

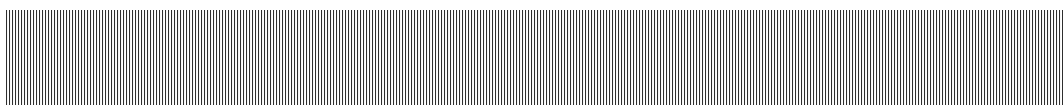
**Solid Waste Authority of Palm Beach County
Palm Beach Renewable Energy Facility No. 2**

Volume I

**Petition to Modify
Conditions of
Certification PA 84-20:
Palm Beach Renewable
Energy Facility No. 2**



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Volume III (PSD Permit Application)

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*A detailed Table of Contents for the Prevention of Significant Deterioration Air Permit Application is provided in Volume III.

A. Abbreviated Terms and Definitions

A.1. Abbreviated Terms

The abbreviated terms contained in this Application are set forth below. These terms are defined when they are first used in this Application. The following list is provided for the reader's reference.

AAQS	Ambient Air Quality Standards
ACC	Air Cooled Condenser
ACI	Activated Carbon Injection
ADICPR	Advanced Interconnected Channel and Pond Routing
APC	Air Pollution Control
AR	Agricultural Residential
ASCE	American Society of Civil Engineers
Authority	Solid Waste Authority of Palm Beach County
BACT	Best Available Control Technology
BGS	Below Ground Surface
BOR	Basis of Review
BTU	British Thermal Unit
C&D	Construction and Demolition
CEC	Cation Exchange Capacity
CESQG	Conditionally Exempt Small Quantity Generator
CFR	Code of Federal Regulations
CN	Curve Number
CO	Carbon Monoxide
CO₂	Carbon Dioxide
County	Palm Beach County
CT	Cooling Tower
DAHRM	Department of State, Division of Archives, History and Records Management
dBA	A-weighted decibel
ECRWRF	East Central Regional Water Reclamation Facility
EAR	Evaluation and Appraisal Report
EIS	Environmental Impact Statement
EMF	Electric and Magnetic Field
EOP	Edge of Pavement
EPA	Environmental Protection Agency
ERP	Environmental Resource Permit
ERCP	Elliptical Reinforced Concrete Pipe

ESP	Electrostatic Precipitator
F.A.C.	Florida Administrative Code
FDA	Florida Department of Agriculture
FDEP	Florida Department of Environmental Protection
FDOT	Florida Department of Transportation
FEMA	Federal Emergency Management Agency
FF	Fabric Filter
FFE	Finished Floor Elevation
FHA	Federal Highway Administration
FPL	Florida Power and Light Company
F.S.	Florida Statutes
GCP	Good Combustion Practices
GPD	Gallons Per Day
HCL	Hydrogen Chloride
Hg	Mercury
HHW	Household Hazardous Waste
HLDI	High Level Disinfection
HUD	Department of Housing and Urban Development
HVTL	High Voltage Transmission Lines
ISWM	Integrated Solid Waste Management Plan
KV	Kilovolt
KWh	Kilowatt Hour
LCD	Local Climatological Data
LOS	Levels of Service
MCDs	Mercury Containing Devices
MGD	Million Gallons Per Day
MRF	Materials Recovery Facility
MSL	Mean Sea Level
MSW	Municipal Solid Waste
MW	Megawatt
MWC	Municipal Waste Combustor
NCRRF	North County Resource Recovery Facility
NEPA	National Environmental Policy Act
NOAA	National Oceanic and Atmospheric Administration
NO_x	Nitrogen Oxide
NSR	New Source Review
NGVD	National Geodetic Vertical Datum
NPBWCD	North Palm Beach Water Control District
NVGD	Niging Van Grammofoonplaten Detaillisten
OCC	Organic Carbon Concentration
O&M	Operation and Maintenance
PBREF	Palm Beach Renewable Energy Facility
PCPI	Per Capita Personal Income

PM	Particulate Matter
POV	Personnel Occupied Vehicle
PPM	Parts Per Million
PPA	Power Purchase Agreement
PPSA	Power Plant Siting Act
PPSC	Power Plant Siting Certification
PSC	Public Service Commission
PSD	Prevention of Significant Deterioration
PSF	Per Square Foot
RCP	Reinforced Concrete Pipe
RDF	Refuse Derived Fuel
RMPF	Recovered Materials Processing Facility
ROW	Right of Way
RPM	Revolutions Per Minute
SCR	Selective Catalytic Reduction
SCS	Soil Conservation Services
SDA	Spray Dryer Absorber
Sf	Square Foot
SHS	Stormwater Harvesting System
SHWT	Seasonal High Water Table
SNCR	Selective Non-Catalytic Reduction
SIZ	Special Impact Zone
SO₂	Sulfur Dioxide
SO_x	Sulfur Oxide
SPT	Standard Penetration Test
SFWMD	South Florida Water Management District
SWMS	Stormwater Management System
T_c	Time of Concentration
TPD	Tons Per Day
TPY	Tons Per Year
T-G	Turbine Generator
TSS	Total Suspended Solids
UIC	Underground Injection Control
USACE	United States Army Corps of Engineers
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
UTM	Universal Transverse Mercators
VOC	Volatile Organic Compound
WCA	Water Catchment Area
WTE	Waste-to-Energy
WWTP	Wastewater Treatment Plant

A.2. Definitions

Unless otherwise defined in this Application, all of the terms contained in this Application are defined below. The terms listed below appear in multiple sections of this Application. They are defined when they are first used in the Application. They are listed here for the reader's reference.

Application means this Petition to Modify Conditions of Certification PA 84-20: Palm Beach Renewable Energy Facility No. 2, which is being submitted in accordance with the requirements of the FDEP Application Instruction Guide, Electrical Power Plant Sites and Associated Facilities, draft September 19, 2009.

