	4/15/1997	10:15	21.2	
SJRCE	4/15/1997	10:15	21.2	
SJRCE	5/13/1997	10:10	24.6	
SJRCE	5/13/1997	10:10	24.6	
SJRCE	6/10/1997	10:25	24	
SJRCE	6/10/1997	10:25	24	
SJRCE	7/8/1997	10:30	30.4	
SJRCE	7/8/1997	10:30	30.4	
SJRCE	8/5/1997	10:20	29.9	
SJRCE	8/5/1997	10:20	29.9	
SJRCE	9/16/1997	9:35	28.9	
SJRCE	9/16/1997	9:35	28.9	
SJRCE	10/9/1997	14:00	27.2	
SJRCE	11/11/1997	9:45	18.9	
SJRCE	12/9/1997	9:30	16.4	
SJRCE	1/13/1998	9:55	16.8	
SJRCE	2/10/1998	9:40	13.6	
SJRCE	3/17/1998	10:15	16.7	
SJRCE	4/14/1998	9:30	21.6	
SJRCE	5/12/1998	13:45	26.9	
SJRCE	6/9/1998	13:45	29.8	
SJRCE	7/14/1998	13:45	30.3	
SJRCE	8/18/1998	9:00	30.4	
SJRCE	9/8/1998	13:20	29.3	
SJRCE	10/15/1998	13:40	27.4	
SJRCE	12/15/1998	13:40	19.9	
SJRCE	1/12/1999	9:45	13.2	

Average =	25.1 (°C)
Maximum =	33.5 (°C)
Standard Dev =	5.5 (°C)
95 Percentile =	14.0 (°C)
Count	947.0

Ambient Temperature Data in St. Johns River near SECI Palatka Plant

Station	Date	Time	Temperature (°C)	Remark Code
SJRCE	2/9/1999	10:15	20.7	
SJRCE	3/10/1999	13:45	18.7	
SJRCE	4/27/1999	10:20	25.4	
SJRCE	5/10/1999	10:10	25	
SJRCE	6/7/1999	10:00	27.9	
SJRCE	7/12/1999	13:20	31.6	
SJRCE	8/10/1999	13:35	30.7	
SJRCE	9/28/1999	14:40	26.98	
SJRCE	10/12/1999	14:40	26.62	
SJRCE	11/9/1999	11:20	19.91	
SJRCE	12/6/1999	14:20	17.2	
SJRCE	1/10/2000	14:30	18.04	
SJRCE	2/7/2000	15:50	13.93	
SJRCE	3/6/2000	15:20	20.67	
SJRCE	4/10/2000	10:40	20.79	
SJRCE	5/8/2000	10:55	25.94	
SJRCE	6/12/2000	15:15	28.66	
SJRCE	7/10/2000	10:15	29.55	
SJRCE	8/7/2000	10:35	30	
SJRCE	9/11/2000	9:45	27.74	
SJRCE	10/11/2000	15:35	20.81	
SJRCE	11/13/2000	9:30	21.06	
SJRCE	12/14/2000	9:45	17.04	
SJRCE	1/9/2001	11:50	10.82	
SJRCE	2/15/2001	9:50	18.03	
SJRCE	3/15/2001	8:45	19.04	
SJRCE	4/10/2001	8:45	23.58	
SJRCE	5/14/2001	13:40	25.91	
SJRCE	6/11/2001	13:40	31.3	
SJRCE	7/11/2001	12:45	29.58	
SJRCE	8/9/2001	12:00	31.98	
SJRCE	9/11/2001	14:50	29.09	
SJRCE	10/9/2001	12:30	23.58	
SJRCW	3/9/1993	14:50	19	
SJRCW	4/13/1993	15:05	23.6	
SJRCW	5/12/1993	13:30	25.7	
SJRCW	7/7/1993	11:30	31.2	
SJRCW	8/12/1993	11:10	30.7	
SJRCW	9/22/1993	9:00	30.3	
SJRCW	10/20/1993	10:40	24.94	
SJRCW	11/15/1993	11:50	20.75	
SJRCW	12/15/1993	11:45	14.83	
SJRCW	1/20/1994	12:15	11.9	
SJRCW	2/15/1994	9:50	18.02	
SJRCW	3/14/1994	12:25	19.6	

Average =	25.1 (°C)
Maximum =	33.5 (°C)
Standard Dev =	5.5 (°C)
95 Percentile =	14.0 (°C)
Count	947.0

Ambient Temperature Data in St. Johns River near SECI Palatka Plant

Station	Date	Time	Temperature (°C)	Remark Code
SJRCW	4/12/1994	11:40	25	
SJRCW	5/16/1994	12:20	28.8	
SJRCW	6/14/1994	12:35	31	
SJRCW	7/12/1994	11:55	30.3	
SJRCW	8/16/1994	12:00	27.3	
SJRCW	9/13/1994	11:55	27.7	
SJRCW	10/17/1994	11:45	22.5	
SJRCW	11/18/1994	10:50	20.8	
SJRCW	12/13/1994	12:20	19	
SJRCW	1/19/1995	11:50	15.9	
SJRCW	3/15/1995	10:55	20.4	
SJRCW	4/11/1995	9:40	23.8	
SJRCW	5/16/1995	11:35	27.75	
SJRCW	6/13/1995	10:15	29.8	
SJRCW	7/11/1995	11:30	30.2	
SJRCW	8/15/1995	12:30	32.3	
SJRCW	9/13/1995	12:25	28.3	
SJRCW	10/17/1995	11:20	24.4	
SJRCW	11/16/1995	11:35	16.9	
SJRCW	12/13/1995	10:50	15.4	
SJRCW	1/16/1996	11:00	12	
SJRCW	2/13/1996	11:35	14.7	
SJRCW	3/13/1996	11:25	12.9	
SJRCW	4/16/1996	10:50	21.6	
SJRCW	5/14/1996	11:15	27.7	
SJRCW	6/12/1996	11:30	28.9	
SJRCW	7/16/1996	11:10	30.2	
SJRCW	8/21/1996	11:35	29.1	
SJRCW	9/17/1996	10:30	28.5	
SJRCW	10/15/1996	10:00	22.1	
SJRCW	11/13/1996	11:00	17.6	
SJRCW	12/3/1996	10:55	18.2	
SJRCW	1/14/1997	10:40	15.1	
SJRCW	2/11/1997	10:40	17	
SJRCW	3/11/1997	10:45	22.7	
SJRCW	4/15/1997	10:35	21.9	
SJRCW	4/15/1997	10:35	21.9	
SJRCW	5/13/1997	10:25	24.8	
SJRCW	5/13/1997	10:25	24.8	
SJRCW	6/10/1997	10:50	24.5	
SJRCW	6/10/1997	10:50	24.5	
SJRCW	7/8/1997	10:45	30	
SJRCW	7/8/1997	10:45	30	
SJRCW	8/5/1997	10:40	28.8	
SJRCW	8/5/1997	10:40	28.8	

Average =	25.1 (°C)
Maximum =	33.5 (°C)
Standard Dev =	5.5 (°C)
95 Percentile =	14.0 (°C)
Count	947.0

Ambient Temperature Data in St. Johns River near SECI Palatka Plant

Station	Date	Time	Temperature (°C)	Remark Code
SJRCW	9/16/1997	9:50	30.9	
SJRCW	9/16/1997	9:50	30.9	
SJRCW	10/9/1997	14:50	27.1	
SJRCW	11/11/1997	10:00	18.3	
SJRCW	12/9/1997	10:00	16	
SJRCW	1/13/1998	10:20	17	
SJRCW	2/10/1998	10:00	13.4	
SJRCW	3/17/1998	10:35	17.6	
SJRCW	4/14/1998	10:10	21.8	
SJRCW	5/12/1998	13:20	26.2	
SJRCW	6/9/1998	13:20	29.6	
SJRCW	7/14/1998	14:15	31.2	
SJRCW	8/18/1998	9:30	30.6	
SJRCW	9/8/1998	10:45	28.3	
SJRCW	9/8/1998	13:45	29.8	
SJRCW	10/15/1998	14:15	27.7	
SJRCW	11/10/1998	13:30	22.3	
SJRCW	12/15/1998	13:15	20.6	
SJRCW	1/12/1999	10:15	13.2	
SJRCW	2/9/1999	10:40	20.5	
SJRCW	3/10/1999	13:20	18.5	
SJRCW	4/27/1999	11:00	26.5	
SJRCW	5/10/1999	11:00	26	
SJRCW	6/7/1999	10:30	28.5	
SJRCW	7/12/1999	13:00	31.3	
SJRCW	8/10/1999	13:15	30.1	
SJRCW	9/28/1999	14:20	29.52	
SJRCW	10/12/1999	14:20	27.65	
SJRCW	11/9/1999	12:00	20.93	
SJRCW	12/6/1999	14:00	17.79	
SJRCW	1/10/2000	14:10	17.92	
SJRCW	2/7/2000	15:30	15.12	
SJRCW	3/6/2000	15:00	21.86	
SJRCW	4/10/2000	11:00	21.17	
SJRCW	5/8/2000	11:25	26.96	
SJRCW	6/12/2000	14:55	29.02	
SJRCW	7/10/2000	10:50	30.18	
SJRCW	8/7/2000	11:00	31.18	
SJRCW	9/11/2000	10:05	26.9	
SJRCW	10/11/2000	15:15	21.58	
SJRCW	11/13/2000	9:50	21.76	
SJRCW	12/14/2000	10:05	18.01	
SJRCW	1/9/2001	11:30	10.97	
SJRCW	2/15/2001	10:10	18.43	
SJRCW	3/15/2001	9:15	19.48	

Average =	25.1 (°C)
Maximum =	33.5 (°C)
Standard Dev =	5.5 (°C)
95 Percentile =	14.0 (°C)
Count	947.0

Ambient Temperature Data in St. Johns River near SECI Palatka Plant

Station	Date	Time	Temperature (°C)	Remark Code
SJRCW	4/10/2001	8:55	24.27	
SJRCW	5/14/2001	14:10	26.11	
SJRCW	6/11/2001	13:55	31.34	
SJRCW	7/11/2001	12:25	29.34	
SJRCW	8/9/2001	11:40	29.24	
SJRCW	9/11/2001	14:30	29.06	
SJRCW	10/9/2001	12:05	23.38	
SJRCW	11/20/2001	12:55	20.7	
SJRCW	12/5/2001	12:40	22.16	
SJRCW	1/8/2002	12:00	11.54	
SJRCW	2/11/2002	11:25	17.33	
SJRCW	3/11/2002	9:35	19.14	
SJRCW	4/8/2002	12:55	22.91	
SJRCW	5/13/2002	12:00	29.16	
SJRCW	6/10/2002	12:10	29.06	
SJRCW	7/15/2002	12:30	29.68	
SJRCW	8/12/2002	11:35	28.07	
SJRCW	9/12/2002	11:20	28.9	
SJRCW	10/7/2002	12:10	29.92	
SJRCW	11/11/2002	11:40	23.25	
SJRCW	12/9/2002	11:15	15.41	
SJRCW	1/6/2003	11:10	13	
SJRCW	2/11/2003	9:50	14.11	
SJRCW	3/11/2003	13:05	19.8	
SJRCW	3/11/2003	13:05	24.77	
SJRCW	4/14/2003	12:00	22.98	
SJRCW	8/12/2003	12:45	28.66	
SJRCW	9/8/2003	12:00	28.04	
SJRCW	10/7/2003	11:35	26.16	
SJRCW	11/12/2003	12:20	22.94	
SJRCW	11/12/2003	12:20	23.27	
SJRCW	11/12/2003	12:20	23.6	
SJRCW	12/10/2003	13:40	17.07	
SJRCW	1/12/2004	13:25	12.34	
SJRCW	1/12/2004	13:25	13.36	
SJRCW	1/12/2004	13:25	13.56	
SJRCW	2/9/2004	12:45	18.11	
SJRM70B	6/7/2000	10:10	28.08	
SJRM70B	6/7/2000	10:10	28.09	
SJRM70B	6/7/2000	10:10	28.1	
SJRM70B	6/14/2000	9:55	29.18	
SJRM70B	6/14/2000	9:55	29.24	
SJRM70B	6/14/2000	9:55	29.3	
SJRM70B	6/21/2000	9:10	29.92	
SJRM70B	6/21/2000	9:10	29.95	

Average =	25.1 (°C)
Maximum =	33.5 (°C)
Standard Dev =	5.5 (°C)
95 Percentile =	14.0 (°C)
Count	947.0

Ambient Temperature Data in St. Johns River near SECI Palatka Plant

Station	Date	Time	Temperature (°C)	Remark Code
SJRM70B	6/21/2000	9:10	29.98	
SJRM70B	6/28/2000	8:50	29.06	
SJRM70B	6/28/2000	8:50	29.09	
SJRM70B	6/28/2000	8:50	29.11	
SJRM70B	7/5/2000	10:25	28.88	
SJRM70B	7/5/2000	10:25	29.32	
SJRM70B	7/5/2000	10:25	29.77	
SJRM70B	7/12/2000	9:50	29.84	
SJRM70B	7/12/2000	9:50	29.85	
SJRM70B	7/12/2000	9:50	29.86	
SJRM70B	7/19/2000	10:30	29.72	
SJRM70B	7/19/2000	10:30	29.96	
SJRM70B	7/19/2000	10:30	30.19	
SJRM70B	7/26/2000	9:10	28.37	
SJRM70B	7/26/2000	9:10	28.43	
SJRM70B	7/26/2000	9:10	28.49	
SJRM70B	8/2/2000	7:55	30.4	
SJRM70B	8/2/2000	7:55	30.4	
SJRM70B	8/2/2000	7:55	30.41	
SJRM70B	8/23/2000	7:55	29.5	
SJRM70B	8/23/2000	7:55	29.5	
SJRM70B	8/23/2000	7:55	29.51	
SJRM70B	6/6/2001	8:30	29.03	
SJRM70B	6/6/2001	8:30	29.04	
SJRM70B	6/6/2001	8:30	29.04	
SJRM70B	6/27/2001	12:40	29.55	
SJRM70B	6/27/2001	12:40	29.64	
SJRM70B	6/27/2001	12:40	29.74	
SJRM70C	6/7/2000	10:20	28.09	
SJRM70C	6/7/2000	10:20	28.09	
SJRM70C	6/7/2000	10:20	28.09	
SJRM70C	6/14/2000	10:05	29.06	
SJRM70C	6/14/2000	10:05	29.18	
SJRM70C	6/14/2000	10:05	29.3	
SJRM70C	6/21/2000	9:15	29.96	
SJRM70C	6/21/2000	9:15	30.13	
SJRM70C	6/21/2000	9:15	30.3	
SJRM70C	6/28/2000	9:00	29.03	
SJRM70C	6/28/2000	9:00	29.05	
SJRM70C	6/28/2000	9:00	29.07	
SJRM70C	7/5/2000	10:35	28.8	
SJRM70C	7/5/2000	10:35	29.08	
SJRM70C	7/5/2000	10:35	29.36	
SJRM70C	7/12/2000	10:00	30.05	
SJRM70C	7/12/2000	10:00	30.14	

Average =	25.1 (°C)
Maximum =	33.5 (°C)
Standard Dev =	5.5 (°C)
95 Percentile =	14.0 (°C)
Count	947.0

Ambient Temperature Data in St. Johns River near SECI Palatka Plant

Station	Date	Time	Temperature (°C)	Remark Code
SJRM70C	7/12/2000	10:00	30.22	
SJRM70C	7/19/2000	10:40	29.94	
SJRM70C	7/19/2000	10:40	29.99	
SJRM70C	7/19/2000	10:40	30.33	
SJRM70C	7/26/2000	9:20	28.43	
SJRM70C	7/26/2000	9:20	28.6	
SJRM70C	7/26/2000	9:20	28.76	
SJRM70C	8/2/2000	8:10	30.2	
SJRM70C	8/2/2000	8:10	30.24	
SJRM70C	8/2/2000	8:10	30.27	
SJRM70C	8/23/2000	8:05	29.43	
SJRM70C	8/23/2000	8:05	29.44	
SJRM70C	8/23/2000	8:05	29.44	
SJRM70C	6/6/2001	8:40	28.99	
SJRM70C	6/6/2001	8:40	29	
SJRM70C	6/6/2001	8:40	29.02	
SJRM70C	6/27/2001	12:50	29.39	
SJRM70C	6/27/2001	12:50	29.6	
SJRM70C	6/27/2001	12:50	29.81	
SJRM70D	6/7/2000	10:35	28.3	
SJRM70D	6/7/2000	10:35	28.3	
SJRM70D	6/7/2000	10:35	28.31	
SJRM70D	6/14/2000	10:15	28.7	
SJRM70D	6/14/2000	10:15	28.81	
SJRM70D	6/14/2000	10:15	28.92	
SJRM70D	6/21/2000	9:25	30.45	
SJRM70D	6/21/2000	9:25	30.56	
SJRM70D	6/21/2000	9:25	30.67	
SJRM70D	6/28/2000	9:10	28.23	
SJRM70D	6/28/2000	9:10	28.31	
SJRM70D	6/28/2000	9:10	28.38	
SJRM70D	7/5/2000	10:45	28.73	
SJRM70D	7/5/2000	10:45	29.18	
SJRM70D	7/12/2000	10:15	29.3	
SJRM70D	7/12/2000	10:15	29.8	
SJRM70D	7/12/2000	10:15	30.3	
SJRM70D	7/19/2000	10:50	30.28	
SJRM70D	7/19/2000	10:50	30.55	
SJRM70D	7/19/2000	10:50	30.82	
SJRM70D	7/26/2000	9:30	28.38	
SJRM70D	7/26/2000	9:30	28.52	
SJRM70D	7/26/2000	9:30	28.65	
SJRM70D	8/2/2000	8:20	29.79	
SJRM70D	8/2/2000	8:20	29.81	
SJRM70D	8/2/2000	8:20	29.83	

Average =	25.1 (°C)
Maximum =	33.5 (°C)
Standard Dev =	5.5 (°C)
95 Percentile =	14.0 (°C)
Count	947.0

Ambient Temperature Data in St. Johns River near SECI Palatka Plant

Station	Date	Time	Temperature (°C)	Remark Code
SJRM70D	8/23/2000	8:15	29.54	
SJRM70D	8/23/2000	8:15	29.54	
SJRM70D	8/23/2000	8:15	29.55	
SJRM70D	6/6/2001	8:50	28.54	
SJRM70D	6/6/2001	8:50	28.62	
SJRM70D	6/6/2001	8:50	28.69	
SJRM70D	6/27/2001	12:55	29.83	
SJRM70D	6/27/2001	12:55	29.92	
SJRM70D	6/27/2001	12:55	30	
SJRM70E	6/7/2000	10:45	28.48	
SJRM70E	6/14/2000	10:25	28.85	
SJRM70E	6/21/2000	9:40	30.7	
SJRM70E	6/28/2000	9:20	28	
SJRM70E	7/5/2000	10:55	29.42	
SJRM70E	7/12/2000	10:30	30.38	
SJRM70E	7/19/2000	11:00	31.01	
SJRM70E	7/26/2000	9:45	28.26	
SJRM70E	8/2/2000	8:30	29.74	
SJRM70E	8/23/2000	8:25	29.43	
SJRM70E	8/23/2000	8:25	29.43	
SJRM70E	8/23/2000	8:25	29.43	
SJRM70E	6/6/2001	9:05	28.63	
SJRM70E	6/27/2001	13:05	30.53	
SJRM70W	6/7/2000	10:00	27.72	
SJRM70W	6/14/2000	9:45	29.1	
SJRM70W	6/21/2000	9:00	29.77	
SJRM70W	6/28/2000	8:40	28.66	
SJRM70W	7/5/2000	10:10	29.4	
SJRM70W	7/12/2000	9:45	29.99	
SJRM70W	7/19/2000	10:20	30.2	
SJRM70W	7/26/2000	8:55	27.94	
SJRM70W	8/2/2000	7:35	30.4	
SJRM70W	8/23/2000	7:35	28.62	
SJRM70W	6/6/2001	8:10	28.83	
SJRM70W	6/27/2001	12:30	30.26	
SJRM74B	6/7/2000	9:20	28.43	
SJRM74B	6/7/2000	9:20	28.44	
SJRM74B	6/7/2000	9:20	28.44	
SJRM74B	6/14/2000	9:15	29.14	
SJRM74B	6/14/2000	9:15	29.25	
SJRM74B	6/14/2000	9:15	29.36	
SJRM74B	6/21/2000	8:30	30.71	
SJRM74B	6/21/2000	8:30	30.73	
SJRM74B	6/21/2000	8:30	30.75	
SJRM74B	6/28/2000	8:15	28.21	

Average =	25.1 (°C)
Maximum =	33.5 (°C)
Standard Dev =	5.5 (°C)
95 Percentile =	14.0 (°C)
Count	947.0

Ambient Temperature Data in St. Johns River near SECI Palatka Plant

Station	Date	Time	Temperature (°C)	Remark Code
SJRM74B	7/5/2000	9:35	28.91	
SJRM74B	7/5/2000	9:35	29.08	
SJRM74B	7/5/2000	9:35	29.26	
SJRM74B	7/12/2000	9:10	29.83	
SJRM74B	7/12/2000	9:10	29.92	
SJRM74B	7/12/2000	9:10	30.01	
SJRM74B	7/19/2000	9:45	29.77	
SJRM74B	7/19/2000	9:45	29.95	
SJRM74B	7/19/2000	9:45	30.13	
SJRM74B	7/26/2000	8:25	28.55	
SJRM74B	7/26/2000	8:25	28.58	
SJRM74B	7/26/2000	8:25	28.6	
SJRM74C	6/7/2000	9:10	28.03	
SJRM74C	6/7/2000	9:10	28.03	
SJRM74C	6/7/2000	9:10	28.03	
SJRM74C	6/14/2000	9:00	28.8	
SJRM74C	6/14/2000	9:00	28.82	
SJRM74C	6/14/2000	9:00	28.84	
SJRM74C	6/21/2000	8:20	30.63	
SJRM74C	6/21/2000	8:20	30.64	
SJRM74C	6/21/2000	8:20	30.65	
SJRM74C	6/28/2000	8:00	28.52	
SJRM74C	6/28/2000	8:00	28.53	
SJRM74C	6/28/2000	8:00	28.54	
SJRM74C	6/28/2000	8:15	28.2	
SJRM74C	6/28/2000	8:15	28.21	
SJRM74C	7/5/2000	9:15	28.86	
SJRM74C	7/5/2000	9:15	29.18	
SJRM74C	7/5/2000	9:25	29.02	
SJRM74C	7/12/2000	9:00	29.7	
SJRM74C	7/12/2000	9:00	29.72	
SJRM74C	7/12/2000	9:00	29.73	
SJRM74C	7/19/2000	9:30	29.55	
SJRM74C	7/19/2000	9:30	29.81	
SJRM74C	7/19/2000	9:30	30.07	
SJRM74C	7/26/2000	8:10	28.1	
SJRM74C	7/26/2000	8:10	28.1	
SJRM74C	7/26/2000	8:10	28.1	
SJRM74D	6/7/2000	9:00	27.98	
SJRM74D	6/7/2000	9:00	27.98	
SJRM74D	6/7/2000	9:00	27.98	
SJRM74D	6/14/2000	8:50	28.62	
SJRM74D	6/14/2000	8:50	28.64	
SJRM74D	6/14/2000	8:50	28.67	
SJRM74D	6/21/2000	8:05	30.51	

Average =	25.1 (°C)
Maximum =	33.5 (°C)
Standard Dev =	5.5 (°C)
95 Percentile =	14.0 (°C)
Count	947.0

Ambient Temperature Data in St. Johns River near SECI Palatka Plant

Station	Date	Time	Temperature (°C)	Remark Code
SJRM74D	6/21/2000	8:05	30.52	
SJRM74D	6/21/2000	8:05	30.52	
SJRM74D	6/28/2000	7:55	28.49	
SJRM74D	6/28/2000	7:55	28.49	
SJRM74D	6/28/2000	7:55	28.49	
SJRM74D	7/5/2000	9:15	29.03	
SJRM74D	7/5/2000	9:15	29.2	
SJRM74D	7/5/2000	9:15	29.38	
SJRM74D	7/12/2000	8:50	29.82	
SJRM74D	7/12/2000	8:50	29.84	
SJRM74D	7/12/2000	8:50	29.86	
SJRM74D	7/19/2000	9:15	29.53	
SJRM74D	7/19/2000	9:15	29.55	
SJRM74D	7/19/2000	9:15	29.57	
SJRM74D	7/26/2000	7:55	28.12	
SJRM74D	7/26/2000	7:55	28.12	
SJRM74D	7/26/2000	7:55	28.13	
SJRM74E	6/7/2000	8:45	27.49	
SJRM74E	6/14/2000	8:40	28.2	
SJRM74E	6/14/2000	8:40	28.25	
SJRM74E	6/14/2000	8:40	28.3	
SJRM74E	6/21/2000	7:50	29.76	
SJRM74E	6/21/2000	7:50	29.84	
SJRM74E	6/21/2000	7:50	29.92	
SJRM74E	6/28/2000	7:40	27.88	
SJRM74E	6/28/2000	7:40	27.97	
SJRM74E	6/28/2000	7:40	28.05	
SJRM74E	7/5/2000	9:05	28.73	
SJRM74E	7/5/2000	9:05	28.84	
SJRM74E	7/5/2000	9:05	28.96	
SJRM74E	7/12/2000	8:40	29.76	
SJRM74E	7/12/2000	8:40	29.79	
SJRM74E	7/12/2000	8:40	29.81	
SJRM74E	7/19/2000	9:00	29.45	
SJRM74E	7/19/2000	9:00	29.46	
SJRM74E	7/19/2000	9:00	29.47	
SJRM74E	7/26/2000	7:30	28.24	
SJRM74W	6/7/2000	9:30	28.25	
SJRM74W	6/14/2000	9:25	30.12	
SJRM74W	6/21/2000	8:35	30.58	
SJRM74W	6/21/2000	8:35	30.59	
SJRM74W	6/21/2000	8:35	30.6	
SJRM74W	6/28/2000	8:20	28.51	
SJRM74W	7/5/2000	9:45	29.45	
SJRM74W	7/12/2000	9:20	30.31	

Average =	25.1 (°C)
Maximum =	33.5 (°C)
Standard Dev =	5.5 (°C)
95 Percentile =	14.0 (°C)
Count	947.0

Ambient Temperature Data in St. Johns River near SECI Palatka Plant

Station	Date	Time	Temperature (°C)	Remark Code
SJRM74W	7/19/2000	9:55	30.4	
SJRM74W	7/26/2000	8:35	28.57	

Average =	25.1 (°C)
Maximum =	33.5 (°C)
Standard Dev =	5.5 (°C)
95 Percentile =	14.0 (°C)
Count	947.0

SECTION 8.0

St. Johns River Florida Water Management District - Todd Eller

1. **The application requests 33.2 million gallons per day (MGD) or 12,136 million gallons per year (MGY) of surface water withdrawal from the St. Johns River for various uses at the site. The application also indicates 8.6 mgd or 3.138 mgy of surface water returned to the St. Johns River. This results in a net lost of 24.6 mgd or 8,979 mgy of surface water from the St. Johns River. Please provide reasonable assurance that the proposed surface water withdrawals from the St. Johns River will not cause adverse impacts to the River and associated wetlands. Please provide documentation that the proposed withdrawals from the St. Johns River will not harm individuals or populations of the endangered West Indian manatee (*Trichechus manatus*). [Paragraph 10.3; (d) A.H.].**

   The withdrawals and returns associated with SGS Units 1 and 2 have already been permitted, and the SGS Unit 3 SCA only requests authorization to withdraw the additional amounts for Unit 3. However, in the interest of addressing cumulative impacts, this response will address the combined withdrawal of all 3 units.

   Discussions with SJRWMD engineering staff (Dr. Peter Sucsy) concluded that the withdrawal rates proposed for Units 1, 2, and 3 are so insignificant relative to the river flow rates, that the use of the EFDC model is not warranted to provide reasonable assurance relative to adverse impacts (to wetlands and salinity impacts). Figure 8-1 depicts the location of the stream gaging stations within the Upper and Lower St. Johns River. The nearest stream gaging station to the SGS site is Number 02244040 at Buffalo Bluff near Satsuma, Florida, 89 miles upstream from the river mouth. USGS notes that the flows recorded at the Buffalo Bluff station are actually the net value of "much larger upstream and downstream discharges." This is because the St. Johns River at the SGS (about 73 miles upstream of the river mouth) is actually tidal; in fact, National Ocean Service (Tide Tables, 1996, High and Low Water Predictions, East Coast of North and South America) reports a mean tidal range of 1.09 feet at Palatka. Daily flow records are available at the Buffalo Bluff station for the Period of Record (POR) October 1992, through September 2004 (12 years). A flow frequency analysis of the data has been performed, and is shown on Figure 8-2. This analysis determined that the 2 in 10 year low flow value based on these data is approximately 849 cfs.

   Because of the short POR at Buffalo Bluff, Seminole has also performed analysis on data available from USGS Station No. 02236000 St. Johns River near Deland. The Unit 1 & 2 SCA (Section 2.3.1) determined that the station near Deland is the closest upstream station relatively unaffected by tidal action. Flow at the Deland station can therefore be used to approximate the fresh water flow further downstream. Data are available for the POR from October, 1933, through September, 2004 (71 years). A flow frequency analysis of the data has been performed, and is shown on Figure 8-3. This analysis determined that the 2 in 10 year low flow value based on these data is about 1,220 cfs.

   Seminole has estimated that an average net demand of water from the St. Johns River for SGS Units 1, 2, and 3 is approximately 17,120 gpm (23,089 gpm intake – 5,970 gpm discharge), or 24.7 MGD (38 cfs) - see Figure 8-4. This demand represents about 4.5 percent of the 2 in 10 year low flow at Buffalo Bluff, and about 3.1 percent of the 2 in 10 year low flow at Deland.

   Seminole has estimated that a peak net demand of water from the St. Johns River for SGS Units 1-3 is approximately 21,613 gpm (33,877 gpm intake – 12,264 gpm discharge), or 31.1 MGD (48

cfs). This represents about 5.7 percent of the 2 in 10 year low flow at Buffalo Bluff, and about 3.9 percent of the 2 in 10 year low flow at Deland.

SGS Unit 1, 2, and 3

Percent of 2 in 10 year low flow

Average Net Demand	**Buffalo Bluff**	**Deland**
17,120 (gpm)/24.7 (MGD)	4.5%	3.1%
Peak Net Demand (gpm)		
21,613 (gpm)/31.1 (MGD)	5.7%	3.9%

The recorded flows are only a small fraction of the actual tidally-influenced flows. St. Johns River Water Management District's Technical Publication SJ95-9, Volume 3 of the Lower St. Johns River Basin Reconnaissance, Hydrodynamics and Salinity of Surface Water, by Frederic W. Morris IV, 1995, describes the flows in the St. Johns River, and mentions that " ... the fresh-water discharge per second is only 6 percent of the maximum value of the tidal flow and the total fresh-water discharge during one-half tidal period amounts to about 9.2 percent of the tidal prism..." Conservatively factoring this information into the above analysis, the peak net withdrawal requested for SGS Units 1 - 3 is no more than 0.6 percent or 0.4 percent of the actual flow as measured at Buffalo Bluff and at Deland, respectively. Similarly, the average net withdrawal is no more than 0.5 percent and 0.3 percent of the actual flow as measured at Buffalo Bluff and at De Land, respectively. Based on these statistics, which indicate the SGS (including the operation of Unit 3) will not withdraw more than about ½ percent of the river flow, impacts on river salinity and adjacent wetlands are expected to be insignificant, and less than the natural variation.

The change in water level that would be associated with the reduction in flow due to the net withdrawal of the 3 units at Seminole Generating Station can be estimated by preparing a curve-fit of water level in the river vs. flow, which has been done for the stations near Buffalo Bluff (Figure 8-6) and Deland (Figure 8-7). The black lines on these two figures represent linear curve-fits of the data, using equations of the form $Y = Mx + B$, where Y is the water level, X is the flow rate, M is the slope of the curve, and B is the Y-intercept. The estimated change in water level for a given change in flow can be calculated as simply the product of the slope M times the change in flow rate. Results are shown in the following table:

	Average Withdrawal	**Maximum Withdrawal**
Flow in CFS	38 cfs	48 cfs
Change near Buffalo Bluff (M = .00002)	.00076 feet	.00096 feet
Change near Deland (M = .0003)	.0114 feet	.0144 feet

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Wetland vegetation within the littoral zone of the St. Johns River generally adapt to fluctuations in water level, tolerating periods of inundation and exposure with tidal cycles. The insignificant reduction in flow resulting from the addition of SGS Unit 3 is well within the natural tidal fluctuations, and no adverse impacts are anticipated upon wetland communities adjacent to the river.

As described in Section 5.1.2 of the SGS Unit 3 SCA, during the permitting of Units 1 and 2, the U.S. Fish and Wildlife Service determined that the construction and operation of those Units would "neither jeopardize the existence of the manatee nor adversely affect its habitat." Previous survey data indicate that the area of the St. Johns River in the vicinity of the intake structure is not a manatee congregation area, and no adverse impacts to the manatee have occurred during the construction and operation of Units 1 and 2. A search of the Florida Natural Areas Inventory confirmed that there were/are no occurrences of threatened and endangered or rare species in the vicinity of the SGS intake (See Attachment 8-1). Additionally, the changes associated with Unit 3 are so minimal it is reasonable to conclude that there will continue to be no impacts to manatees in this area of the St. Johns River.

2. **Please submit a map delineating all the existing and proposed surface water pumps for this project. This map must be a USGS quad map that includes the project's property boundary. Please provide the following information for each of these pumps; pump number, pump capacity (gpm), operation in hours per week, status (date if proposed), name of source, and type of use. [Paragraph 10.3; (a) (b) (c) (d) A.H.]**

The location of the river water pumps (house) is shown on Figure 8-5. Currently, there are 5 pumps in service each with a capacity to pump up to 5500 gpm of water from the St. Johns River, (i.e., River Pump 1, River Pump 2, etc.) to supply cooling water and plant service water. Four of the five pumps operate 24 hours a day, 7 days a week. One pump is rotated out of service every week.

The existing river water pumps will be replaced with larger capacity pumps sized for operation of Units 1, 2, and 3. The pumps will be operational May 1, 2012 and continue to supply cooling water and plant service water. Detailed design information will be provided post certification.

3. **The District requires the most efficient use of water for each process. The application indicates a request for 33.2 mgd of surface water from the St. Johns River for various uses (processes) at the site. Please substantiate the amount of surface water requested by providing the methodology used for determining the amount of water necessary for each use. This shall include an explanation of the water requirements for each process by providing a detailed description of each process with an emphasis on water use requirements [Paragraph 10.3; (a) (b) A.H.].**

As discussed in the Water Supply Alternatives Analysis provided in Appendix 10.8 of the SCA, and shown on the water use diagram (Figure 8-4 attached, which replaces Figure 3.5.0-1 of the SCA), SGS Unit 3 will utilize water from the St. Johns River and the Floridan aquifer as water supply sources for plant operations. Several alternative water supply sources were evaluated including: 1) groundwater resources, 2) surface water resources, 3) reclaimed water supply, 4) industrial reuse and 5) municipal water supply. The alternatives analyses concluded that surface water from the St. Johns River (annual average of 33.2 MGD and an instantaneous maximum of 48.7 MGD, as shown on Figure 8-4) and groundwater from the Upper Floridan

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Aquifer (annual average withdrawal of 0.55 MGD and a peak daily withdrawal of 3.6 MGD as shown on Figure 8-4) continue to be the most feasible sources of water supply based on water quality requirements and water supply needs.

The principal surface water uses within the proposed SGS Unit 3 are:

- Makeup water to replace net evaporation and blowdown from the cooling tower heat dissipation system;
- Makeup water to replace net evaporation and blowdown/rinse waters from the scrubber system;
- Makeup water to replace evaporation from the bottom ash handling system;
- Boiler blowdown quench;
- General "service" water for washdowns; and
- Coal pile dust suppression.

The largest water use is cooling tower makeup. There are two reasons this water use is necessary:

- First, the efficiency of a steam turbine-generator increases as its outlet pressure decreases. If the steam is exhausted to the atmosphere, it condenses at 212° F, which is the condensing point of steam at atmospheric pressure. By using a water-cooled condenser, the steam can be condensed at a lower pressure and temperature, typically less than 1.5 psi and less than 115° F; and
- Second, because the boiler water is very high quality, condensing it in a closed system also allows recycling of that water. A water-cooled condenser is essentially a large metal box with thousands of small diameter tubes passing through it. Steam is introduced into the box and water, known as "circulating water", is run through the tubes. When the steam contacts the outer wall of a tube, heat is drawn from it, through the tube wall, into the water. This causes the steam to condense, and the temperature of the water in the tube to rise. The condensed steam, called "condensate", is collected in the bottom of the box, and recycled. The warmed water is sent to the heat dissipation device, in this case the cooling tower, to remove the heat and lower the temperature of the circulating water. The cooled water is then recirculated back to the condenser. It should be pointed out that the EPA has determined that the flow reduction relative to non-recirculating cooling systems of such recirculating heat dissipation systems are Best Available Technology for minimizing the environmental impacts of power plants on aquatic biota.

In the cooling tower process, circulating water carrying rejected heat from the plant is brought into contact with atmospheric air drawn into the tower. As the heated water falls through the tower, the water is cooled by the incoming air. The air, passing over the water, vaporizes a small percent of the water, thereby cooling the remaining water while the air is being heated as it flows

to the tower exits. The heat exchange between air and water through direct contact derives from two types of heat transfer: (a) the evaporative cooling of water, and (b) the convective heating of air. The total amount of heat transferred is directly proportional to the amount of power the plant is producing, while the ratio between evaporative and convective heat transfer depends on the ambient air meteorological conditions (dry bulb temperature and relative humidity). The methodology with which Seminole has estimated the cooling tower evaporation in section 3.5 of the SCA (Tables 3.5.1-2 and 3.5.1-3) is the heat-and-mass balance method as derived by Leung and Moore ("Water Consumption Determination for Steam Power Plant Cooling Towers: A Heat-and-Mass Balance Method", Paul Leung and Raymond E. Moore, Combustion, November, 1970). This same methodology has been used to estimate evaporation rates from the cooling towers of several other generating stations certified in Florida under the Power Plant Siting Act including:

- St. Johns River Power Park;
- Purdom Unit 8;
- Manatee Unit 3;
- Martin Unit 8; and
- Turkey Point Unit 5.