Authority means the Solid Waste Authority of Palm Beach County.

City means the City of West Palm Beach, Florida.

County means Palm Beach County, Florida.

Existing Facility means the existing facility, (previously referred to as the North County Resource Recovery Facility "NCRRF"), which is a 1,800 tpd refuse derived fuel waste-to-energy facility, which officially is now referred to as PBREF No.1

Landfill means the North County Landfill operated at the Energy Park by the Authority. The Landfill consists of a Class I and a Class III disposal area.

Laws of Florida A verbatim publication of the general and special laws enacted by the Florida Legislature in a given year and published each year following the regular session of the legislature. It presents the laws in the order in which they are numbered by the Secretary of State, as well as resolutions and memorials passed by the legislature.

Original Certification means the 1985 Conditions of Certification PA 84-20.

Palm Beach Renewable Energy Park (Energy Park) means the 1320-acre site located in Palm Beach County on Jog Road between State Road 710 (Beeline Highway), and State Road 702 (NW 45th Street), and that was certified for power generation under Site Certification PA 84-20. The Energy Park includes PBREF No. 1, Landfill, a ferrous metals processing facility, a composting facility, a recovered materials processing facility, household hazardous waste drop-off, sewage sludge pelletizer, the Authority's administrative offices, and is the site of the Proposed PBREF No. 2.

Palm Beach Renewable Energy Facility (PBREF) No.1 means the Existing Waste-To-Energy facility located in the Energy Park. It was previously called the NCRRF.

Palm Beach Renewable Energy Facility (PBREF) No.2 means the Proposed Facility.

Project Area means the Proposed Facility area including the edge of pavement of Jog Road on the east, the existing conservation area on the west, the northern edge of the existing entrance road to the north, and portions of the existing PBREF No. 1, Visitor's Center, and maintenance building to the south.

Project Site means the area where PBREF No. 2 will be constructed. The Project Site is located immediately north of the Authority PBREF No. 1.

Proposed Facility means the Authority's Proposed New PBREF No. 2. The Proposed Facility is a 3,000 tpd mass burn waste-to-energy facility that will be located at the Energy Park on the Project Site, which is immediately north of the Authority's Existing Facility.

B. Executive Summary

The Solid Waste Authority of Palm Beach County (Authority) needs to expand its solid waste processing and electrical generation capacity by constructing a new renewable energy facility to process the solid waste generated by the residents and businesses in Palm Beach County, Florida. The new facility will be called the Palm Beach Renewable Energy Facility Number 2 (Proposed Facility).

The Proposed Facility will be constructed adjacent to the Authority's existing Palm Beach Renewable Energy Facility Number 1, which is known as the North County Resource Recovery Facility (Existing Facility). The Proposed Facility will be built on an approximately 24-acre site (Project Site) that is centrally located within the Authority's 1,320-acre Palm Beach Renewable Energy Park (Energy Park) in West Palm Beach, Florida, as illustrated by Figure B-1.

The Energy Park was certified as a power plant site under the Florida Electrical Power Plant Siting Act (PPSA) in 1986. The Authority is filing this "Petition to Modify Conditions of Certification PA 84-20: Palm Beach Renewable Facility No. 2" (Application) because the Authority is requesting a modification of the existing PPSA Conditions of Certification to allow the construction and operation of the Proposed Facility in the Energy Park.

The Proposed Facility will have three 1,000 ton per day (tpd) mass-burn municipal waste combustor (MWC) units and associated

equipment. The three units collectively will be able to process 3,000 tpd of municipal solid waste (MSW). Energy extracted from the combustion of MSW will be converted into electricity by a highly efficient steam turbine generator, which will have a rated capacity of approximately 100 megawatts (MW).



Figure B-1 Energy Park Facilities

The Proposed Facility will use an air cooled condenser to provide dry cooling of excess steam from the steam turbine generator, thereby minimizing water demands. The Proposed Facility will use Best Available Control Technology to comply with emissions limits for Nitrogen Oxides (NO_x), Sulfur Dioxide (SO₂) and Mercury (Hg) that are

lower than the permit limits for any MWC unit operating in the United States. Continuous emissions monitors will be used to demonstrate on-going compliance with federal and state air quality regulations.

No adverse impacts on human health or the environment are anticipated from the airborne emissions from the Proposed Facility. The Proposed Facility will not cause any increases in the emissions from the Existing Facility or other existing operations at the Energy Park.

The construction and operation of the Proposed Facility will comply with all of the applicable nonprocedural requirements of the local, regional, and state agencies with jurisdiction over the Proposed Facility. No variances from any applicable state, regional and local standards are needed for the construction and operation of the Proposed Facility.



Figure B-2 Conceptual Illustration of Proposed Facility (from east)

The Proposed Facility will complement the services already provided by the Authority and will help implement the Authority's 2006

Integrated Solid Waste Management Plan (ISWM Plan). Under the ISWM Plan, the Authority operates programs and facilities that effectively and economically manage solid waste through source reduction, recycling, composting, combustion and disposal. The Authority's solid waste management system includes the Existing Facility, Landfill, a ferrous metal processing facility, a composting facility, a vegetation processing facility, a Recovered Materials Processing Facility (RMPF), household hazardous waste (HHW) collection facilities, a sewage sludge pelletizer, and five Transfer Stations. A sixth Transfer Station is under construction. All of the Authority's facilities, except the Transfer Stations and HHW collection facilities, are located at the Energy Park.

The Authority's Application for the Proposed Facility is divided into the following sections, which contain the information highlighted below.

Section 1. Need for Power

The PPSA certification for the Energy Park only authorizes the Authority to generate 75 MW. Accordingly, the Authority will be seeking concurrently a new determination of need from the Florida Public Service Commission (PSC) for an ultimate site capacity of 185 MW.