The SGS Unit 3 cooling tower has an average net consumptive use of (6,847gpm-1,938gpm)/750 MW = 6.54 gpm/MW, which is more water-efficient than the Unit 1 and 2 average net consumptive use of (10,180 gpm/1300MW) = 7.83 gpm/MW. Unit 3 will be more water-efficient because it will be a supercritical unit, producing more MW of power per unit of waste heat produced. Units 1 and 2 are within industry standards for cooling tower net consumptive use. For example, in the St. Johns River Power Park Site Certification Application, it was estimated the net consumptive use of their cooling towers would be (10,500 gpm/1200 MW) = 8.75 gpm/MW.

In addition to evaporative losses, heat dissipation by cooling tower requires that a blowdown be discharged, and replaced with ambient water, to eliminate the buildup of dissolved solids in the cooling tower water. This is necessary to prevent scaling on heat transfer surfaces, most often caused by sulfate and silica-based compounds. As noted in Comment 1, the quantity of water withdrawn to replace blowdown is compensated for by the discharge of the same volume of blowdown. The amount of blowdown discharged depends not only on the evaporation rate (evaporation concentrates the dissolved solids present in the ambient water), but also on the concentration of each constituent in the makeup water.

The second largest use of surface water within the plant is for the Flue Gas Desulfurization (FGD) or scrubber system. As described in Section 3.4.3.3 of the SCA, wet limestone forced-oxidation is not only the Best Available Control Technology for reducing air emissions of sulfur dioxide, but also converts what otherwise would be a waste product requiring landfilling into a usable product, gypsum suitable for wallboard manufacturing. In the wet limestone forced-oxidation system, a limestone slurry (in water) is brought into contact with the hot flue gases, causing the SO_2 in those flue gases to be absorbed by the liquid in the slurry. As in the cooling tower, contact with the moving flue gases causes evaporation of the slurry liquid. Seminole is proposing to collect all of the plant-generated wastewaters except for cooling tower blowdown, and treat them to be used as

scrubber makeup water. Even the blowdown from the scrubbers will be collected, treated in the ZLD system, and recycled as either scrubber makeup, or as feed water to the demineralizers. Surface waters proposed to be used as scrubber makeup are only in the amount by which the recycled waters fall short of the scrubber requirements. Evaporation in the scrubbers can be calculated from the volumetric flow rates and temperatures of the flue gases and the scrubber slurry. The quantities of slurry water lost in the scrubber solids (gypsum) and fly ash (removed by the electrostatic precipitator) are estimated empirically from performance at other similar facilities such as units 1 and 2. The Unit 3 scrubber system will consume an average of ((863gpm + 45 gpm)/750 MW) = 1.21 gpm/MW, as compared to ((1,406 gpm + 200 gpm)/1300 MW) = 1.24 gpm/MW for Units 1 and 2.

The third largest use of surface water is as makeup water to replace water lost in the bottom ash system, primarily due to evaporation, but also to water bound into the ash produced. Bottom ash and slag are recovered from the "bottom" of the boiler where the ash hopper is located. Cooling of the bottom ash and slag is accomplished by the water with which the ash hopper is filled. This cooling is necessary to reduce the ash temperature so that it can be handled safely. Seminole presently sells this material to concrete and concrete block manufactures. Surface water, rather than recycled wastewaters, is used in this system to maintain the quality of the product so that it can be reused, rather than sent to a landfill. The amount of water required is accurately determined by experience with similar units. Unit 3 will consume an average of (102 gpm/750 MW) = 0.136 gpm/MW, as compared with (178 gpm/1300 MW) = 0.136 gpm/MW for Units 1 and 2.

Boiler blowdown quench is the fourth largest proposed surface water use. This quench water is necessary to condense and cool blowdown of boiler water from Units 1 and 2, so that it can be recycled to the wastewater treatment system and then as scrubber makeup. Surface water is used because available wastewaters have intermittent flows. Unit 3 will be what is known as a "once-through" boiler, meaning it does not produce boiler blowdown and therefore consumes no water for boiler blowdown quench.

General "service" water is used for washdowns to minimize the dissolved solids in the washdown water, thereby preventing excessive dissolved salts from being deposited on surfaces being washed. Quantities of washdown water required are estimated empirically based on experience with Units 1 and 2. Unit 3 average service water use will be (20 gpm/750 MW) = .0267 gpm/MW, as compared to (60 gpm/1300 MW) = 0.0462 gpm/MW for the existing Units 1 and 2.

Coal pile and coal handling equipment dust suppression is required to minimize the emission of fugitive Particulate Matter (dust), as described in Section 3.4.3.7 of the SCA. Surface water is used for this purpose to minimize the amount of dissolved minerals that will be added to the fuel. The estimated quantity of water required is based on experience with the existing coal pile. Units 1 and 2 consume approximately (33.3 gpm/1300 MW) = 0.026 gpm/MW on average; Unit 3 is expected to be slightly more water-efficient at (16.7 gpm/750 MW) = 0.022 gpm/MW.

4. Please provide a Water Conservation Plan for all processes that use surface water at this site. [Paragraph 10.3; (e) A.H.]

As previously stated, the primary use of surface water is for the condenser cooling system where water is recycled and cooled in the cooling towers. Makeup water is added as cooling water evaporates and to control the levels of total dissolved solids in the system.

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Other uses of surface waters occurs with cooling of bottom ash, makeup water to the Flue Gas Desulfurization (FGD) system, washing of gypsum to remove chlorides, spraying of the coal pile to reduce dust, and general washing of plant roads and equipment to prevent dust. Upgrades to Units 1 and 2 will include the addition of a carbon burn out (CBO) system that will use minor amounts of surface water.

The amount of surface water used at the facility is controlled by several factors including weather and whether the units are operating. Rain decreases the amount of dust and allows for reduced uses of surface water for dust control. If a unit is not operating less water is required for cooling, the FGD system, and gypsum washing.

The SGS Unit 3 project has implemented recycling/reuse and various conservation practices in order to minimize water use requirements.

Recycling of surface water is common at the SGS. Cooling water is recycled 3-4 times to the cooling towers before discharge to the river. The number of cycles is based on the quantity of dissolved solids in the surface water, the cleaner the river water the more times the cooling water can be recycled. The FGD system also recycles water approximately 10-12 times based on the amount of chlorides in the water. Stormwater is collected in the active portion of the landfill area and used as makeup to the FGD system.

Maintenance is also an important part of water use minimization. Pumps and pump seals are maintained on a regular to minimize leaking.

Several processes have been identified that will allow conservation of surface water use. These systems are being investigated as to whether these seals could be replaced with seals that no longer utilize water.

The FGD system is also currently required to operate at relatively low chloride levels due to limitations on the water quality that can be discharged to the river. The addition of Unit 3 will allow the construction of a zero liquid discharge system (ZLD) that will be operational in 2012. This system will allow the FGD system to be operated at a higher chloride level than currently is required which will minimize the makeup to the system. The ZLD will also allow all wastewater at the facility to be treated and most will be reused in the various systems such as makeup to the FGD system.

A new bottom ash system is also being evaluated that will minimize surface water use. The current system is designed with a wet system to overflow water to cool and convey bottom ash. New bottom ash systems are designed to use less water for cooling. Unit 3 will be evaluated to minimize surface water usage.

SGS Unit 3 is expected to begin commercial operation in May 1, 2012. Seminole will implement a Water Conservation Plan, in accordance with the requirements of Section 12.3.2 of the SJRWMD Applicant's Handbook prior to the operation of SGS Unit 3. In addition to the current water conservation activities discussed above, the SGS Unit 3 Water Conservation Plan will include the following components designed to conserve water:

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a) An audit of the amount of water used in the various operational processes. Implementation of a leak detection and repair program if the audit results indicate such measures would be cost effective.

b) A program for making technological, procedural and/or programmatic improvements to the SGS facilities and processes to decrease water consumption.

c) Development and implementation of an employee awareness and consumer education program concerning water conservation.

d) Periodic assessment and revision of the water conservation plan.

A schedule for development and implementation of the water conservation plan will be developed after SGS Unit 3 is operational and opportunities for water conservation can be identified. A report which details the progress of plan implementation will be submitted to the District in accordance with the identified schedule.

5. **The application states that numerous temporary dewatering activities conducted at various locations throughout the site will last approximately 16 months. Please answer the following questions concerning these dewatering activities:**

   a. **Please describe what procedures you propose to implement at the site to ensure that dewatering will not cause or contribute to flood damage. This should include the proposed rate and duration of water pumped for dewatering.**

   During construction that requires excavation to depths below the water table, measures must be in place to lower the water table allowing the construction to be completed in the dry (dewatering). These measures may consist of pumping from sumps in the excavation, installation of well points, the installation of large vertical wells or a combination of the above to lower the water table.

   The selection of the dewatering method depends on several factors including:

   - Depth of excavation (below the water table);
   - Areal extent of the excavation;
   - Nature of the subsurface materials;
   - Proximity of sources of recharge (surface lakes, etc); and
   - Critical nature of the construction.

   When dewatering is determined to be required for a structure, geotechnical information will be collected to help determine the dewatering method, approximate sizing, and design. For structures of a less critical nature (where a failure could be easily repaired) such as a pipeline, and where the subsurface materials are low to moderate permeability, pumping from sumps may be sufficient.

For critical construction requiring dewatering, additional geotechnical information is developed to determine the appropriate method along with analysis for sizing and design. Design considerations would include well or well point depth, size, pumping rate, spacing, length of time needed, type of power, the need for standby power, and water discharge locations.

Typically, pumping from sumps may produce turbid water that would require the discharge be routed to a settling pond (or storm water pond) prior to discharge. Wells and well points generally produce water of low turbidity and can be discharged with adequate erosion protection to nearby water courses depending on state and local regulations.

Seminole does not anticipate that there will be offsite impacts and flood damage as a result of dewatering activities. The details for dewatering will be determined upon completion of the geotechnical investigation post certification. Authorization for dewatering can be granted following review of the detailed dewatering plan.

b. **Please provide a map delineating the portions of the property where the dewatering activities will take place, and the extent of the proposed excavations, both vertically and laterally. Also include locations and dimensions of the proposed ponds that are proposed to receive dewatering discharges.**

The locations where dewatering may be required include the areas for the boiler, turbine and cooling tower. The details for dewatering will be determined upon completion of the geotechnical investigation post certification.

c. **Please provide the proposed sample locations and capacities (gpm) of proposed dewatering pump(s).**

The details for dewatering will be determined upon completion of the geotechnical investigation post certification.

d. **Please provide a detailed description of turbidity treatment and erosion control measures at the discharge point(s). Please fully describe the means to be taken to ensure there will not be turbid discharge or erosion downstream of the discharge point(s). Will there be use of silt screens, bales, socks, and/or discharge of water through a culvert before reaching receiving water bodies?**

The details for dewatering will be determined upon completion of the geotechnical investigation post certification.

e. **Please submit a map showing the extent of the projected drawdown in the surficial aquifer due to dewatering. Please be aware that based on the projected drawdown and the location of wetland areas and existing legal users in relation to the withdrawal point(s), a demonstration that drawdowns due to dewatering will not result in adverse impacts to wetlands or existing legal users is required. [Paragraph 10.3; (d) (i) (k) A.H.]**

SECTION 8.0

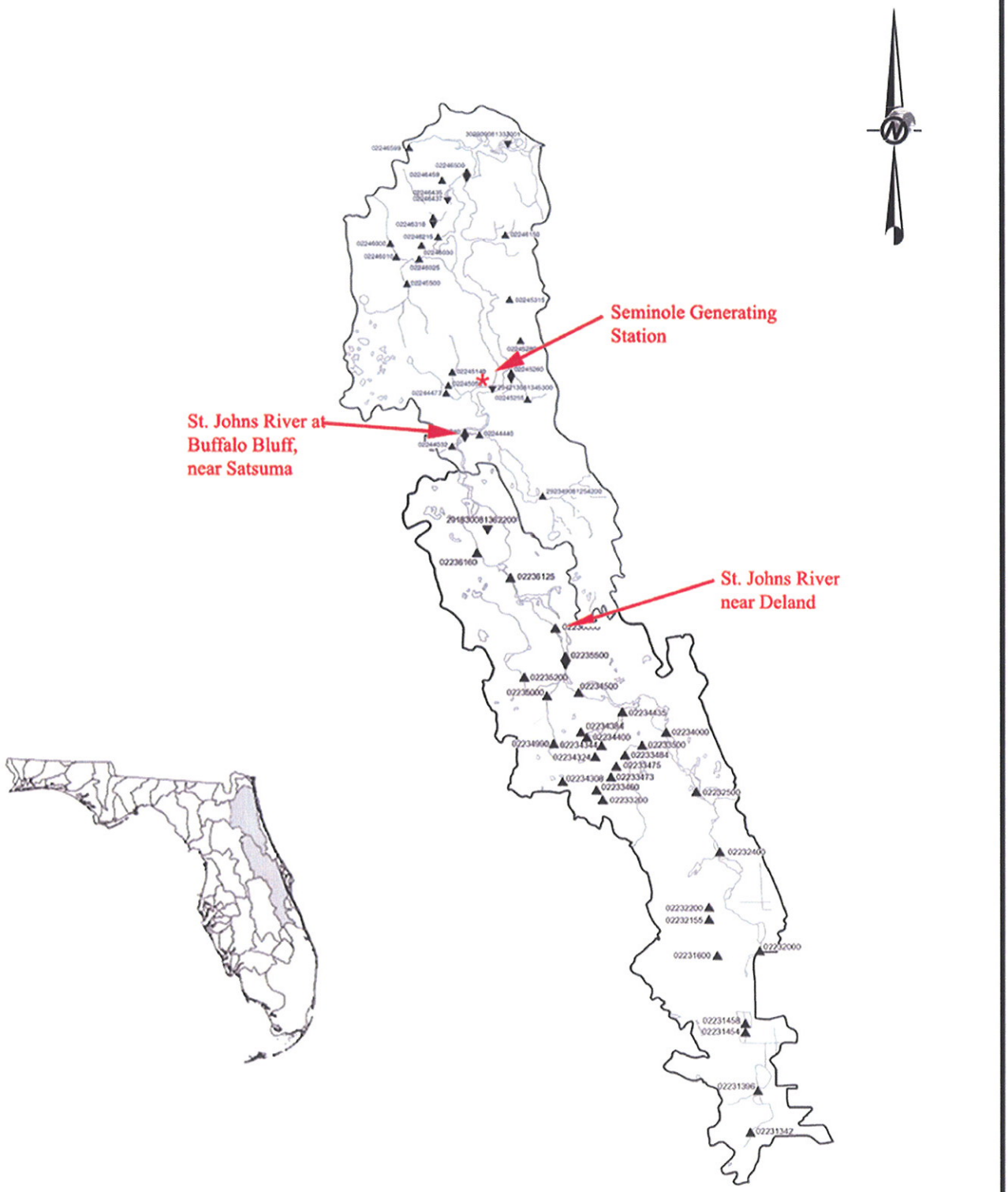
St. Johns River Florida Water Management District - Todd Eller

SGS Unit 3 is expected to go into service approximately May 1, 2012. Seminole is willing to accept a Condition of Certification to prepare and submit a Dewatering Plan, in accordance with the requirements of Section 10.3 of the SJRWMD Applicant's Handbook: Consumptive Uses of Water, prior to construction of SGS Unit 3.

This plan shall include a map showing the locations of dewatering systems and associated projected drawdowns. If projected drawdowns initially appear to cause adverse impacts to other legal users or wetlands, mitigation measures (e.g. recharge via rim-ditches for wetlands) will be proposed and included in the dewatering plan.

The details for dewatering will be determined upon completion of the geotechnical investigation post certification.

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0 10 20 MILE

0 10 20 KILOMETER

EXPLANATION

▲ 02233200 STREAM GAGING STATION AND NUMBER

Source: USGS, 2004; Golder, 2006

PROJECT

SEMINOLE ELECTRIC COOPERATIVE, INC.
PUTNAM COUNTY, FLORIDA

TITLE

UPPER AND LOWER ST. JOHNS RIVER
STREAM GAGING STATION

Golder Associates
Tampa, Florida

PROJECT No.		053-9540	FILE No.	Figure 8-1.pdf	
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CADD	HF	6/22/06	FIGURE 8-1		
CHECK	MM	6/22/06			
REVIEW					

Drawing file: Figure 8-1.pdf June 12, 2006 12:15 PM

Figure 8-2
St. Johns River at Buffalo Bluff Flow Frequency Analysis

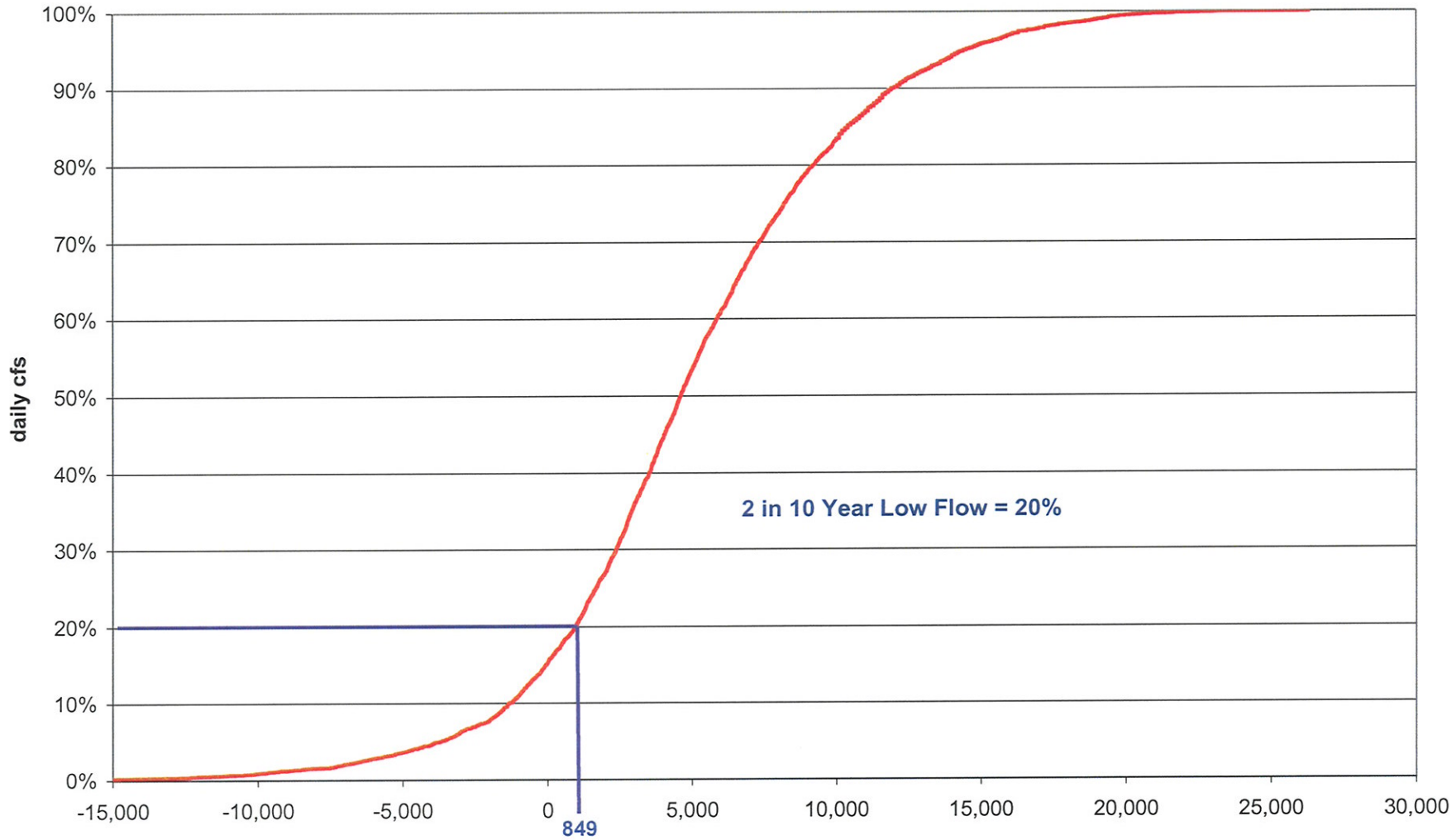
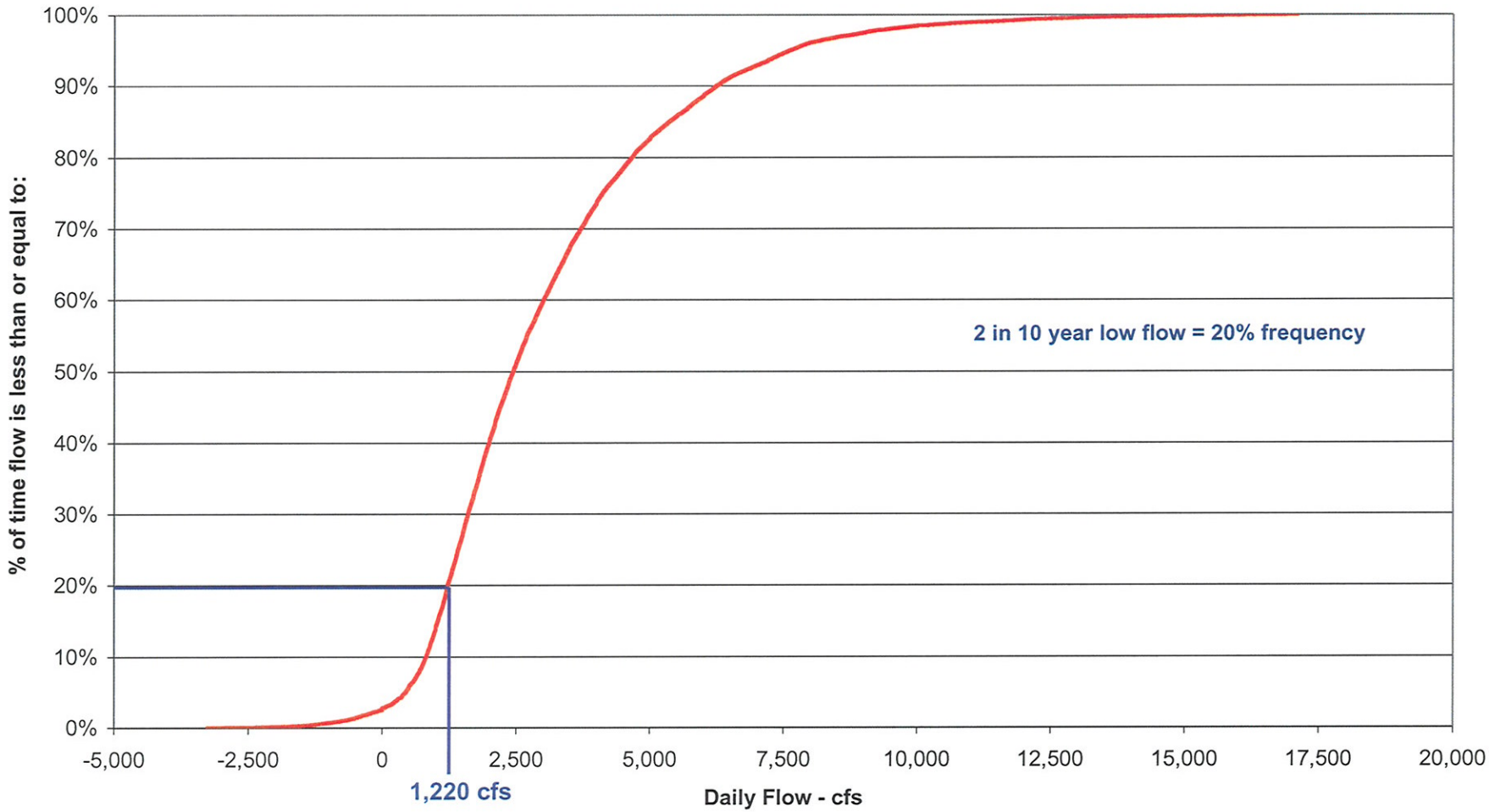


Figure 8-3
St. Johns River at Deland
Flow Frequency Analysis



1 Average flows in gpm
2 Peak flows in parentheses in gpm
3 Carbon Burn Out System
4 Assumed plant capacity factor of 100%

St. Johns River

23,089
(33,877)

5,970
(12,184)

Landfill Solids
2 (2)
Spray Dryer
Evaporation
20
(21)
Net Precipitation
Contained in Fly Ash
17
Evaporation
1,107
Contained in Scrubber Solids
49
Units 1 & 2 ScrubberSystem
1,406
432
22
(23)
200
2,269
1,456
Existing Landfill
Runoff
161
199
Drain water
Zero Liquid Discharge System
245
45
361
196
Unit 3 ScrubberSystem
863
Unit 3 Landfill
Runoff
16
Drain water
20
396
0
Existing Landfill Ponds
18
Contained in Scrubber Solids
677
17
Contained in Fly Ash
Evaporation
CBO [3]
0
Surge Pond
0
396
813
15
Evaporation
417
5
20
Units 1 & 2 Air Heater/Fireside Wash
5
5
7
Wastewater Treatment System/Equalization Basins
60
Oil/Water Separator
40
Units 1 & 2 Service Water
60
0
Percolation Pond
44
4
247
50
Coal Pile
20
Unit 3 Service Water
20
Unit 3 Air Heater/Fireside Wash
2
50
2
Well
12
164
214
Units 1 & 2 Boiler Blowdown Quench
Potable Water System
4
Unit 1, 2 & 3 Sewage Treatment Plant
4
13
(10)
Units 1 & 2 Bottom Ash Handling
178
165
Evaporation
8
Consumption
Contained in Bottom Ash
95
7
(6)
Unit 3 Bottom Ash Handling
102
7
218
16
28
83
Evaporation
126
4,032
(8,223)
Fire Protection and Miscellaneous Uses
196
Units 1 & 2 Demineralizer
19
209
Demineralized Water Storage Tank
209
Units 1 & 2
540,000
Units 1 & 2 Cooling Towers
14,212
(21,475)
10,180
(13,252)
Evaporation + Drift
Well
59
Unit 3 Demineralizer
33
162
(176)
143
Unit 3
361,449
Unit 3 Cooling Tower
4,909
(6,385)
6,847
(10,346)
145
19
(157)
143
Evaporation
1,938
(3,961)
Urea Processing System

PROJECT
SEMINOLE ELECTRIC COOPERATIVE INC
SGS UNIT 3
PUTNAM COUNTY, FLORIDA

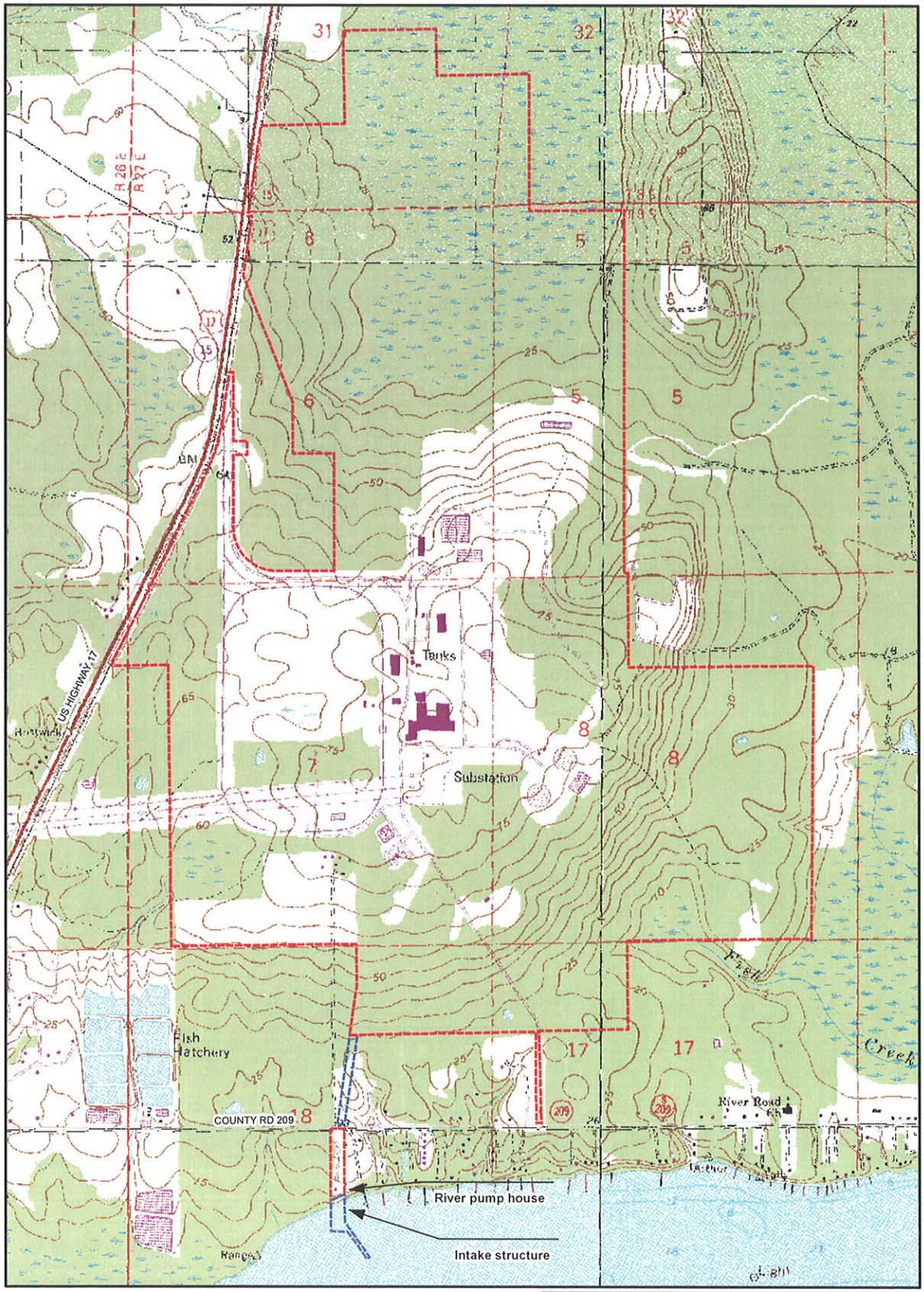
TITLE
SGS UNIT 3 WATER-USE DIAGRAM

Golder Associates
Tampa, Florida

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CADD	MEF	03/07/06			
CHECK	HF	03/07/06			
REVIEW	MM	03/07/06			

FIGURE 8-4

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0 0.25 0.5 Miles

LEGEND

- Easement
- Property Boundary

REFERENCE

1.) Property parcel, Putnam County parcel data set and property legal description
2.) USGS Digital Raster Graphic (DRG) Florida Topographic Quadrangles (Bostwick, Hastings, Palatka, Riverdale), LABINS

N

PROJECT: SEMINOLE ELECTRIC COOPERATIVE INC.
SGS UNIT 3
PUTNUM COUNTY, FL

TITLE

SGS UNIT 3 RIVER PUMP HOUSE

Golder Associates
Tampa, Florida

PROJECT No. 053-9540			SCALE AS SHOWN	REV. 0
DESIGN	JWT	11/28/2005		
GIS	JWT	6/12/2006		
CHECK	MM		8-5	
REVIEW	RAZ			

N:\FILE\2005\053-9540 - EECVA - GIS\MapDocument\mxd\053-9540A18.mxd

FIGURE 8-6
St. Johns River near Buffalo Bluff
Water Level vs Flow

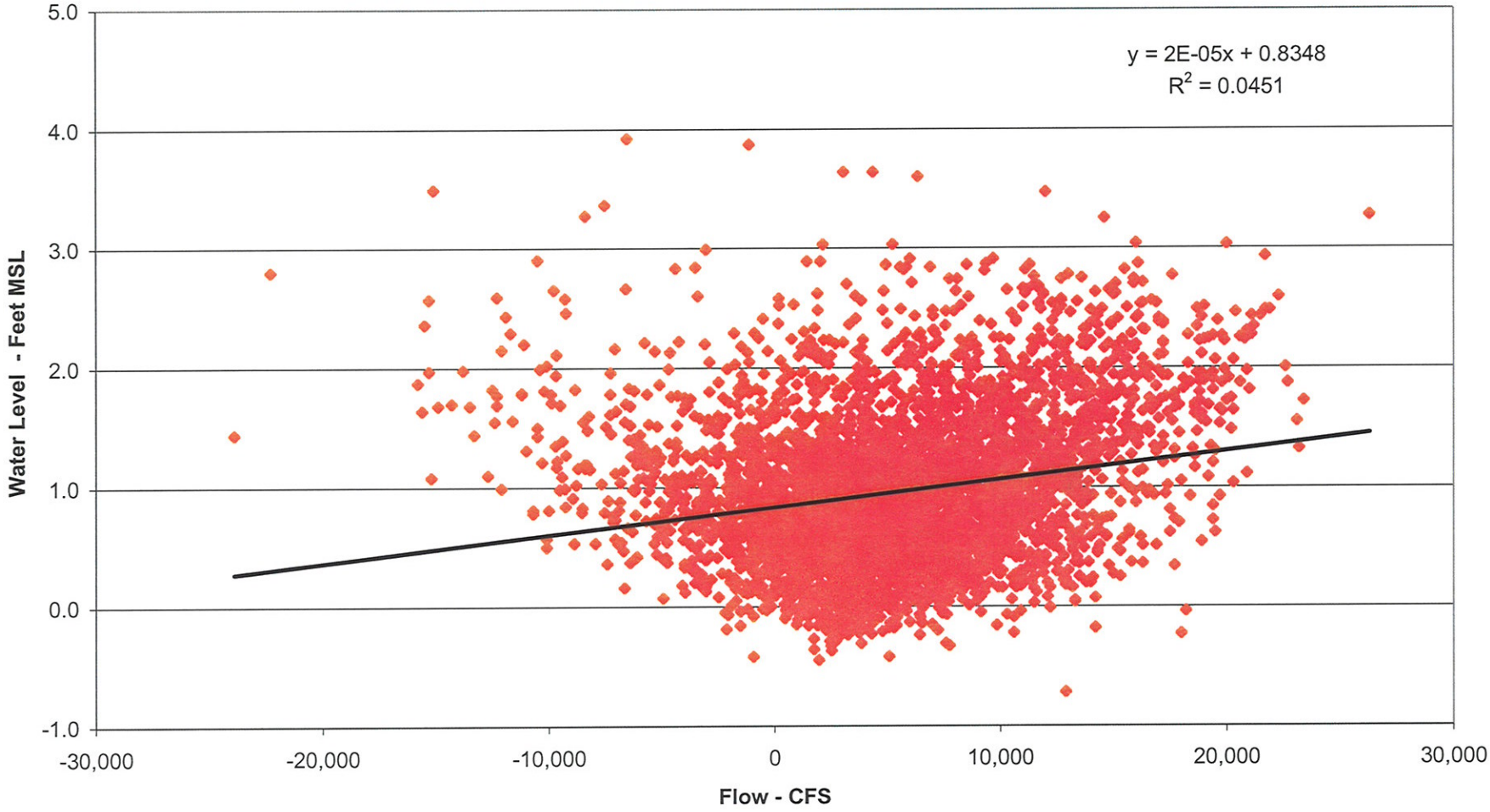
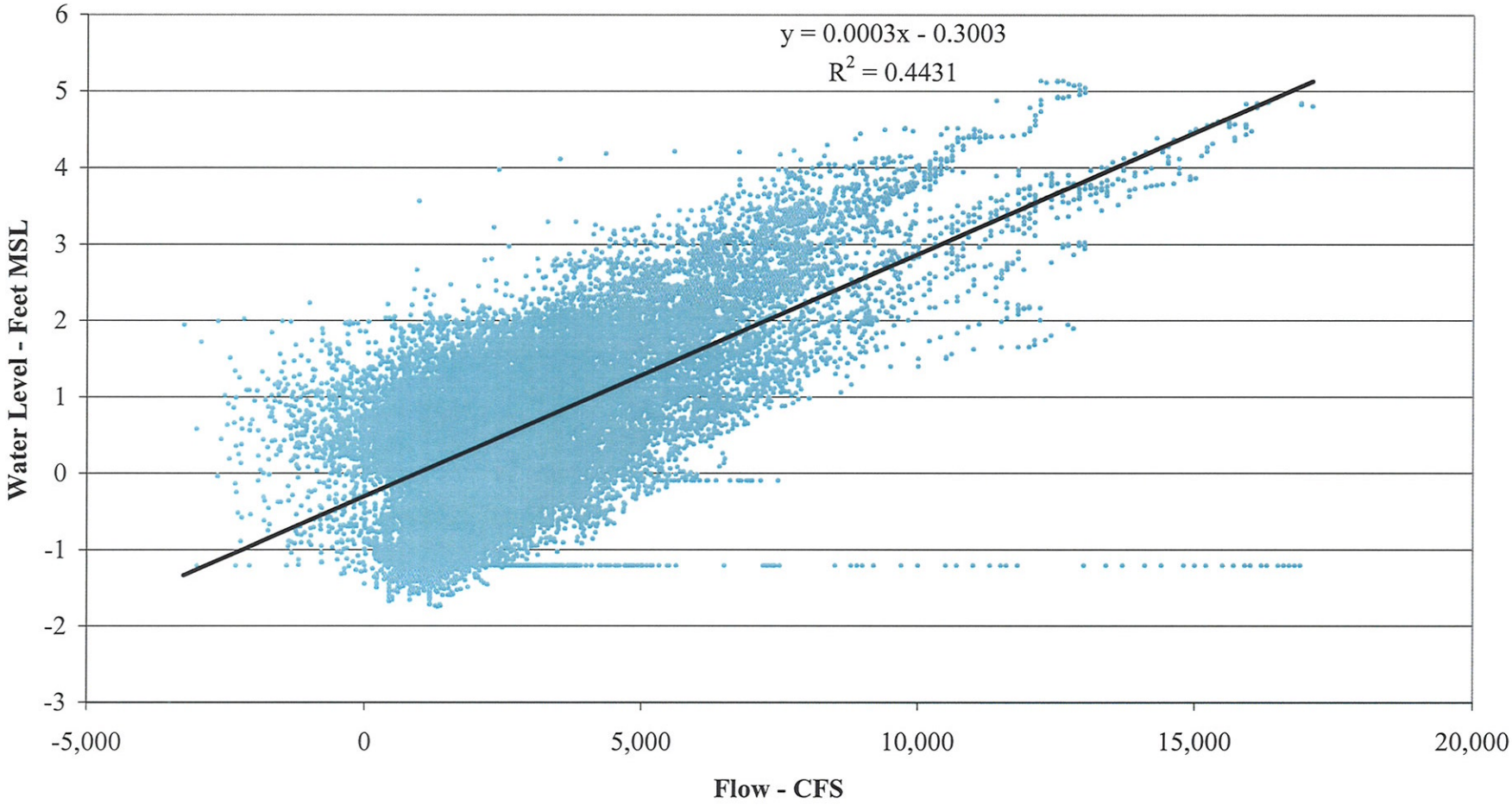


FIGURE 8-7
St. Johns River near Deland
Water Level vs. Flow



ATTACHMENT 8-1

FLORIDA
Natural Areas
INVENTORY

1018 Thomasville Road
Suite 200-C
Tallahassee, FL 32303
850-224-8207
fax 850-681-9364
www.fnai.org

December 15, 2005

Karl Bullock
Golder & Associates
6241 NW 23rd Street, Suite 500
Gainesville, FL 32653-1500

Dear Mr. Bullock:

Thank you for your request for information from the Florida Natural Areas Inventory (FNAI). We have compiled the following information for your project area.