Section 2. Site and Vicinity Characterization

The Energy Park was annexed into the City of West Palm Beach after being certified under the PPSA. The Project Site, and the construction and operation of the Proposed Facility, are consistent and in compliance with the applicable provisions of the City's Comprehensive Plan and zoning ordinances. The land use designation in the Comprehensive Plan is Special Impact

Zone/Community Service (SIZ/CS). The zoning designation is Community Service (CS). A “Class A” special use permit allows a heavy utility use and construction of resource recovery and landfill facilities.

The Project Site provides no critical habitat for wildlife. A portion of the Project Site is a borrow lake (South Borrow Lake) which was excavated to provide fill for the construction of the Existing Facility. Most of the South Borrow Lake will be filled, pursuant to a federal dredge and fill permit and PPSA Conditions of Certification, before construction commences on the Proposed Facility.



Figure B-3 Conceptual Illustration of Proposed Facility (from northeast)

Section 3. The Plant and Directly Associated Facilities

The Proposed Facility will consist of an enclosed tipping floor and refuse storage pit, three MWC units, air pollution control systems, stack, air cooled condenser, a metals recovery and ash storage building, turbine-generator, switchyard, maintenance building and warehouse, administration building, stack, ancillary equipment and structures, and interior roadways. The scale house that serves

the Existing Facility will also serve the Proposed Facility.

There will not be any significant pre-processing of wastes at the Proposed Facility. Recyclable materials will be separated from the solid waste at the source of generation, and the source separated recyclable materials will be taken to the RMPF for processing. The Proposed Facility will only receive the MSW that remains after recycling is completed.

MSW will be delivered to the Proposed Facility by transfer tractor-trailers and packer trucks. The MSW will be unloaded into a pit located inside the refuse storage building. No waste will be unloaded, stored, or processed outside. Three overhead bridge cranes will mix the waste in the storage pit and load the charging hoppers of the three MWC units.

MSW will be reduced by the combustion process to less than 10 percent of its original volume and 30 percent of its original weight. Ferrous and non-ferrous metals will be removed from the bottom ash. Recovered metals will be processed at the ferrous processing facility in the Energy Park. The ash will be stored in the ash management building until it is removed from the Proposed Facility and taken to the Landfill or other facility for disposal.

Electrical transmission lines from the Proposed Facility will be connected to the FPL substation in the Energy Park. Water, wastewater and other utilities are located within the right-of-way (ROW) adjacent to the Project Site. The Proposed Facility will connect to and use the existing infrastructure in the Energy Park.

The administration building and a visitor center will be designed to be certified LEED

Platinum under rating system of the US Green Building Council.

Potential Airborne Emissions

Emissions from the MWCs will be minimized through a combination of good combustion practices and advanced air pollution control systems, as indicated below.

BACT Summary

Pollutant	Proposed Emission Rate (at 7% O dry basis)	Proposed Control Technology
NO _x	100 ppmv (24-hr); 85 ppmv (12-month)	Selective Non-Catalytic Reduction
SO ₂	24 ppmv (24-hr) or 80% reduction	Spray Dryer Absorber (with Fabric Filter)
HCl	20 ppmv or 95% reduction	
Fluorides (as HF)	3.5 ppmv	
Sulfuric Acid Mist	5 ppmv	
PM, PM10, PM2.5 and MWC Metals	12 mg/dscm	Fabric Filter
Lead	140 µg/dscm	
CO	100 ppmv (4-hr); 80 ppmv (30-day)	Design and Good Combustion Practices
VOCs	7 ppmv	
MWC Organics (as Dioxins/Furans)	13 ng/dscm	
Mercury	25 µg/dscm or 85% reduction (quarterly test); 15 µg/dscm (12-month average)	Activated Carbon Injection (with Fabric Filter)

Water Use

The Proposed Facility will minimize the use of potable and industrial process water and reduce the need for disposal of wastewater. No increase in the Energy Park's allowed

surficial aquifer withdrawal or potable water supply from the City of West Palm Beach will be needed for process water by the Proposed Facility during normal operations. The air cooled condenser will significantly reduce the amount of water required for the generation of electricity. Process water will come from 1) cooling tower blowdown wastewater from the Existing Facility; 2) reuse of process wastewater from the Proposed Facility; 3) existing industrial supply wells; and 4) rainwater harvested from Existing and Proposed Facility building roofs.

Stormwater Management

The stormwater management system for the Proposed Facility has been designed in accordance with applicable FDEP and SFWMD regulations. A dry retention system will provide the required water quality treatment and retention for the direct runoff resulting from a 25-year, 72-hour storm event. The proposed system will maintain the current capability to route stormwater overflow from the Jog Road drainage system through the Project Site to the Authority's conservation area in the western part of the Energy Park.

The Environmental Resource Permit application for the proposed stormwater management system is contained in Volume II, Appendix 10.7.3.

Section 4. Effects of Site Preparation and Plant and Associated Construction

Construction of the Proposed Facility will take approximately 36 months. The entire design, construction, start-up, and testing period (i.e., from the notice to proceed until

full plant operation is achieved) will take approximately 54 months.

The construction of the Proposed Facility will disturb the Project Site and an additional 10 acres used for staging, materials laydown, and work force parking. This entire area was previously disturbed during the construction of the Energy Park. No new roads, rail lines or sidings or utility lines will be required off the Energy Park.

No impacts to surface water bodies are proposed as part of the construction of the Proposed Facility. The Proposed Facility will not have any intake or discharge structures for cooling water or other process waters. Minimal dewatering, if any, will be required. If any dewatering is needed, it will be accomplished in accordance with existing Conditions of Certification.

Construction of the Proposed Facility will have no effect on groundwater levels and availability.

Habitats and species diversity and composition at the Project Site are not expected to undergo any significant changes as a result of the proposed construction. No significant effects on environmentally sensitive areas outside of the Project Site including Grassy Waters, the Energy Park bird rookery and Winding Waters Park are anticipated. No significant effects on sensitive human receptors are anticipated during construction of the Proposed Facility.

There are no landmarks or sensitive areas within the limits of the Project Site. No regional scenic, cultural and natural landmark will be impacted by site preparation or other construction activities.

There are no archaeological or historic sites within the limits of the Project Site. No archaeological or historic sites will be impacted by site preparation or other construction activities.

Benefits during construction associated with the Proposed Facility includes employment of more than 2,000 construction workers during the three year construction period, the sale of goods and services by local businesses to contractors and employees, and the indirect economic benefits of such spending.

Section 5. Effects of Plant Operation

Surface Water and Groundwater

The Proposed Facility will not have any direct impacts on any surface waters because there will not be any direct withdrawals from or discharges to any surface water body. Domestic wastewater will be discharged into the domestic wastewater treatment system of the City of West Palm Beach. Process wastewater will be treated, as necessary, and discharged to the Authority's existing deep injection wells, in compliance with the applicable permit.

All solid waste and ash will be handled and stored in enclosed buildings to prevent contact with stormwater or groundwater. Consequently, no groundwater contamination is anticipated from the operation of the Proposed Facility.

The drinking water and potable water for the Proposed Facility will be provided by the City of West Palm Beach potable water system.

Harvested rainwater and wastewater from Existing and Proposed Facilities will be used

to provide most of the process water required for operations.

Stormwater not captured by the rainwater harvesting system will be managed through a new retention swale, which will overflow through the existing structure before discharging into the Energy Park's conservation area.

Solid and Hazardous Waste

The Facility will accept only MSW, which includes non-hazardous residential, commercial, and industrial wastes. Hazardous waste will not be accepted or disposed of at the Proposed Facility. Ash and other solid waste will be removed from the Proposed Facility and taken to the Landfill or other facility for disposal.

Air Quality

The airborne emissions from the Proposed Facility will be minimized by using state-of-the-art air pollution control systems. Air dispersion modeling was performed and it demonstrates that the Proposed Facility will comply with all applicable standards and criteria, including the Florida and National Ambient Air Quality Standards, which are designed to protect human health and the environment

Noise

All of the major equipment, except the air-cooled condenser, will be located inside enclosed buildings, which will minimize potential noise from the operation of the Proposed Facility. The combined sound level from the Existing Facility and the Proposed Facility will be no more than 3.3 dBA greater than existing conditions at the closest residence. A change of 3 dBA is considered barely discernable by the human ear. No

increase in noise level is anticipated in the area of the Energy Park bird rookery. The overall sound level from the Proposed Facility will be well below applicable guidelines and standards.

Visual Impacts

Visual impact of the Proposed Facility to the residential community north of the Energy Park has been minimized by reducing the height of the stack to less than that which would have been allowed by good engineering practices and making the stack oblong with the narrowest dimension visible to the north, as illustrated by Figures B-4 and B-5.



Figure B-4 Conventional stack from north



Figure B-5 Proposed shorter oblong stack

Traffic

The Proposed Facility will not have any adverse traffic impacts. The trucks that will deliver MSW to the Proposed Facility are

currently delivering MSW to the Landfill. The Proposed Facility will not require changes in traffic patterns or roadways. The Proposed Facility will result in some additional traffic associated with new employees, and the delivery of supplies and removal of ash, but this traffic will be negligible.

Environmentally Sensitive Areas

Operation of the Proposed Facility will have no adverse impacts on environmentally sensitive areas outside of the Project Site including Grassy Waters, Energy Park bird rookery and Winding Waters Park.

Section 6. Transmission Lines and Other Linear Facilities

The Proposed Facility will utilize the FPL Recway substation and transmission lines constructed for the Existing Facility. No new transmission line corridor will be required for the Proposed Facility. All necessary roads and utilities (e.g., potable water, sanitary sewer, natural gas, and telecommunications) already exist in the Energy Park adjacent to the Project Site. The Proposed Facility will merely need to interconnect to these existing facilities.

Section 7. Economic and Social Effects of Plant Construction and Operation

The local economy and labor market will benefit during construction from the estimated \$700 million project. Increased revenues from direct construction employment and the purchase of construction-related goods and services will benefit the state and local economy. There will also be indirect benefits to the retail and service sectors from

supplying the work force with goods and services throughout the construction period.

After construction, the Proposed Facility will employ approximately 75 personnel and the annual payroll will be approximately \$4 million. An additional \$8 million per year will be spent locally for the procurement of spare parts, consumable goods, utilities, and outside service contractors needed to operate and maintain the Proposed Facility.

Operation of the Proposed Facility will extend the life of the Landfill by more than 20 years, thus postponing the time when the Authority must construct a new landfill at a location outside the Energy Park.

Short-term costs related to the construction and operation of the Proposed Facility will include an increase in construction traffic and noise during construction work hours. These temporary external costs will be mitigated by the location of the Proposed Facility at the Energy Park.

The major long-term economic cost for the Proposed Facility will be a commitment of an estimated \$700 million in capital funds by the Authority.

The Proposed Facility will generate clean renewable electricity, thereby displacing the use of about 985,000 barrels of oil per year and reducing greenhouse gas emissions from fossil fuels.

Proposed Modifications to Conditions of Certification

With the exception of the ultimate site capacity, the construction and operation of the Proposed Facility will not require any changes to the existing Conditions of Certification PA 84-20L. This Application

addresses a separate set of conditions of certification for the construction and operation of the Proposed Facility.