Project:	39736
Date Received:	November 18, 2005
Location:	Township 9 S, Range 27 E, Sections 5-8, 17 & 18 Putnam County

Element Occurrences

A search of our maps and database indicates that currently we have no Element Occurrences mapped within the vicinity of the study area (see enclosed map and element occurrence table). Please be advised that a lack of element occurrences in the FNAI database is not a sufficient indication of the absence of rare or endangered species on a site.

The Element Occurrences data layer includes occurrences of rare species and natural communities. The map legend indicates that some element occurrences occur in the general vicinity of the label point. This may be due to lack of precision of the source data, or an element that occurs over an extended area (such as a wide ranging species or large natural community). For animals and plants, Element Occurrences generally refer to more than a casual sighting; they usually indicate a viable population of the species. Note that some element occurrences represent historically documented observations which may no longer be extant.

Likely and Potential Rare Species

In addition to documented occurrences, other rare species and natural communities may be identified on or near the site based on habitat models and species range models (see enclosed Biodiversity Matrix Report). These species should be taken into consideration in field surveys, land management, and impact avoidance and mitigation.

FNAI habitat models indicate areas, which based on landcover type, offer suitable habitat for one or more rare species that is known to occur in the vicinity. Habitat models have been developed for approximately 300 of the most rare species tracked by the Inventory, including all federally listed species.

Florida Resources and Environmental Analysis Center

Institute of Science and Public Affairs

The Florida State University

FNAI species range models indicate areas that are within the known or predicted range of a species, based on climate variables, soils, vegetation, and/or slope. Species range models have been developed for approximately 340 species, including all federally listed species.

The FNAI Biodiversity Matrix Geodatabase compiles Documented, Likely, and Potential species and natural communities for each square mile Matrix Unit statewide.

The Inventory always recommends that professionals familiar with Florida's flora and fauna should conduct a site-specific survey to determine the current presence or absence of rare, threatened, or endangered species.

Please visit www.fnai.org/data.cfm for county or statewide element occurrence distributions and links to more element information.

The database maintained by the Florida Natural Areas Inventory is the single most comprehensive source of information available on the locations of rare species and other significant ecological resources. However, the data are not always based on comprehensive or site-specific field surveys. Therefore, this information should not be regarded as a final statement on the biological resources of the site being considered, nor should it be substituted for on-site surveys. Inventory data are designed for the purposes of conservation planning and scientific research, and are not intended for use as the primary criteria for regulatory decisions.

Information provided by this database may not be published without prior written notification to the Florida Natural Areas Inventory, and the Inventory must be credited as an information source in these publications. FNAI data may not be resold for profit.

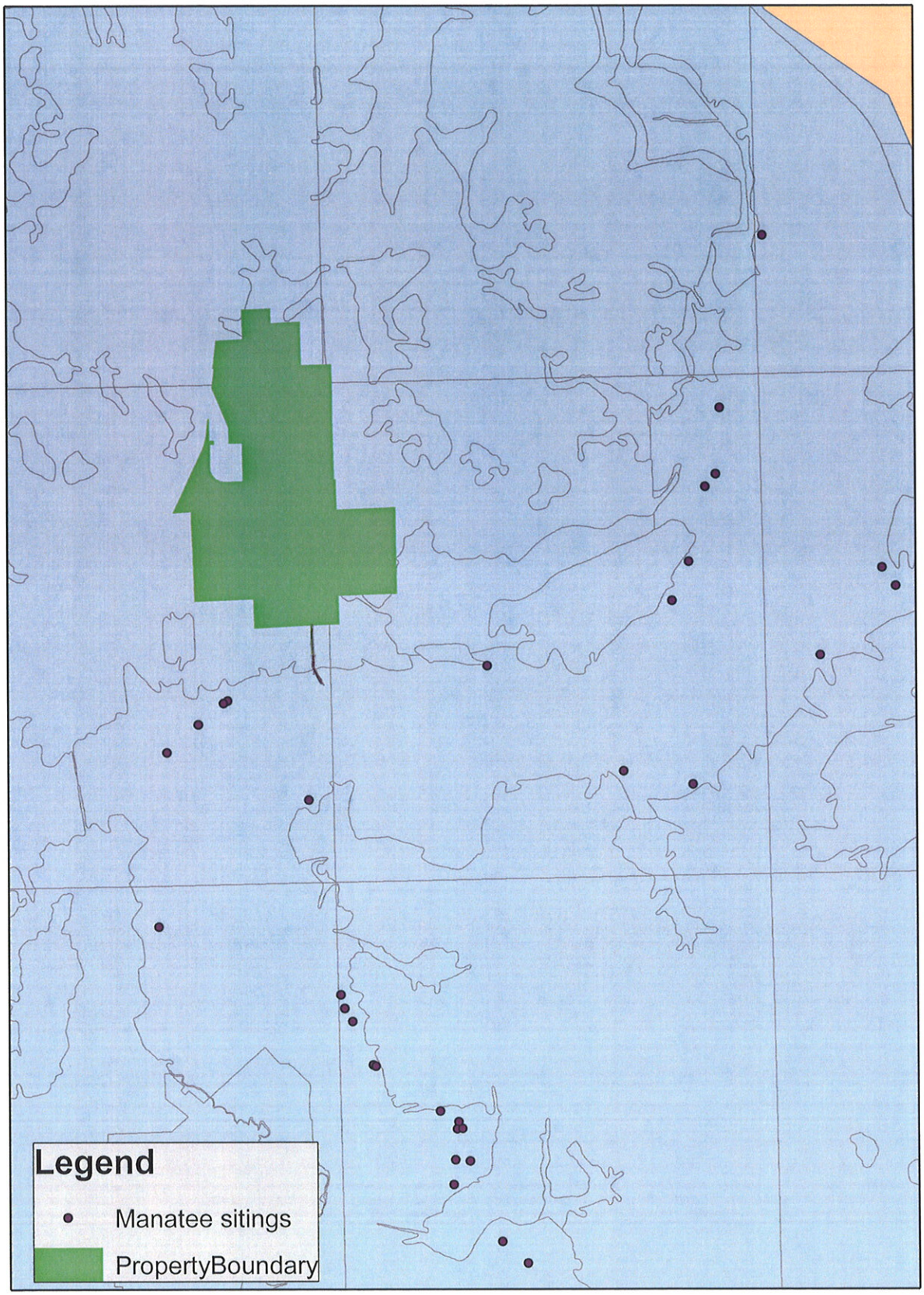
Thank you for your use of FNAI services. If I can be of further assistance, please give me a call at (850) 224-8207.

Sincerely,

Jason A. Griffin

Jason A. Griffin
Data Services Coordinator

encl


Legend
Manatee sitings
PropertyBoundary

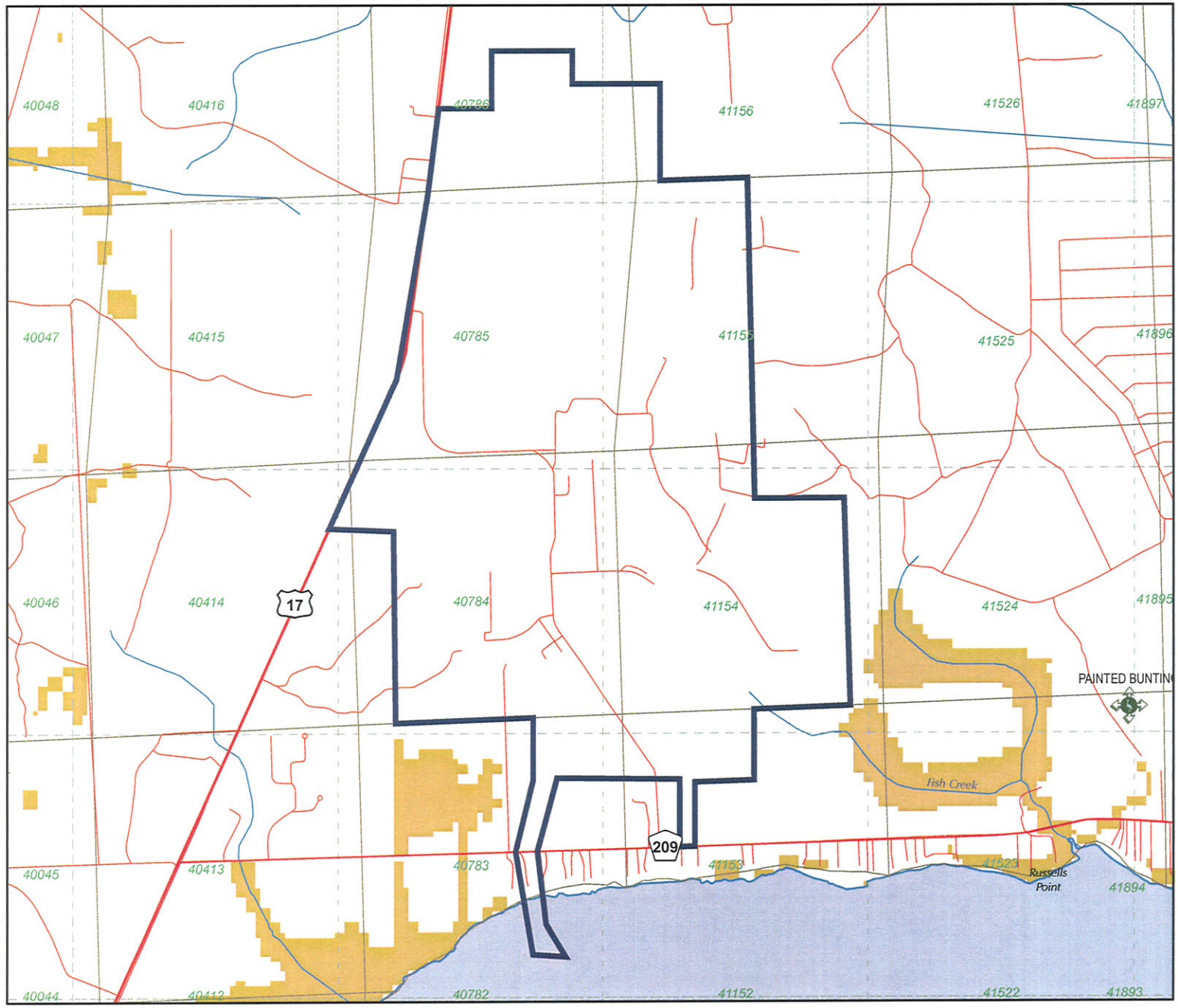
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FLORIDA Natural Areas INVENTORY

39736

Site boundaries are appoximate.

Putnam County



Element Occurrences

- Animals
- Plants
- Communities
- Other
- Point Indicates General Vicinity of Element
- U.S. Fish & Wildlife Service Scrub Jay Survey 1992-96
- FL Fish & Wildlife Cons. Comm. Breeding Bird Atlas Project 1986-91 center point of 10 sq mi survey block

Conservation Lands

- Federal
- State
- Local
- Private
- State Aquatic Preserves

Land Acquisition Projects

- Florida Forever Board of Trustees Projects

- FNAI Rare Species Habitat
- FNAI Biodiversity Matrix Square Mile Units

- County Boundary
- Interstate
- Turnpike
- Major Highway
- Local Road
- Water

N W E S

Map produced by JAG
Map Date: 15 Dec 2005

NOTE
Map should not be interpreted without accompanying documents.

0 0.5 1 Miles

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Florida Natural Areas Inventory

Biodiversity Matrix Report

Scientific Name	Common Name	Global Rank	State Rank	Federal Status	State Listing
FNAI Biodiversity Matrix Unit ID: 40783					
Likely					
Acipenser brevirostrum	Shortnose Sturgeon	G3	S1	LE	LE
Trichechus manatus	Manatee	G2	S2	LE	LE
Potential					
Acipenser brevirostrum	Shortnose Sturgeon	G3	S1	LE	LE
Acipenser oxyrinchus oxyrinchus	Atlantic Sturgeon	G3T3	S1	C	LS
Aimophila aestivalis	Bachman's Sparrow	G3	S3	N	N
Arnoglossum diversifolium	Variable-leaved Indian-plantain	G2	S2	N	LT
Asplenium heteroresiliens	Wagner's Spleenwort	G2	S1	N	N
Balduina atropurpurea	Purple Honeycomb-head	G2	S1	N	LE
Calydorea coelestina	Bartram's Ixia	G2	S2	N	LE
Carex chapmanii	Chapman's Sedge	G3	S3	N	LE
Corynorhinus rafinesquii	Rafinesque's Big-eared Bat	G3G4	S2	N	N
Ctenium floridanum	Florida toothache-grass	G2	S2	N	LE
Drymarchon couperi	Eastern Indigo Snake	G3	S3	LT	LT
Gopherus polyphemus	Gopher Tortoise	G3	S3	N	LS
Gymnopogon chapmanianus	Chapman's Skeletongrass	G3	S3	N	N
Hartwrightia floridana	Hartwrightia	G2	S2	N	LT
Helianthus carnosus	Lake-side Sunflower	G1G2	S1S2	N	LE
Illicium parviflorum	Star Anise	G2	S2	N	LE
Litsea aestivalis	Pondspice	G3	S2	N	LE
Lythrum curtissii	Curtis's Loosestrife	G1	S1	N	LE
Matelea floridana	Florida Spiny-pod	G2	S2	N	LE
Monotropsis reynoldsiae	Pigmy Pipes	G1Q	S1	N	LE
Mustela frenata peninsulae	Florida Long-tailed Weasel	G5T3	S3	N	N
Nemastylis floridana	Celestial Lily	G2	S2	N	LE
Neofiber alleni	Round-tailed Muskrat	G3	S3	N	N
Nolina atopocarpa	Florida Beargrass	G3	S3	N	LT
Notophthalmus perstriatus	Striped Newt	G2G3	S2S3	N	N
Orbexilum virgatum	Pineland Scurfpea	G1	S1	N	PE
Picoides borealis	Red-cockaded Woodpecker	G3	S2	LE	LS
Podomys floridanus	Florida Mouse	G3	S3	N	LS
Pteroglossaspis ecristata	Giant Orchid	G2G3	S2	N	LT
Pycnanthemum floridanum	Florida Mountain-mint	G3	S3	N	LT
Rana capito	Gopher Frog	G3	S3	N	LS
Rhynchospora thornei	Thorne's Beakrush	G3	S1S2	N	N
Rudbeckia nitida	St. John's Black-eyed-susan	G3	S2	N	LE
Salix floridana	Florida Willow	G2	S2	N	LE
Sciurus niger shermani	Sherman's Fox Squirrel	G5T3	S3	N	LS
Trichechus manatus	Manatee	G2	S2	LE	LE
Ursus americanus floridanus	Florida Black Bear	G5T2	S2	N	LT*
FNAI Biodiversity Matrix Unit ID: 40784					
Potential					
Agrimonia incisa	Incised Groove-bur	G3	S2	N	LE
Aimophila aestivalis	Bachman's Sparrow	G3	S3	N	N
Andropogon arctatus	Pine-woods Bluestem	G3	S3	N	LT
Asplenium heteroresiliens	Wagner's Spleenwort	G2	S1	N	N
Asplenium x curtissii	Curtiss' Spleenwort	G1	S1	N	N

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Florida Natural Areas Inventory

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Scientific Name	Common Name	Global Rank	State Rank	Federal Status	State Listing
Balduina atropurpurea	Purple Honeycomb-head	G2	S1	N	LE
Calydorea coelestina	Bartram's Ixia	G2	S2	N	LE
Carex chapmanii	Chapman's Sedge	G3	S3	N	LE
Ctenium floridanum	Florida toothache-grass	G2	S2	N	LE
Drymarchon couperi	Eastern Indigo Snake	G3	S3	LT	LT
Gopherus polyphemus	Gopher Tortoise	G3	S3	N	LS
Grus canadensis pratensis	Florida Sandhill Crane	G5T2T3	S2S3	N	LT
Gymnopogon chapmanianus	Chapman's Skeletongrass	G3	S3	N	N
Hartwrightia floridana	Hartwrightia	G2	S2	N	LT
Heterodon simus	Southern Hognose Snake	G2	S2	N	N
Litsea aestivalis	Pondspice	G3	S2	N	LE
Lythrum curtissii	Curtis's Loosestrife	G1	S1	N	LE
Matelea floridana	Florida Spiny-pod	G2	S2	N	LE
Monotropsis reynoldsiae	Pigmy Pipes	G1Q	S1	N	LE
Mustela frenata peninsulae	Florida Long-tailed Weasel	G5T3	S3	N	N
Nemastylis floridana	Celestial Lily	G2	S2	N	LE
Neofiber alleni	Round-tailed Muskrat	G3	S3	N	N
Nolina atopocarpa	Florida Beargrass	G3	S3	N	LT
Notophthalmus perstriatus	Striped Newt	G2G3	S2S3	N	N
Orbexilum virgatum	Pineland Scurfpea	G1	S1	N	PE
Picoides borealis	Red-cockaded Woodpecker	G3	S2	LE	LS
Podomys floridanus	Florida Mouse	G3	S3	N	LS
Pteroglossaspis ecristata	Giant Orchid	G2G3	S2	N	LT
Pycnanthemum floridanum	Florida Mountain-mint	G3	S3	N	LT
Rana capito	Gopher Frog	G3	S3	N	LS
Rhynchospora thornei	Thorne's Beakrush	G3	S1S2	N	N
Rudbeckia nitida	St. John's Black-eyed-susan	G3	S2	N	LE
Salix floridana	Florida Willow	G2	S2	N	LE
Sciurus niger shermani	Sherman's Fox Squirrel	G5T3	S3	N	LS
Ursus americanus floridanus	Florida Black Bear	G5T2	S2	N	LT*