C. Introduction

C.1 Introduction

The Solid Waste Authority of Palm Beach County (Authority) is the agency responsible for providing an environmentally-sound, cost effective, integrated solid waste management and recycling program for the residents and businesses of Palm Beach County, Florida (County). The Authority was established by special act of the Florida Legislature in 1975 and currently operates pursuant to Chapter 2001-331, Laws of Florida. The Authority's solid waste management system includes PBREF No. 1, the Landfill, ferrous metal processing facility, composting facility, vegetation processing facility, Recovered Materials Processing Facility (RMPF), household hazardous waste (HHW) collection facilities, sewage sludge pelletizer, and five transfer stations. A sixth Transfer Station is currently under construction in the southwest area of the County. All of these waste processing facilities, except the Transfer Stations and satellite HHW collection facilities, are located at the Palm Beach Renewable Energy Park (Energy Park), a certified power plant site, in West Palm Beach, Florida as shown in Figure C-1.

This "Petition to Modify Conditions of Certification PA 84-20: Palm Beach Renewable Energy Facility No. 2" (Application) is submitted by the Authority for construction and operation the Proposed Facility at the Project Site, immediately north of the Existing Facility on the Energy Park.

C.2 General Information

C.2.1 Format

The format and content of this Application are organized in accordance with the specific guidelines prescribed in the FDEP Application Instruction Guide, Electrical Power Plant Sites and Associated Facilities, Form 62-17.900, draft dated September 19, 2009.

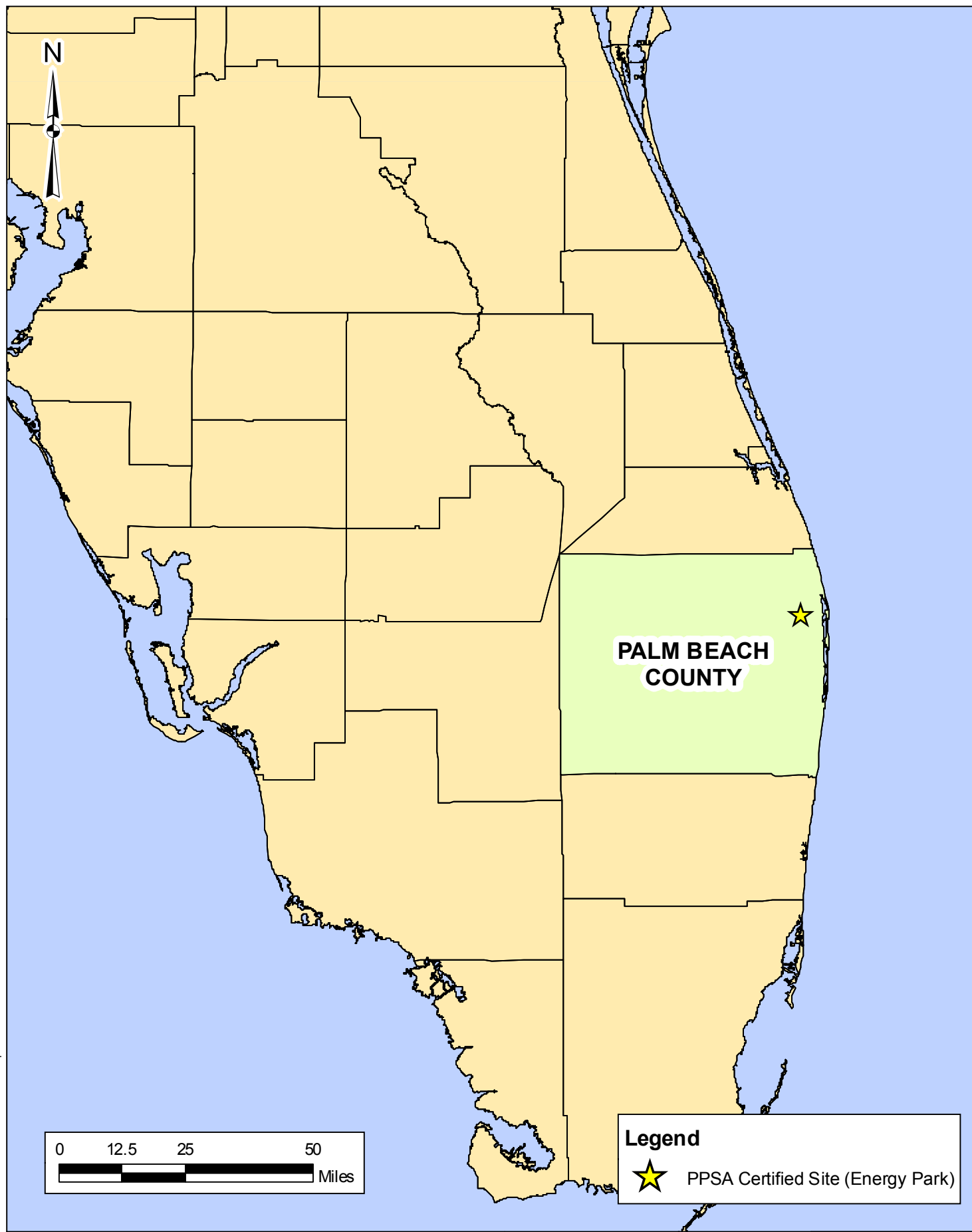
C.2.2 Review

The review process in this case will follow the procedures for reviewing and processing applications for electrical power plants. The procedures are set forth in Sections 403.501-518, F.S., and Chapter 62-17 F.A.C.

C.2.3 State-Owned Lands

No state-owned lands will be impacted or crossed for the development of this Proposed Facility.

G:\Projects\3582\056\MXD\PPSA\1-1 Location Map.mxd



C.2.4 Appendices

All existing permits or applications for all permits associated with the Energy Park, including Conditions of Certification PA 84-20, are provided in Volume II, Appendix 10.9.

C.2.5 Information Sources

Information obtained from state, federal, local and regional governmental agencies, educational institutions, publications, and qualified consultants were used in the preparation of this Application. The sources were as follows:

**Table C-1.
Information Sources**

No.	Information Reference	Information Identified
1	2009 Landfill Depletion Model	Capacity of Class I landfill
2	Integrated Solid Waste Management Plan	Historical Site and Vicinity Data
3	2000 Census	Population & Socioeconomic Data
4	Comprehensive Plan	Social and Political Information
5	Land Use Plan	FLA Land use & cover classification system data
6	South Florida Water Management District	Potable well inventory, water shed data
7	Palm Beach County	Water table data, Potable well inventory
8	City of West Palm Beach	Flood and land use coverages
9	FL Department of Transportation	Roadway and expansion data
10	Army Corp of Engineers	South Borrow Lake ERP/Federal Dredge and Fill Permit
11	Florida Department of Environmental Protection	Various permits and approved monitoring plans identified in Volume II Appendix 10
12	Palm Beach County Traffic Division	Traffic Concurrency
13	DAHRM	Archaeological Report of the project site
14	CDM Inc.	Stormwater Water Management System data
15	Malcolm Pirnie Inc.	The Proposed Facility and Directly Associated Facilities technical design and operation details.

C.2.6 Data Gathering and Monitoring Appendices

Professional protocols and procedures were utilized, as applicable, for gathering monitoring data regarding air and water quality, noise conditions, solid wastes or other environmental impacts. The methods used for gathering monitoring data, as applicable, were those duly adopted, published, or otherwise approved by the FDEP.

C.2.7 Maps and Drawings

All maps and drawings are provided in accordance with the FDEP guidelines outlined in Form 62-17.900. Data contained in the maps, drawings, or aerials photographs will be representative of the area within six (6) months of filing the Application.

C.2.8 Variances

The construction and operation of the Proposed Facility will comply with all of the applicable nonprocedural requirements of the local, regional, and state agencies with jurisdiction over the Proposed Facility. No variances from any applicable state, regional and local standards are needed for the construction and operation of the Proposed Facility.

C.3 Information Requirements

C.3.1 Applicant Identification

Table C-2.
Applicant Identification Information

Applicant Identification		
A	Applicant's Official Name	Solid Waste Authority of Palm Beach County
B	Address of Applicant	7501 North Jog Road, West Palm Beach, 33412
C	Address of Official Headquarters	7501 North Jog Road, West Palm Beach, 33412
D	Business Entity	Dependent Special District of Palm Beach County
E	Owner	Solid Waste Authority of Palm Beach County
F	Name and Title of Chief Executive Officer	Mark Hammond
G	Official Representative Obtaining Certification	Mark Hammond, Executive Director Solid Waste Authority of Palm Beach County 7501 North Jog Road West Palm Beach, FL 33412 1-561-640-4000 mhammond@swa.org
H	Site Location	<u>City:</u> West Palm Beach, FL <u>County:</u> Palm Beach County <u>Latitude and Longitude:</u> 26°46'25.608"N, 80°8'30.855"W <u>Universal Transverse Mercators (UTM)</u> – Northerly and Easterly: Easting 585,300.173 Northing 2,961,825.781 Meters, Zone 17N <u>Section, Township, and Range:</u> Section 34, Range 42E, Township 42S
I	Location of Transmission Lines	Interconnection will be to on-site Recway Substation
J	Site Capacity	Nameplate Existing Generating Capacity: 62 MW Capacity of Proposed Addition: 100 MW Ultimate Site Capacity: 185 MW (See Section C.3.2)

K	Additional Information on Power-Plant Associated Facility	The Proposed Facility will not require any improvements outside of the Energy Park.
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C.3.2 Ultimate Capacity Certification

The existing Site Certification approval is for 75 MW. The Authority is separately seeking from the Public Service Commission (PSC) a new determination of need for an ultimate site capacity of 185 MW. The Authority anticipates submittal of a petition to the PSC for an Order Granting Need Determination for this ultimate site capacity in August 2010. Volume II, Appendix 10.15 is reserved for the PSC's Order. A copy will be forwarded to the FDEP upon receipt by the Authority.

1. Need for the Proposed Facility

The Governing Board of the Authority of Palm Beach County (Authority), has concluded that the Authority needs to develop a new 3,000 ton-per-day (tpd) mass burn renewable energy facility (Proposed Facility) on a site (Project Site) located immediately north of the Existing Facility. The Proposed Facility will increase the Authority's ability to process the solid waste generated by the residents and businesses in Palm Beach County, thus complementing the services already provided by the Existing Facility, an 1,800 tpd refuse-derived fuel (RDF) renewable energy facility owned by the Authority.

In 2007, the population of Palm Beach County was approximately 1,295,033 and it is projected to increase to 1,879,400 by 2035.ⁱ The Proposed Facility will increase the Authority's overall waste processing capacity by approximately 1,000,000 tpy of municipal solid waste (MSW). This increased capacity will address the increased MSW generation associated with the growing population and it will extend the life of the Authority's existing Class I landfill (Landfill) by twenty years, while generating significant amounts of renewable electrical energy.

The Energy Park is currently certified for an ultimate site capacity of 75 MW. The Existing Facility has a design capacity of 62 MW. The Proposed Facility will be approximately 100 MW. Accordingly, the Authority is seeking a new determination of need from the FPSC for an ultimate site capacity of 185 MW, which will allow the Authority to operate the Proposed Facility as well as other potential future projects. The Authority anticipates submittal of a petition to the PSC for an Order Granting Need Determination for this ultimate site capacity in August 2010. Volume II, Appendix 10.15 is reserved for the PSC Order. A copy will be forwarded to FDEP upon receipt by the Authority.