FNAI Biodiversity Matrix Unit ID: 40785

Potential

Agrimonia incisa	Incised Groove-bur	G3	S2	N	LE
Andropogon arctatus	Pine-woods Bluestem	G3	S3	N	LT
Arnoglossum diversifolium	Variable-leaved Indian-plantain	G2	S2	N	LT
Asplenium heteroresiliens	Wagner's Spleenwort	G2	S1	N	N
Asplenium x curtissii	Curtiss' Spleenwort	G1	S1	N	N
Balduina atropurpurea	Purple Honeycomb-head	G2	S1	N	LE
Calydorea coelestina	Bartram's Ixia	G2	S2	N	LE
Carex chapmanii	Chapman's Sedge	G3	S3	N	LE
Corynorhinus rafinesquii	Rafinesque's Big-eared Bat	G3G4	S2	N	N
Ctenium floridanum	Florida toothache-grass	G2	S2	N	LE
Drymarchon couperi	Eastern Indigo Snake	G3	S3	LT	LT
Gopherus polyphemus	Gopher Tortoise	G3	S3	N	LS
Grus canadensis pratensis	Florida Sandhill Crane	G5T2T3	S2S3	N	LT
Gymnopogon chapmanianus	Chapman's Skeletongrass	G3	S3	N	N
Hartwrightia floridana	Hartwrightia	G2	S2	N	LT
Heterodon simus	Southern Hognose Snake	G2	S2	N	N
Litsea aestivalis	Pondspice	G3	S2	N	LE
Lythrum curtissii	Curtis's Loosestrife	G1	S1	N	LE

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Florida Natural Areas Inventory

Biodiversity Matrix Report

Scientific Name	Common Name	Global Rank	State Rank	Federal Status	State Listing
Matelea floridana	Florida Spiny-pod	G2	S2	N	LE
Monotropsis reynoldsiae	Pigmy Pipes	G1Q	S1	N	LE
Mustela frenata peninsulae	Florida Long-tailed Weasel	G5T3	S3	N	N
Nemastylis floridana	Celestial Lily	G2	S2	N	LE
Neofiber alleni	Round-tailed Muskrat	G3	S3	N	N
Notophthalmus perstriatus	Striped Newt	G2G3	S2S3	N	N
Orbexilum virgatum	Pineland Scurfpea	G1	S1	N	PE
Picoides borealis	Red-cockaded Woodpecker	G3	S2	LE	LS
Podomys floridanus	Florida Mouse	G3	S3	N	LS
Pteroglossaspis ecristata	Giant Orchid	G2G3	S2	N	LT
Pycnanthemum floridanum	Florida Mountain-mint	G3	S3	N	LT
Rana capito	Gopher Frog	G3	S3	N	LS
Rhynchospora thornei	Thorne's Beakrush	G3	S1S2	N	N
Rudbeckia nitida	St. John's Black-eyed-susan	G3	S2	N	LE
Salix floridana	Florida Willow	G2	S2	N	LE
Sciurus niger shermani	Sherman's Fox Squirrel	G5T3	S3	N	LS
Ursus americanus floridanus	Florida Black Bear	G5T2	S2	N	LT*

FNAI Biodiversity Matrix Unit ID: 40786

Potential

Arnoglossum diversifolium	Variable-leaved Indian-plantain	G2	S2	N	LT
Asclepias viridula	Southern Milkweed	G2	S2	N	LT
Asplenium heteroresiliens	Wagner's Spleenwort	G2	S1	N	N
Balduina atropurpurea	Purple Honeycomb-head	G2	S1	N	LE
Calydorea coelestina	Bartram's Ixia	G2	S2	N	LE
Carex chapmanii	Chapman's Sedge	G3	S3	N	LE
Corynorhinus rafinesquii	Rafinesque's Big-eared Bat	G3G4	S2	N	N
Ctenium floridanum	Florida toothache-grass	G2	S2	N	LE
Drymarchon couperi	Eastern Indigo Snake	G3	S3	LT	LT
Gopherus polyphemus	Gopher Tortoise	G3	S3	N	LS
Grus canadensis pratensis	Florida Sandhill Crane	G5T2T3	S2S3	N	LT
Gymnopogon chapmanianus	Chapman's Skeletongrass	G3	S3	N	N
Hartwrightia floridana	Hartwrightia	G2	S2	N	LT
Litsea aestivalis	Pondspice	G3	S2	N	LE
Lythrum curtissii	Curtis's Loosestrife	G1	S1	N	LE
Matelea floridana	Florida Spiny-pod	G2	S2	N	LE
Mustela frenata peninsulae	Florida Long-tailed Weasel	G5T3	S3	N	N
Nemastylis floridana	Celestial Lily	G2	S2	N	LE
Neofiber alleni	Round-tailed Muskrat	G3	S3	N	N
Notophthalmus perstriatus	Striped Newt	G2G3	S2S3	N	N
Orbexilum virgatum	Pineland Scurfpea	G1	S1	N	PE
Picoides borealis	Red-cockaded Woodpecker	G3	S2	LE	LS
Podomys floridanus	Florida Mouse	G3	S3	N	LS
Pycnanthemum floridanum	Florida Mountain-mint	G3	S3	N	LT
Rana capito	Gopher Frog	G3	S3	N	LS
Rhynchospora thornei	Thorne's Beakrush	G3	S1S2	N	N
Rudbeckia nitida	St. John's Black-eyed-susan	G3	S2	N	LE
Salix floridana	Florida Willow	G2	S2	N	LE
Sciurus niger shermani	Sherman's Fox Squirrel	G5T3	S3	N	LS
Ursus americanus floridanus	Florida Black Bear	G5T2	S2	N	LT*

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Florida Natural Areas Inventory

Biodiversity Matrix Report

Scientific Name	Common Name	Global Rank	State Rank	Federal Status	State Listing
FNAI Biodiversity Matrix Unit ID: 41153					
Likely					
Acipenser brevirostrum	Shortnose Sturgeon	G3	S1	LE	LE
Trichechus manatus	Manatee	G2	S2	LE	LE
Potential					
Acipenser brevirostrum	Shortnose Sturgeon	G3	S1	LE	LE
Acipenser oxyrinchus oxyrinchus	Atlantic Sturgeon	G3T3	S1	C	LS
Aimophila aestivalis	Bachman's Sparrow	G3	S3	N	N
Arnoglossum diversifolium	Variable-leaved Indian-plantain	G2	S2	N	LT
Asplenium heteroresiliens	Wagner's Spleenwort	G2	S1	N	N
Balduina atropurpurea	Purple Honeycomb-head	G2	S1	N	LE
Calydorea coelestina	Bartram's Ixia	G2	S2	N	LE
Corynorhinus rafinesquii	Rafinesque's Big-eared Bat	G3G4	S2	N	N
Ctenium floridanum	Florida toothache-grass	G2	S2	N	LE
Drymarchon couperi	Eastern Indigo Snake	G3	S3	LT	LT
Gopherus polyphemus	Gopher Tortoise	G3	S3	N	LS
Hartwrightia floridana	Hartwrightia	G2	S2	N	LT
Helianthus carnosus	Lake-side Sunflower	G1G2	S1S2	N	LE
Illicium parviflorum	Star Anise	G2	S2	N	LE
Litsea aestivalis	Pondspice	G3	S2	N	LE
Lythrum curtissii	Curtis's Loosestrife	G1	S1	N	LE
Matelea floridana	Florida Spiny-pod	G2	S2	N	LE
Monotropsis reynoldsiae	Pigmy Pipes	G1Q	S1	N	LE
Mustela frenata peninsulae	Florida Long-tailed Weasel	G5T3	S3	N	N
Nemastylis floridana	Celestial Lily	G2	S2	N	LE
Neofiber alleni	Round-tailed Muskrat	G3	S3	N	N
Notophthalmus perstriatus	Striped Newt	G2G3	S2S3	N	N
Orbexilum virgatum	Pineland Scurfpea	G1	S1	N	PE
Podomys floridanus	Florida Mouse	G3	S3	N	LS
Pteroglossaspis ecristata	Giant Orchid	G2G3	S2	N	LT
Pycnanthemum floridanum	Florida Mountain-mint	G3	S3	N	LT
Rana capito	Gopher Frog	G3	S3	N	LS
Rudbeckia nitida	St. John's Black-eyed-susan	G3	S2	N	LE
Salix floridana	Florida Willow	G2	S2	N	LE
Sciurus niger shermani	Sherman's Fox Squirrel	G5T3	S3	N	LS
Trichechus manatus	Manatee	G2	S2	LE	LE
FNAI Biodiversity Matrix Unit ID: 41154					
Likely					
Acipenser brevirostrum	Shortnose Sturgeon	G3	S1	LE	LE
Potential					
Agrimonia incisa	Incised Groove-bur	G3	S2	N	LE
Aimophila aestivalis	Bachman's Sparrow	G3	S3	N	N
Andropogon arctatus	Pine-woods Bluestem	G3	S3	N	LT
Arnoglossum diversifolium	Variable-leaved Indian-plantain	G2	S2	N	LT
Asplenium heteroresiliens	Wagner's Spleenwort	G2	S1	N	N
Asplenium x curtissii	Curtiss' Spleenwort	G1	S1	N	N
Balduina atropurpurea	Purple Honeycomb-head	G2	S1	N	LE
Calydorea coelestina	Bartram's Ixia	G2	S2	N	LE
Carex chapmanii	Chapman's Sedge	G3	S3	N	LE
Centrosema arenicola	Sand Butterfly Pea	G2Q	S2	N	LE
Corynorhinus rafinesquii	Rafinesque's Big-eared Bat	G3G4	S2	N	N
Ctenium floridanum	Florida toothache-grass	G2	S2	N	LE

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Florida Natural Areas Inventory

Biodiversity Matrix Report

Scientific Name	Common Name	Global Rank	State Rank	Federal Status	State Listing
Drymarchon couperi	Eastern Indigo Snake	G3	S3	LT	LT
Gopherus polyphemus	Gopher Tortoise	G3	S3	N	LS
Gymnopogon chapmanianus	Chapman's Skeletongrass	G3	S3	N	N
Hartwrightia floridana	Hartwrightia	G2	S2	N	LT
Helianthus carnosus	Lake-side Sunflower	G1G2	S1S2	N	LE
Litsea aestivalis	Pondspice	G3	S2	N	LE
Lythrum curtissii	Curtis's Loosestrife	G1	S1	N	LE
Matelea floridana	Florida Spiny-pod	G2	S2	N	LE
Monotropsis reynoldsiae	Pigmy Pipes	G1Q	S1	N	LE
Mustela frenata peninsulae	Florida Long-tailed Weasel	G5T3	S3	N	N
Nemastylis floridana	Celestial Lily	G2	S2	N	LE
Neofiber alleni	Round-tailed Muskrat	G3	S3	N	N
Nolina atopocarpa	Florida Beargrass	G3	S3	N	LT
Notophthalmus perstriatus	Striped Newt	G2G3	S2S3	N	N
Orbexilum virgatum	Pineland Scurfpea	G1	S1	N	PE
Picoides borealis	Red-cockaded Woodpecker	G3	S2	LE	LS
Podomys floridanus	Florida Mouse	G3	S3	N	LS
Pteroglossaspis ecristata	Giant Orchid	G2G3	S2	N	LT
Pycnanthemum floridanum	Florida Mountain-mint	G3	S3	N	LT
Rana capito	Gopher Frog	G3	S3	N	LS
Rhynchospora thornei	Thorne's Beakrush	G3	S1S2	N	N
Rudbeckia nitida	St. John's Black-eyed-susan	G3	S2	N	LE
Salix floridana	Florida Willow	G2	S2	N	LE
Sciurus niger shermani	Sherman's Fox Squirrel	G5T3	S3	N	LS
Ursus americanus floridanus	Florida Black Bear	G5T2	S2	N	LT*
Verbesina heterophylla	Variable-leaf Crownbeard	G2	S2	N	N

FNAI Biodiversity Matrix Unit ID: 41155

Potential

Agrimonia incisa	Incised Groove-bur	G3	S2	N	LE
Andropogon arctatus	Pine-woods Bluestem	G3	S3	N	LT
Arnoglossum diversifolium	Variable-leaved Indian-plantain	G2	S2	N	LT
Asplenium heteroresiliens	Wagner's Spleenwort	G2	S1	N	N
Asplenium x curtissii	Curtiss' Spleenwort	G1	S1	N	N
Balduina atropurpurea	Purple Honeycomb-head	G2	S1	N	LE
Calydorea coelestina	Bartram's Ixia	G2	S2	N	LE
Carex chapmanii	Chapman's Sedge	G3	S3	N	LE
Corynorhinus rafinesquii	Rafinesque's Big-eared Bat	G3G4	S2	N	N
Ctenium floridanum	Florida toothache-grass	G2	S2	N	LE
Drymarchon couperi	Eastern Indigo Snake	G3	S3	LT	LT
Gopherus polyphemus	Gopher Tortoise	G3	S3	N	LS
Grus canadensis pratensis	Florida Sandhill Crane	G5T2T3	S2S3	N	LT
Gymnopogon chapmanianus	Chapman's Skeletongrass	G3	S3	N	N
Hartwrightia floridana	Hartwrightia	G2	S2	N	LT
Litsea aestivalis	Pondspice	G3	S2	N	LE
Lythrum curtissii	Curtis's Loosestrife	G1	S1	N	LE
Matelea floridana	Florida Spiny-pod	G2	S2	N	LE
Monotropsis reynoldsiae	Pigmy Pipes	G1Q	S1	N	LE
Mustela frenata peninsulae	Florida Long-tailed Weasel	G5T3	S3	N	N
Nemastylis floridana	Celestial Lily	G2	S2	N	LE
Neofiber alleni	Round-tailed Muskrat	G3	S3	N	N

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Florida Natural Areas Inventory

Biodiversity Matrix Report

Scientific Name	Common Name	Global Rank	State Rank	Federal Status	State Listing
Nolina atopocarpa	Florida Beargrass	G3	S3	N	LT
Notophthalmus perstriatus	Striped Newt	G2G3	S2S3	N	N
Orbexilum virgatum	Pineland Scurfpea	G1	S1	N	PE
Picoides borealis	Red-cockaded Woodpecker	G3	S2	LE	LS
Podomys floridanus	Florida Mouse	G3	S3	N	LS
Pteroglossaspis ecristata	Giant Orchid	G2G3	S2	N	LT
Pycnanthemum floridanum	Florida Mountain-mint	G3	S3	N	LT
Rana capito	Gopher Frog	G3	S3	N	LS
Rhynchospora thornei	Thorne's Beakrush	G3	S1S2	N	N
Rudbeckia nitida	St. John's Black-eyed-susan	G3	S2	N	LE
Salix floridana	Florida Willow	G2	S2	N	LE
Sciurus niger shermani	Sherman's Fox Squirrel	G5T3	S3	N	LS

FNAI Biodiversity Matrix Unit ID: 41156

Potential

Arnoglossum diversifolium	Variable-leaved Indian-plantain	G2	S2	N	LT
Asclepias viridula	Southern Milkweed	G2	S2	N	LT
Asplenium heteroresiliens	Wagner's Spleenwort	G2	S1	N	N
Balduina atropurpurea	Purple Honeycomb-head	G2	S1	N	LE
Calydorea coelestina	Bartram's Ixia	G2	S2	N	LE
Carex chapmanii	Chapman's Sedge	G3	S3	N	LE
Corynorhinus rafinesquii	Rafinesque's Big-eared Bat	G3G4	S2	N	N
Ctenium floridanum	Florida toothache-grass	G2	S2	N	LE
Drymarchon couperi	Eastern Indigo Snake	G3	S3	LT	LT
Gopherus polyphemus	Gopher Tortoise	G3	S3	N	LS
Grus canadensis pratensis	Florida Sandhill Crane	G5T2T3	S2S3	N	LT
Gymnopogon chapmanianus	Chapman's Skeletongrass	G3	S3	N	N
Hartwrightia floridana	Hartwrightia	G2	S2	N	LT
Litsea aestivalis	Pondspice	G3	S2	N	LE
Lythrum curtissii	Curtis's Loosestrife	G1	S1	N	LE
Matelea floridana	Florida Spiny-pod	G2	S2	N	LE
Monotropsis reynoldsiae	Pigmy Pipes	G1Q	S1	N	LE
Mustela frenata peninsulae	Florida Long-tailed Weasel	G5T3	S3	N	N
Nemastylis floridana	Celestial Lily	G2	S2	N	LE
Neofiber alleni	Round-tailed Muskrat	G3	S3	N	N
Nolina atopocarpa	Florida Beargrass	G3	S3	N	LT
Notophthalmus perstriatus	Striped Newt	G2G3	S2S3	N	N
Orbexilum virgatum	Pineland Scurfpea	G1	S1	N	PE
Picoides borealis	Red-cockaded Woodpecker	G3	S2	LE	LS
Podomys floridanus	Florida Mouse	G3	S3	N	LS
Pycnanthemum floridanum	Florida Mountain-mint	G3	S3	N	LT
Rana capito	Gopher Frog	G3	S3	N	LS
Rhynchospora thornei	Thorne's Beakrush	G3	S1S2	N	N
Rudbeckia nitida	St. John's Black-eyed-susan	G3	S2	N	LE
Salix floridana	Florida Willow	G2	S2	N	LE
Sciurus niger shermani	Sherman's Fox Squirrel	G5T3	S3	N	LS

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Florida Natural Areas Inventory

Biodiversity Matrix Report

Scientific Name	Common Name	Global Rank	State Rank	Federal Status	State Listing

DEFINITIONS:
DOCUMENTED - Rare species and natural communities documented on or near this site.
DOCUMENTED-HISTORIC - Rare species and natural communities documented, but not observed/reported within the last twenty years.
LIKELY - Rare species and natural communities likely to occur on this site based on suitable habitat and/or known occurrences in the vicinity.
POTENTIAL - This site lies within the known or predicted range of the species listed.

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FLORIDA Natural Areas INVENTORY

GLOBAL AND STATE RANKS

Florida Natural Areas Inventory (FNAI) defines an **element** as any rare or exemplary component of the natural environment, such as a species, natural community, bird rookery, spring, sinkhole, cave, or other ecological feature. FNAI assigns two ranks to each element found in Florida: the **global rank**, which is based on an element's worldwide status, and the **state rank**, which is based on the status of the element within Florida. Element ranks are based on many factors, including estimated number of occurrences, estimated abundance (for species and populations) or area (for natural communities), estimated number of adequately protected occurrences, range, threats, and ecological fragility.