In addition to allowing the Authority to meet the solid waste disposal and energy needs of the County's rapidly growing population, the New Facility will address the provisions of the Authority's Integrated Solid Waste Management (ISWM) Plan. One of the principle objectives of the ISWM Plan is to develop a system of programs and facilities for effectively and economically managing solid waste through source reduction, recycling, composting, combustion, and landfilling. The ISWM Plan identifies the need to expand combustion capacity in order to extend the life of the Landfill.

ⁱ University of Florida Bureau of Economic and Business Research, Medium Projection, Projections of Florida Population by County, 2007-2035, Volume 41, Bulletin 150, March 2008.

The following sections identify some of the reasons why there is a need for the Proposed Facility.

1.1. Internal benefits to the Authority.

The Proposed Facility will provide the following benefits to the Authority:

- Provides the Authority with necessary and timely MSW disposal capacity, while using a technology that is environmentally preferred as a matter of Florida legislative policy.
- Assists the Authority in extending the lifespan of its valuable and scarce Class I landfill capacity, thus delaying the time when the Authority will need to construct a new landfill at a location outside the Energy Park.
- Assists the Authority in meeting its legal obligation to provide facilities and capacity for the disposal of MSW generated within the County.
- Provides a reliable, low cost source of electricity that can be used by the Authority at the material handling, preparation, recycling, and other operations in the Authority's Energy Park.
- Generates revenue for the Authority from the sale of excess electricity and this revenue reduces the costs paid by the County's residents and businesses for the Authority's solid waste services.

1.2. Direct benefits to the county, region, and state.

The Proposed Facility will provide the following benefits to Palm Beach County, South Florida, and the State of Florida:

- Improves electric system reliability and integrity, and provides adequate electricity at a reasonable cost.
- Increases fuel diversity and supply reliability, by lessening dependence on natural gas, fuel oil and other fossil fuels for the production of electricity.
- Utilizes efficient and cost-effective renewable energy systems, consistent with state policy, thus protecting the health, prosperity, and general welfare of the state and its citizens.

- Increases the total available energy supply for the entire electric grid of the State.
- Provides a substantial renewable energy resource located in Florida and fueled by Florida indigenous renewable fuel (MSW).
- Reduces the amount of money exported out of the Florida economy for the purchase of coal, oil and natural gas.
- Displaces electricity produced with fossil fuels, thereby maintaining the supply of adequate electricity at a reasonable cost while lessening the State's dependence on imported and fossil fuels.
- Adds more renewable energy to the fuel mix used in the generation of electricity in Florida, thereby reducing volatility of fuel costs, improving environmental conditions, and minimizing the costs of power supply to electric utilities and their customers.
- Provides a cost-effective conservation measure because the electrical energy generated by the Proposed Facility will be purchased by utilities at no more than avoided cost.
- Reduces the amount of greenhouse gas associated with the generation of electricity in Florida.
- Reduces the amount of greenhouse gas associated with the disposal of MSW by landfilling.
- Reduces the amount of greenhouse gas associated with the disposal of MSW because the location of the Proposed Facility is close to MSW generators, thus eliminating the need to haul the MSW long distances to out-of-county landfills.
- Reduces the potential for surface and ground water impacts associated with the landfilling of MSW.
- Conserves water resources by using an air cooled condenser, reusing process waste water from the Existing and Proposed Facilities, and harvesting of rainwater.

1.3. Beneficially impact the reliability, generation planning, unit dispatching and generation costs of the power-purchasing utility.

(Note: The “power-purchasing” utility(ies) has/have not been identified at this time. However, the facility will be interconnected directly with the FPL system and electricity will, at a minimum, be delivered and sold to FPL pursuant to the

standard tariff for the sale of “as-available energy”. This should not be construed as a shortcoming or as having a serious impact on the many benefits of the Proposed Facility – the main purpose of which is the disposal and volume reduction of MSW via combustion. As long as the Proposed Facility is connected to the grid and is disposing of MSW, benefits will flow.)

- There is a need for electric generation capacity in the time-frame of the Proposed Facility, based on the April 1, 2010 ten-year site plans of Florida Power and Light, Progress Energy, Tampa Electric and Gulf Power - as well as JEA, Orlando Utilities Commission and Seminole Electric Cooperative. (Together these utilities account for about 95% of the net energy for load in Florida.)
 - The Ten Year Site Plans of these utilities project that, in the aggregate, the Summer Peak Demand will grow from 42,746 MW in 2010 to 47,927 MW in 2019 - an increase of over 5,000 MW or about 12%. Notably, that forecast reflects a substantial decrease in demand in 2010 forward associated with the current economic downturn.
 - To maintain the “target” reserve margin of 20%, Florida will require an additional 192 MW by 2015, 1,047 MW by 2016, over 2,800 MW by 2018 and over 4,100 MW by 2019.
- The Proposed Facility will be a base-load type generator that will run at high levels of capacity factor and availability. Its renewable energy characteristics will allow it to displace or offset the combustion of fossil fuels that would otherwise be used by the utilities for the production of electricity. It will not be “dispatchable”, nor should it be. Dispatching would reduce the substantial renewable energy production and fossil fuel displacement benefits offered by the Proposed Facility.
- With respect to FPL, the interconnected utility, FPL’s ten-year site plan indicates that that in 2010 it will be generating 56% of its energy using natural gas and that percentage will increase to 66% in 2019. Absent renewable energy resources such as the Proposed Facility, FPL’s fuel diversity will “decrease” with a growing dependence on natural gas.
 - The renewable energy produced by the Proposed Facility will help to diversify the types of fuel used to generate electricity in Florida because every kWh of energy produced by the Proposed Facility will displace energy that would have been produced by fossil fuels, including natural gas and oil, by Florida’s utilities.