GLOBAL RANK DEFINITIONS

G1	Critically imperiled globally because of extreme rarity (5 or fewer occurrences or less than 1000 individuals) or because of extreme vulnerability to extinction due to some natural or man-made factor.
G2	Imperiled globally because of rarity (6 to 20 occurrences or less than 3000 individuals) or because of vulnerability to extinction due to some natural or man-made factor.
G3	Either very rare and local throughout its range (21-100 occurrences or less than 10,0000 individuals) or found locally in a restricted range or vulnerable to extinction from other factors.
G4	Apparently secure globally (may be rare in parts of range).
G5	Demonstrably secure globally.
G#?	Tentative rank (e.g., G2?)
G#G#	Range of rank; insufficient data to assign specific global rank (e.g., G2G3)
G#T#	Rank of a taxonomic subgroup such as a subspecies or variety; the G portion of the rank refers to the entire species and the T portion refers to the specific subgroup; numbers have same definition as above (e.g., G3T1)
G#Q	Rank of questionable species - ranked as species but questionable whether it is species or subspecies; numbers have same definition as above (e.g., G2Q)
G#T#Q	Same as above, but validity as subspecies or variety is questioned.
GH	Of historical occurrence throughout its range, may be rediscovered (e.g., ivory-billed woodpecker)
GNA	Ranking is not applicable because element is not a suitable target for conservation (e.g. as for hybrid species)
GNR	Not yet ranked (temporary)
GNRTNR	Neither the full species nor the taxonomic subgroup has yet been ranked (temporary)
GX	Believed to be extinct throughout range
GXC	Extirpated from the wild but still known from captivity/cultivation
GU	Unrankable. Due to lack of information, no rank or range can be assigned (e.g., GUT2).

STATE RANK DEFINITIONS

Definition parallels global element rank: substitute "S" for "G" in above global ranks, and "in Florida" for "globally" in above global rank definitions.

FEDERAL AND STATE LEGAL STATUSES PROVIDED BY FNAI FOR INFORMATION ONLY.

For official definitions and lists of protected species, consult the relevant state or federal agency.

FEDERAL LEGAL STATUS

Definitions derived from U.S. Endangered Species Act of 1973, Sec. 3. Note that the federal status given by FNAI refers only to Florida populations and that federal status may differ elsewhere.

LE	Listed as Endangered Species in the List of Endangered and Threatened Wildlife and Plants under the provisions of the Endangered Species Act. Defined as any species which is in danger of extinction throughout all or a significant portion of its range.
LE,XN	An experimental population of a species otherwise Listed as an Endangered Species in the List of Endangered and Threatened Wildlife and Plants.
PE	Proposed for addition to the List of Endangered and Threatened Wildlife and Plants as Endangered Species.
LT	Listed as Threatened Species. Defined as any species which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.
LT,PDL	Species currently listed threatened but has been proposed for delisting.
PT	Proposed for listing as Threatened Species.
C	Candidate Species for addition to the list of Endangered and Threatened Wildlife and Plants, Category 1. Taxa for which the USFWS currently has substantial information on hand or in possession to support the biological appropriateness of proposing to list the species as endangered or threatened.
PS	Partial listing status (species is listed for only a portion of its geographic range).
SAT	Threatened due to similarity of appearance to a threatened species.
SC	Species of concern. Species is not currently listed but is of management concern to USFWS.
N	Not currently listed, nor currently being considered for addition to the List of endangered and Threatened Wildlife and Plants.

FLORIDA LEGAL STATUSES

Animals: Definitions derived from "Florida's Endangered Species and Species of Special Concern, Official Lists" published by Florida Fish and Wildlife Conservation Commission, 1 August 1997, and subsequent updates.

Animals (Florida Fish and Wildlife Concervation Commission- FFWCC)

LE	Listed as Endangered Species by the FGFWFC. Defined as a species, subspecies, or isolated population which is so rare or depleted in number or so restricted in range of habitat due to any man-made or natural factors that it is in immediate danger of extinction or extirpation from the state, or which may attain such a status within the immediate future.
LT	Listed as Threatened Species by the FGFWFC. Defined as a species, subspecies, or isolated population which is acutely vulnerable to environmental alteration, declining in number at a rapid rate, or whose range or habitat is decreasing in area at a rapid rate and as a consequence is destined or very likely to become an endangered species within the foreseeable future. LT* (for Florida black bear) indicates that LT status does not apply in Baker and Columbia counties and in the Apalachicola National Forest.
LS	Listed as Species of Special Concern by the FGFWFC. Defined as a population which warrants special protection, recognition, or consideration because it has an inherent significant vulnerability to habitat modification, environmental alteration, human disturbance, or substantial human exploitation which, in the foreseeable future, may result in its becoming a threatened species. LS* indicates that a species has LS status only in selected portions of its range in Florida.
N	Not currently listed, nor currently being considered for listing.

Plants: Definitions derived from Sections 581.011 and 581.185(2), Florida Statutes, and the Preservation of Native Flora of Florida Act, 5B-40.001. FNAI does not track all state-regulated plant species; for a complete list of state-regulated plant species, call Florida Division of Plant Industry, 352-372-3505.

LE Listed as Endangered Plants in the Preservation of Native Flora of Florida Act. Defined as species of plants native to the state that are in imminent danger of extinction within the state, the survival of which is unlikely if the causes of a decline in the number of plants continue, and includes all species determined to be endangered or threatened pursuant to the Federal Endangered Species Act of 1973, as amended.

PE Proposed by the FDACS for listing as Endangered Plants.

LT Listed as Threatened Plants in the Preservation of Native Flora of Florida Act. Defined as species native to the state that are in rapid decline in the number of plants within the state, but which have not so decreased in such number as to cause them to be endangered. LT* indicates that a species has LT status only in selected portions of its range in Florida.

PT Proposed by the FDACS for listing as Threatened Plants.

CE Listed as a Commercially Exploited Plant in the Preservation of Native Flora of Florida Act. Defined as species native to state which are subject to being removed in significant numbers from native habitats in the state and sold or transported for sale.

PC Proposed by the FDACS for listing as Commercially Exploited Plants.

(LT) Listed threatened as a member of a larger group but not specifically listed by species name.

N Not currently listed, nor currently being considered for listing.

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FLORIDA
Natural Areas
INVENTORY

Tracking Florida's Biodiversity

SECTION 9.0

Florida Department of Transportation

The Florida Department of Transportation has reviewed the subject application and has found the following additional transportation related information is needed:

1. **An engineering diagram of the access of the Unit 3 Project Entrance Road to U.S. 17.**

   Engineering drawings will be prepared as part of post-certification activities. Seminole will provide the Department with engineering drawings as a Condition of Certification.

2. **A description with accompanying engineering diagrams of proposed improvements necessary at the intersection of the Unit 3 Project entrance Road and U.S. 17 to assure the safety of vehicles (especially trucks) turning in and out of the site, including all exclusive auxiliary lanes, rail crossing and water pipeline improvements in the vicinity of the intersection.**

   Proposed improvements were presented on Figure 3.9.2-1 (see Figure 9-1) of the SGS Unit 3 SCA and include an additional ingress lane and an extended deceleration/right turn lane on northbound U.S. Highway 17. The anticipated improvements include an extended left turn lane and a second left turn lane (dual left turn lanes) on southbound U.S. Highway 17, a traffic signal, pavement striping and stormwater retention/detention improvements. Engineering drawings will be prepared as part of post-certification activities. Seminole will commit to providing the Department with engineering drawings as a Condition of Certification. A traffic signal will be installed to allow acceptable operation at the connection to U.S. Highway 17. The necessary treatment for stormwater runoff will be the subject of a detailed study at the time design drawings are prepared for the improvements at this intersection.

   Seminole acknowledges that access to the State Highway System will be subject to the requirements of Chapters 14-96, State Highway System Connection Permits Administrative Process, and 14-97, Access Management Classification System and Standards, F.A.C. Certain activities on State transportation facilities will be subject to the requirements of the FDOT's Utility Accomodation Manual and Chapter 14-46, Utilities Installation or Adjustment, F.A.C.

   Seminole acknowledges that the operation of overweight/overdimensional vehicles on State transportation facilities during construction and operation of the utility facility are subject to safety and permitting requirements of Chapter 316, F.S. and Chapter 14-26, Safety Regulations and Permit Fees for Overweight and Overdimensional Vehicles, F.A.C.

3. **Plans for a signalization warrant study.**

   A traffic signal warrant study will be conducted prior to installation of the traffic signal at this location. Seminole acknowledges that traffic control will be subject to the following standards (whichever is more stringent):

   Manual on Uniform Traffic Control Devices;
   Chapter 14-94, Statewide Minimum Level of Service Standards, FAC;
   FDOT's Roadway and Traffic Design Standards; and
   FDOT's Standard Specification for Road and Bridge Construction.

SECTION 9.0

Florida Department of Transportation

4. **Identification of any new facilities with a height of 200 feet or more.**

   New facilities greater than 200 feet above proposed ground level include the following:

   - Unit 3 stack- approximately 675 feet
   - Boiler building - approximately 280 feet

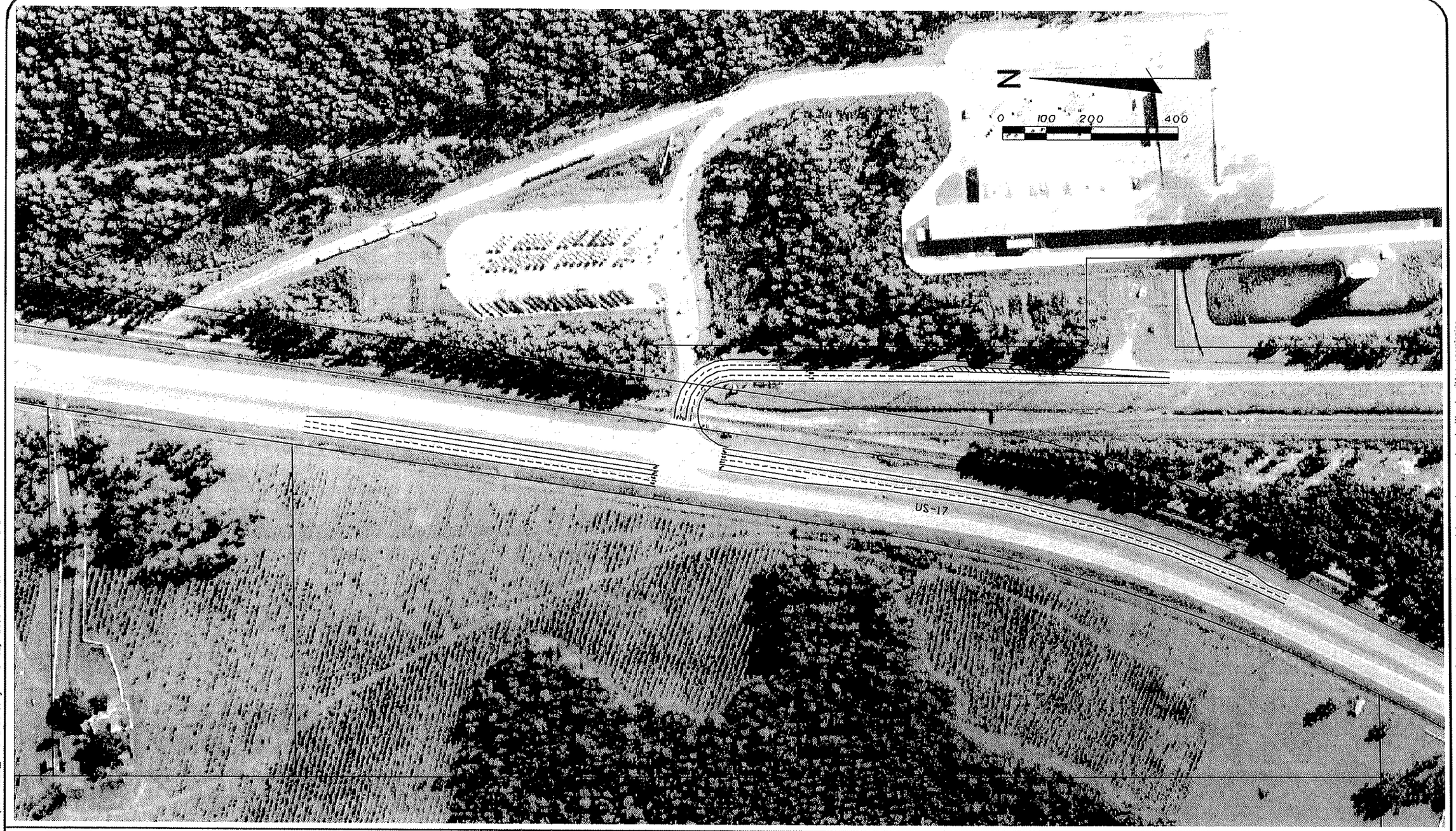
   A map highlighting the location of these structures is provided (See Figure 9-2). Seminole acknowledges that these structures are subject to the Federal Aviation Authority under provisions of the provisions of 14 CFR Part 77 and will complete the required aeronautical study prior to construction.

5. **A description with accompanying engineering diagrams of any stormwater ponds required as a result of widening the roads at the intersection.**

   Engineering drawings for the entire facility's storm water management system are typically prepared once the additional design has been accomplished and are proposed to be prepared as part of post-certification activities.

   Seminole acknowledges that stormwater drainage onto State of Florida right of way and transportation facilities will be subject to the requirements of Chapter 14-86, Drainage Connections, F.A.C, including the attainment of any required construction permits.

   Seminole will commit to providing the Department with engineering drawings of the stormwater management system required for the proposed U.S. Highway 17 entrance intersection improvements as a Condition of Certification.



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DESCRIPTION:

SEMINOLE ELECTRIC COOPERATIVE, Inc.
PROJECT ENTRANCE UPGRADES

PROJ No. 2005-54	DATE. 9/23/05	FIGURE.
EPN: 2005-0054	DRAWN BY: E.P.P.	9-1
SCALE: 1"=200'		

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I:\2005-054\CAD\2005-054-EXC_MPC-SUB1.dwg - Mar 02, 2006 @ 8:42am - mmorton



LEGEND

New Construction

0.05 0 0.05 Miles

N

REFERENCE

1. Site Plan, Burns & McDonnell
2. 2004 aerial photography, USGS Digital Ortho Quarter Quadrangles (DOQQ)

PROJECT
SEMINOLE ELECTRIC COOPERATIVE INC.
SGS UNIT 3
PUTNUM COUNTY, FL

TITLE
SITE PLAN
STRUCTURE > 200 FEET IN HEIGHT

Golder Associates
Tampa, Florida

PROJECT No. 053-9540			SCALE AS SHOWN	REV. 0
DESIGN	QY	9 June 2006		
GIS	QY	9 June 2006		
CHECK	MM	9 June 2006		
REVIEW	MM	9 June 2006		

FIGURE: 9-2

F:\PROJECTS\2006 PRO\053-9540\053954001\C9-2.mxd

SECTION 10.0

Florida Division of Historical Resources

1. **A review of the Florida Master Site File and our records indicates that several historic homestead sites (8PU114 – 8PU116) are located within the project parcel. Based on available information, 8PU114 and 8PU116 are outside of the proposed project area, but 8PU115 may be located within the proposed "site laydown area". It is the opinion of this agency that Seminole Electric Cooperative, Inc. should avoid site 8PU115 in all project activities, including staging areas. Contingent upon the avoidance of site 8PU115 and based on available information, the proposed project should have no effect on historic properties.**

   Janus Research conducted a search of historical documents, books, maps and other materials to research the Hampton Homestead site (8PU115). No mention of John or Wade Hampton was found in the documents, and no additional maps were found other than those presented in the 1978 archaeological survey showing the location of the homestead. The lack of mention of the Hamptons suggests that they had little historical importance. Janus Research also performed a field reconnaissance survey that included a surface inspection using metal detectors and screened judgmental shovel tests on June 15 and 16, 2006 at the reported site location. The lack of surface sand exposure due to about an inch of leaf litter made surface inspection difficult. However, a pedestrian survey was conducted in transects with a metal detector at 25 meter intervals. Subsurface tests were 50cm in diameter and were dug one meter in depth at several locations. All positive "hits" by the metal detector revealed modern metal debris such as aluminum cans, iron rebar, and bottle caps. Much of the area was previously disturbed by pipeline construction in the early 1980s, and a linear clearing shows the original path of the pipeline. Soils in the shovel tests indicated modern disturbance, evidenced by the inclusion of modern debris and banded and mottled soil profiles.

   All work was performed to comply with Chapter 267, F.S. and minimum field methods, data analysis, and reporting standards embodied in the *Historical Preservation Compliance Review Program of the Florida Division of Historical Resources* and Chapter 1A-46 of the Florida Administrative Code. The results of the study concluded that no artifacts were located at the reported site location and no evidence of structural remains was observed. Therefore, site avoidance is not required.

Florida Department of Agriculture/Consumer Services

1. **To assist in our review, we would like to know from the applicant if a portion of the fuel used in the proposed power plant could be biomass? It is our understanding the Lakeland McIntosh Unit 3 can burn a small percent of municipal waste with the coal it uses. the use of biomass as an alternative fuel is worthy of consideration as the successful utilization of biomass may generate positive attention for efforts to use a renewable resource that may decrease impacts on air quality as well as alleviate some of the load stress current waste disposal sites may experience now and in the future. The production of crops for the purpose of generating biomass has the potential to become an important agricultural commodity that could significantly support rural economies.**

   Seminole has not proposed to utilize biomass fuels in conjunction with Unit 3. Seminole finds it more cost effective and efficient to derive biomass energy from the types of facilities described below. Introducing biomass fuel at Unit 3 has the potential to create significant operational complications. Note that Seminole does utilize petroleum coke (up to 30%) at Units 1 and 2, and has proposed the use of petroleum coke for Unit 2. Petroleum coke is an alternative fuel particularly suitable for these pulverized coal units because it has many of the same handling and burning characteristics as coal.

   It is noteworthy that Seminole's overall energy portfolio includes contracts to purchase firm capacity and energy from three renewable resource facilities. These purchases currently total 54 MW and could expand to as much as 98 MW from existing resources. More specifically:

   1) Seminole entered into a long-term purchased power agreement in 1999 with Lee County, Florida purchasing the net capacity and energy from the County's Resource Recovery Facility. That facility has a rated capability of 35 MW. The facility's size and Seminole's capacity entitlement is expected to increase to approximately 55 MW by April, 2007, and under the contract the County may increase facility capacity up to a maximum of 79 MW.

   2) On May 14, 2004 Seminole entered into a long term agreement with DG Telogia Power, LLC that provides Seminole net capacity and energy from the biomass fired steam turbine generator located near Telogia, Florida. That facility has a rated capability of 12 MW.

   3) On November 19, 2004 Seminole entered into a five year purchased power agreement to purchase the entire electrical output from a landfill gas project owned by Bio-Energy Partners in Pompano Beach. That facility has a rated capability of 7 MW.

   Seminole continues to seek out renewable resources in parallel with its more formal competitive bidding activities.

SECTION 12.0

U. S. Environmental Protection Agency - Region IV

The United States Environmental Protection Agency has reviewed the application and provides the following comments to FDEP:

1. **Design Information - The PSD permit application itself contains very few design details for project equipment components (boiler manufacturer and design specifications, emissions control equipment manufacturers and design specifications, etc.). I hope that additional details are provided in the other documents that comprise the total site certification package.**

   The Site Certification Application contains the design information available at the time of application. Seminole has not yet requested bids or selected equipment suppliers. Therefore no equipment has been purchased and specific detailed design information is not available at this stage of the project, but can be provided post-certification.

2. **Creditable Emissions Decreases for Netting - I have the following comments on the netting analysis for the project:**

   a. **A critical component of the proposed project is the use of emissions decreases that allow the project to net out of PSD review for SO_2, NO_X, and SAM emissions. You of course need to check the quantitative netting calculations. You also need to decide if emissions controls being applied for other regulatory purposes such as compliance with the Clean Air Interstate Rule are acceptable as a creditable emissions decrease for PSD netting purposes.**

   b. **Table 3-3, PSD Netting Analysis, contains this footnote: "Units 1 and 2 baseline actual emissions are based on Tables B-4E through B-4S, supplied with the Units 1 and 2 application." For a complete public record of the Unit 3 permitting process, the netting tables need to be included with the Unit 3 project docket and not merely cited by reference to another application.**

   c. **As you review the PSD netting analysis for the proposed Unit 3 project, please keep in mind a regulatory requirement that is often overlooked. The requirement is found in your definition of "net emissions increase." A decrease in emissions is creditable in a netting analysis only if "It has approximately the same qualitative significance for public health and welfare as that attributed to the increase from the particular change."**

   Section 3 of the SCA and the Application for PSD Permit (Appendix 10.1.5) provides in detail Seminole's PSD applicability analysis. Specifically, due to the substantial reductions in air emissions resulting from the installation and upgrade of air pollution controls on Units 1 and 2, the construction and operation of the new Unit 3 will only trigger PSD for PM/PM_{10}, CO, VOC and fluorides. Unit 3 will net-out of PSD for SO_2, NO_X, and SAM, and Seminole is voluntarily committing to a facility-wide decrease in mercury emissions, even after Unit 3 comes online.

   The emission reductions Seminole is achieving on Units 1 and 2 are available for PSD netting calculations, in addition to assisting with compliance with the Clean Air Interstate

Rule (CAIR) and the Clean Air Mercury Rule (CAMR). First, both CAIR and CAMR allow a source to choose the most cost-effective approach to compliance -- reduce emissions or obtain allowances – and do not require/impose a unit or facility-specific emissions limit. Moreover, even if Units 1 and 2 become subject to specific emission limits through the pending upgrade project permit, the federal and state PSD rules do not prevent these reductions from also being used for PSD netting purposes. Specifically, Rule 62-212.400(2)(a) requires a source to subtract its "baseline emissions" from the "projected actual emissions" to determine whether a "significant net emission increase" occurs. Pursuant to Rule 62-210.200(34)(a), an electric utility steam generating unit does not have to adjust its baseline emissions downward to exclude emissions in excess of current limits. Accordingly, Unit 3 is appropriately netting out of PSD for SO_2, NO_X and SAM by substantially reducing these emissions via control installation/upgrades on Units 1 and 2.

Also, the air emission reductions from SGS Units 1 and 2 provide approximately the same qualitative significance as the potential increase from Unit 3, and are therefore creditable for PSD netting purposes. Specifically, the reductions are occurring: (1) before the startup of Unit 3, (2) in a similar geographic location (the stacks for all 3 units are approximately 700 feet apart), (3) year around, and not just during a particular time of the year, such as the ozone season, and (4) at the same general stack height. Moreover, Seminole's application demonstrates that the addition of Unit 3 will not cause or contribute to an exceedance of any ambient air quality standard.

3. **Particulate Matter BACT - SECI's proposed PM/PM_{10} BACT emissions rate is 0.015 lb/MMBtu. I am not sure if this rate is for filterable particles only or for both filterables and condensibles. I recommend that any permit issued for this project include a filterables emissions limit for which compliance will be assessed using a PM CEMS, and a total PM_{10} emissions limit for which compliance will be assessed using annual Method 201A/Method 202 tests or some comparable test method that accounts for condensibles. I understand that PM CEMS equipment may exist for measurement of both filterable and condensible particles, but I do not have any details on this.**

The proposed 0.015 lb/MMBtu emission rate is for filterable PM only. To our knowledge, PM CEMS measure filterable PM only. It should be noted that Method 202 is well known to produce "artifact" false indications of condensible $PM_{2.5}$. For this reason, appropriate corrections to the method will be necessary if this method is to be used for determination of compliance with condensible $PM_{2.5}$ emission limits. For a discussion by EPA of the inherent problems with Method 202, see the following weblink:

http://www.epa.gov/ttn/emc/methods/method202.html.

There are four basic types of Particulate CEMS: 1) Light Scatter; 2) Probe Electrification; 3) Optical Scintillation; and 4) Beta Attenuation.

These types of CEMS cannot be applied in all particulate monitoring situations and this information is well documented in U.S. EPA Publications, such as *Current Knowledge of Particulate Matter (PM) Continuous Emission Monitoring, EPA-454/R-00-039, September 2000.* For example, Light Scatter monitors measure liquid droplets as PM and cannot be used after a wet scrubber. Probe Electrification monitors are affected by

particle charges and measure liquid droplets as PM and therefore cannot be used after an ESP or wet scrubber. Optical Scintillation monitors also measure liquid droplets as PM and cannot be used after a wet scrubber. This only leaves one type of PM monitor that could be installed – the Beta Attenuation type.

There are several manufacturers of this type of CEMS and the method is based on the difference in the amount of Beta particles that reach the detector before and after particulate is deposited on a capture tape. The reduction in Beta particles reaching the sensor is correlated to a particulate value. TECO was required to install a Mechanical Systems, Inc. (MSI) Beta PM monitor for evaluation, as a condition of their recent EPA settlement. The evaluation report is not complete and reportedly had many problems with operation and maintenance. The problems associated with Beta monitors do not appear to be with the chemistry/physics of the detection method, but rather with the practical issues of sample extraction, transport and maintenance. One specific problem involves maintaining isokinetic sampling in gas streams that vary in velocity, such as in power plants following load. The monitor must have the capability to adjust its sampling rate to maintain isokinetic sampling.

An additional problem with Beta monitors is maintaining a high sampling velocity to ensure that the particles are not deposited on the sample tubing before the collection tape. In order to accomplish this, the present sample tubing maximum length is only 50 feet. This transfers into additional problems of locating an air-conditioned CEMS shelter containing the Beta counter and full rack of monitors and PLCs on a stack. Additionally, maintenance would be a problem as Seminole technicians would have to constantly access the system 450 feet up the stack via elevator and/or ladder.

With respect to condensable PM, many PM CEMS make measurements in-situ or measure at elevated temperatures, therefore these devices cannot be calibrated to measure condensable PM. Many PM CEMS operate in temperature regimes that are higher than the temperature EPA defines for condensable PM.

RMB Consulting & Technology, Inc., which has been involved in the evaluation of Tampa Electric's Beta counter PM CEMS at Big Bend Station, has concluded that the system has not been able to meet the requirements set forth in EPA's PS-11. They also stated that, in simplest terms, the relationship between readings from the PM CEMS and concurrent reference method tests is variable and unpredictable.

4. **<u>CO and VOC BACT</u> - SECI comments on page 52 of the draft application that the proposed CO and VOC BACT emissions rates are "within the range of emission rates recently established as BACT." For a proposed new coal-fired EUSGU with the latest design features, justification is needed as to why the proposed BACT emissions rates are not at the low end of the range of previous BACT determinations or even less.**

Refer to the response to Number 4 in Section 1.0 regarding CO emissions. VOC emissions result from incomplete combustion of the fuel as a result of staged combustion, low-NO_X burners and other NO_X reduction techniques, poor air/fuel mixing or insufficient oxygen for combustion. The control method for VOC emissions is combustion controls. If the combustion controls are optimized to minimize CO and VOC emissions, then the NO_X emissions will not be minimized and additional reliance will be

placed on the effectiveness of the SCR system to control the additional NO_X emissions. Regarding VOCs, Seminole is proposing a BACT limit (0.004lbs/MMBtu) at the level of the projected vendor guarantee.

5. Petroleum Coke - **SECI has based its application on a fuel mix containing up to 30 percent petroleum coke (petcoke). Any permit you issue for this project should contain a permit condition specifying the maximum allowed petcoke percentage and a method of tracking this percentage. (Also see additional comment about petcoke in next item.)**

SGS Units 1 and 2 are currently subject to a 30 percent petcoke blend requirement, pursuant to Title V Air Operation Permit No. 1070025-002-AV, Condition A.3. "The only fuels allowed to be fired are coal with a maximum of 30 percent petroleum coke (by weight), No. 2 fuel oil, and on-specification used oil." Pursuant to Condition A.66, SGS has been submitting annual documentation to FDEP demonstrating compliance with this requirement since 1997. This annual documentation includes records of the coal and petcoke quantities actually fired and a copy of Seminole's Petcoke Blending Procedure (CYEO-9R3). Seminole expects conditions to be included in the PSD permit for Unit 3 similar to those for Units 1 and 2.

6. Sulfur Dioxide - **Although the netting analysis appears to exempt the project from PSD review (and BACT) for SO_2 emissions, methods for minimizing SO_2 emissions should still be given careful consideration. I have the following comments on control of SO_2 emissions:**

a. **SECI describes four types of bituminous coal with similar heating values ranging in sulfur content from 0.1 to 3.8 percent by weight. A variability factor of 38 (3.8 ÷ 0.1) in sulfur content is considerably more than is typical for a permit application. If you decide to issue a permit without further selection of a specific coal type on SECI's part, the permit should contain variable SO_2 limits pegged to coal type and coal sulfur content.**

As explained in the SCA and Application for PSD Permit, Seminole is designing the FGD system for Unit 3 to operate at 98% efficiency. And as noted in this question, because of the facility-wide decrease in SO_2 emissions even after Unit 3 comes online, this project is not subject to PSD review for SO_2. Therefore, there is no basis for imposing varying SO_2 limits based on coal types or sulfer content. The requested limit accounts for the worst-case sulfur content and SGS Unit 3 will also comply with the 90 percent removal requirement in NSPS Subpart Da.

b. **Whatever coal type is selected, SECI will have to import coal from long distances. SECI's preference for a bituminous coal appears to be based in part on the convenience of using a coal type that is similar to the coal type currently burned in Units 1 and 2. I recommend that you ask SECI for an explanation as to why exclusive use of low-sulfur Western coal (such as Powder River Basin coal) is not an option.**

As explained in the SCA and Application for PSD Permit, firing the same type of fuel in SGS Units 1, 2,and 3 maximizes the co-use of existing coal handling areas and equipment (rail lines, unloading facilities, storage facilities, conveyor systems, etc.), avoiding the

need to impact additional property and to construct separate facilities dedicated solely to Unit 3.

The exclusive use of Powder River Basin (PRB) coal is estimated to cost SECI between $40,000,000 and $66,000,000 per year in fuel and transportation costs. This estimate is based on PRB costs of $0.90/MMBtu to $1.50MMBtu greater than Eastern Bituminous coal due to transportation and a lower heating value of 8,800 Btu/lb vs Eastern Bituminous at 12,500 Btu/lb. Additional capital cost would be required for separate coal handling facilities dedicated to the new Unit 3. Furthermore, the present state of the transportation and mining capacity for the PRB coal places increased risk on the ability to deliver PRB to Florida, and therefore on the reliability for future operation on this fuel source.

In addition, the FDEP recently released a comprehensive *Energy Plan* which was developed as a result of an executive order issued by Governor Jeb Bush. The State's Plan addresses the need to have an adequate, reliable, diverse, efficient and affordable energy supply. One of the tasks is to amend Chapter 403.519, Florida Statutes, to allow the Florida Public Service commission to consider fuel diversity and fuel reliability as factors when determining the need for new electric generation. Based on the discussion above, utilizing PRB coal raises significant concerns regarding reliability and affordability.

c. SECI proposes to burn a fuel blend with up to 30 percent petroleum coke (petcoke) in Unit 3. The stated petcoke sulfur content is as high as 6.8 percent by weight. If SECI can not assure that the petcoke sulfur content will seldom be at this high level, you should give consideration to restricting the fuel blend to less than 30 percent petcoke content.

In 1995 and 1996, Seminole began efforts to permit the use of petcoke as a fuel in SGS Units 1 and 2. This began by conducting a detailed test burn with approval and guidance from the FDEP. Based on this information, Seminole received a permit modification to PSD Permit No. PSD-FL-018(A) on April 30, 1997. The sulfur content limit for petcoke in this permit is 7.0 percent. This same limit has been carried forward into the original Title V Permit and the subsequent renewal permit. The 6.8 percent sulfur in the application is Seminole's contract reject limit and is the maximum used in the worst-case blended fuel range.

Historically (1995-present), Seminole has seen petcoke sulfur range from 3.25 percent to 7.0 percent. The sulfur content is extremely variable and dependent on the oil source and refinery. Although our typical petcoke sulfur is approximately 5.0 to 5.5 percent, SECI needs to maintain the 7.0 percent limit for the same cost and availability reasons as discussed above. The SGS Unit 3 sulfur control equipment (FGD-98 percent removal and Wet ESP) will be designed to adequately control the worst-case blended sulfur range presented in the application.

d. SECI plans to use No. 2 distillate fuel oil with a sulfur content of 0.5 percent by weight as fuel for an emergency generator and for three ZLD spray dryers. No. 2 fuel oil with much lower sulfur content than 0.5 percent is readily available now and will be even more so in the future. Unless SECI can show that the availability of a lower sulfur fuel oil is questionable or that

the cost of lower sulfur fuel oil is prohibitively expensive, you should give consideration to prescribing that fuel oil sulfur content be on the order of 0.05 percent or less. (Incidentally, it is not clear to me from the PSD permit application why a ZLD design requiring combustion of millions of gallons of fuel oil per year is preferable to a liquid discharge design from an environmental and energy use standpoint.)

Seminole will accept the use of 0.05 percent sulfur oil in the ZLD spray dryers. Regarding the justification for the ZLD system, Seminole explained in detail in the SCA, and presumes the Department is aware of, the substantial environmental benefits achieved by such reductions in liquid discharges from SGS.

7. Nitrogen Oxides - **The netting analysis appears to exempt the project from PSD review (and BACT) for NO_X emissions. Methods for minimizing NO_X emissions should still be given careful consideration, however. Specifically, the proposed NO_X emissions limit for Unit 3 of 0.07 lb/MMBtu is not representative of the emission rate that could be expected for a newly designed supercritical PC boiler firing bituminous coal. A recent example related to this point is the Louisville Gas & Electric (LG&E) Trimble County project in Kentucky. LG&E recently received a permit to construct a new PC supercritical bituminous coal-fired EUSGU at an existing power station. Although the project netted out of PSD review for NO_X, the NO_X emissions limit for the EUSGU is equivalent to an emissions rate of 0.05 lb/MMBtu.**

See the response above regarding the CO limit, and the relationship between CO and NO_X emissions. Further, Seminole is not aware of an operational supercritical unit demonstrating NO_X emissions less than 0.07 lb/MMBtu.

8. Startup and Shutdown Conditions - **Emissions from proposed new coal-fired EUSGU's during startup and shutdown conditions have been receiving increased attention. As a case in point, a number of recent coal-fired power plant projects have been opposed by environmental groups, and startup/shutdown issues have been among the concerns raised by these groups. If you issue a permit for Unit 3, the permit will need to include provisions on startup and shutdown. Some ideas on this point are as follows:**

   a. **The permit should contain an objective definition of what constitutes a condition of startup or shutdown so that emissions occurring during startup and shutdown can be identified separately from other emissions.**

   b. **Since startup and shutdown events are part of normal operation for a utility boiler, you should give consideration to establishing numeric emissions limits for these events.**

   c. **You might also consider a permit requirement that SECI provide a startup and shutdown emissions minimization manual by a date certain prior to start of commercial operation. Such a manual would include specific measures for minimization of emissions during startup and shutdown and not just a general statement that "good work and maintenance practices and manufacturer's recommendations" will be followed. For example, the**

manual would specify the time at which control methods (SCR, ESP, FGD) must be activated following the initiation of a startup.

Seminole expects that conditions will be included in the PSD permit for Unit 3 similar to the conditions for Units 1 and 2, related to minimizing excess emissions during startup and shutdown. Seminole intends to submit its startup and shutdown procedures during the post-certification process.

9. IGCC Discussion - **On page 56 of the permit application SECI comments on IGCC technology with reference to the letter from Stephen Page of EPA dated December 13, 2005. Please consider the following two points concerning the EPA letter: (1) Mr. Page does not say in the letter that a state reviewing authority is prohibited from considering IGCC in a BACT evaluation for a PSD permit. (2) Although Mr. Page states an opinion that EPA would not require consideration of IGCC as a BACT option, he points out that consideration of IGCC might be appropriate with respect to section 165(a)(2) of the Clean Air Act specifying that opportunity be afforded for public comment on "alternatives" to a proposed project.**

Section 4.4 of the Application for PSD Permit, and Section 8.3.3 of the SCA summarize Seminole's consideration of IGCC technology. Seminole agrees with the conclusion in EPA's December 13, 2005 letter that the PSD rules do not require an applicant for a new pulverized coal unit to consider IGCC in a BACT analysis. This is especially true for Seminole's Unit 3 project, where PSD is not triggered for SO_2, NO_X, SAM or mercury. As stated previously, emissions of these pollutants will actually decrease even after Unit 3 comes online.

10. Mercury - **The method of controlling mercury emissions from Unit 3 proposed by SECI is a co-benefit approach. That is, mercury emissions will be reduced as a co-benefit of controls installed for other pollutants. I recommend that consideration also be given to use of a specific add-on mercury control method. If you decide to issue a permit for this project without specific mercury controls, I further recommend that the permit specify a project layout that will accommodate future installation of a specific mercury control method.**

Unit 3, and the entire facility, will comply with the NSPS and cap and trade program as imposed by EPA and DEP. Seminole is reducing facility-wide mercury emissions even after Unit 3 comes online, committing to 90 percent removal on Unit 3, and accepting a limit at approximately one-third of the NSPS level. Seminole will design Unit 3 to accommodate a mercury-specific control in the unlikely event it cannot meet the requested limits.

11. State Ambient Air Quality Standards - **In addition to national ambient air quality standards and PSD increments, you have state ambient air quality standards (SAAQS) for SO_2. Please verify that the information in the PSD permit application is adequate for assuring compliance with the SO_2 SAAQS.**

As shown in the response to the Department's Question No. 5, the maximum SO_2 concentrations predicted for the Seminole Generating Station, including Units 1 and 2 and the proposed Unit 3 together with background sources, comply with the SO_2 National and State AAQS and PSD Class II increments.

12. Emergency Generator - **SECI states on page 12 of the application that "the emergency generator is an exempt emission unit and can be considered an insignificant activity for air permitting purposes." Just as a reminder, the concept of an "exempt emission unit" or an "insignificant activity" does not exist in PSD permitting rules. Any new or modified unit or activity that causes a net increase in emissions of a pollutant subject to PSD review should be assessed.**

Comment noted.