- o The electricity output of the Proposed Facility is estimated to displace the equivalent of approximately 500,000 tons of coal or 1.3 million barrels of oil or 6 billion cubic feet of natural gas annually.
-

2. Site and Vicinity Characterization

2.1. Site and Associated Facilities Delineation

The location of the Proposed Facility is the Energy Park which was certified under the Florida Electrical Power Plant Siting Act (PPSA) in 1986, PA 84-20. The Energy Park is located in the City of West Palm Beach, Palm Beach County, Florida. The boundary of the Certified Site of the Energy Park is illustrated in Figure 2-1.

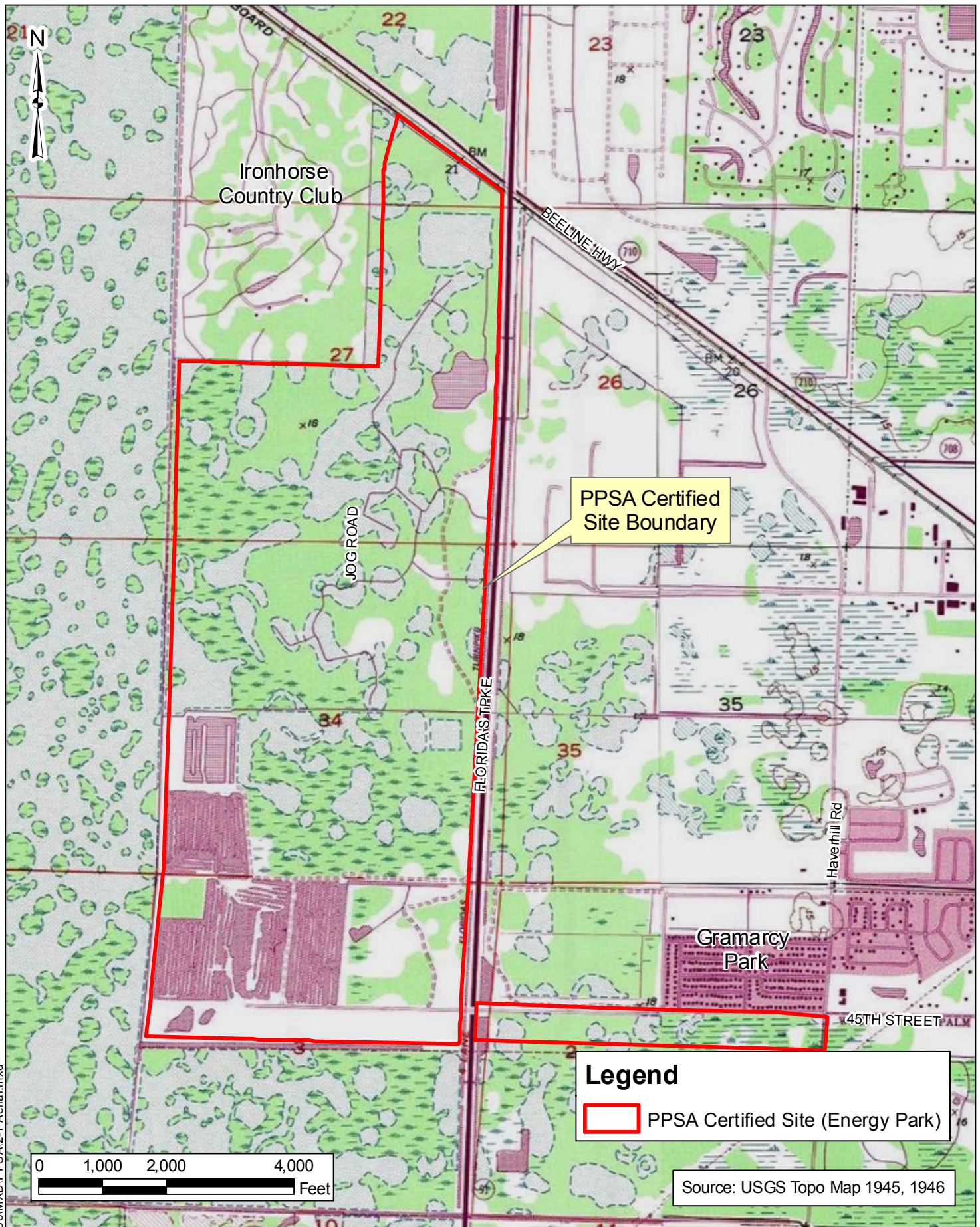
The Energy Park layout is provided as Figure 2-2 and it shows the location of the Proposed Facility, the existing Palm Beach Renewable Energy Facility No. 1 (PBREF No.1) and associated facilities. Table 2-1 provides a breakdown of the existing land uses of the developed portions of the 1,320-acre Energy Park.

The Proposed Facility is not located within the 100-year flood zone, as defined by the Federal Emergency Management Agency (FEMA), as illustrated in Figure 2-3. The Proposed Facility is located in an area designated as Zone B, which is defined as:

Areas between limits of the 100-year flood and 500-year flood, or certain areas subject to 100-year flooding with average depths less than one (1) foot or where the contributing drainage area is less than one square mile; or areas protected by levees from the base flood.

**Table 2-1
Site Land Uses (Developed Portions)**

Description	Name	Acreage
Administration Building	Administration Building	9.3
Biosolids Pelletizer Facility	Biosolids Pelletizer Facility	6.4
Composting Facility	Composting Facility	15.7
Ferrous Processing Facility	Ferrous Processing Facility	3.2
Household Hazardous Waste Facility	Household Hazardous Waste Facility	2.6
Landfill	Landfill	330
Maintenance Building	Maintenance Building	9.5
PBREF No. 1	PBREF No. 1	22.2
PBREF No. 1 Scale House	PBREF No. 1 Scale House	4.3



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**USGS Topo Map
of Energy Park**
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FIGURE 2-1



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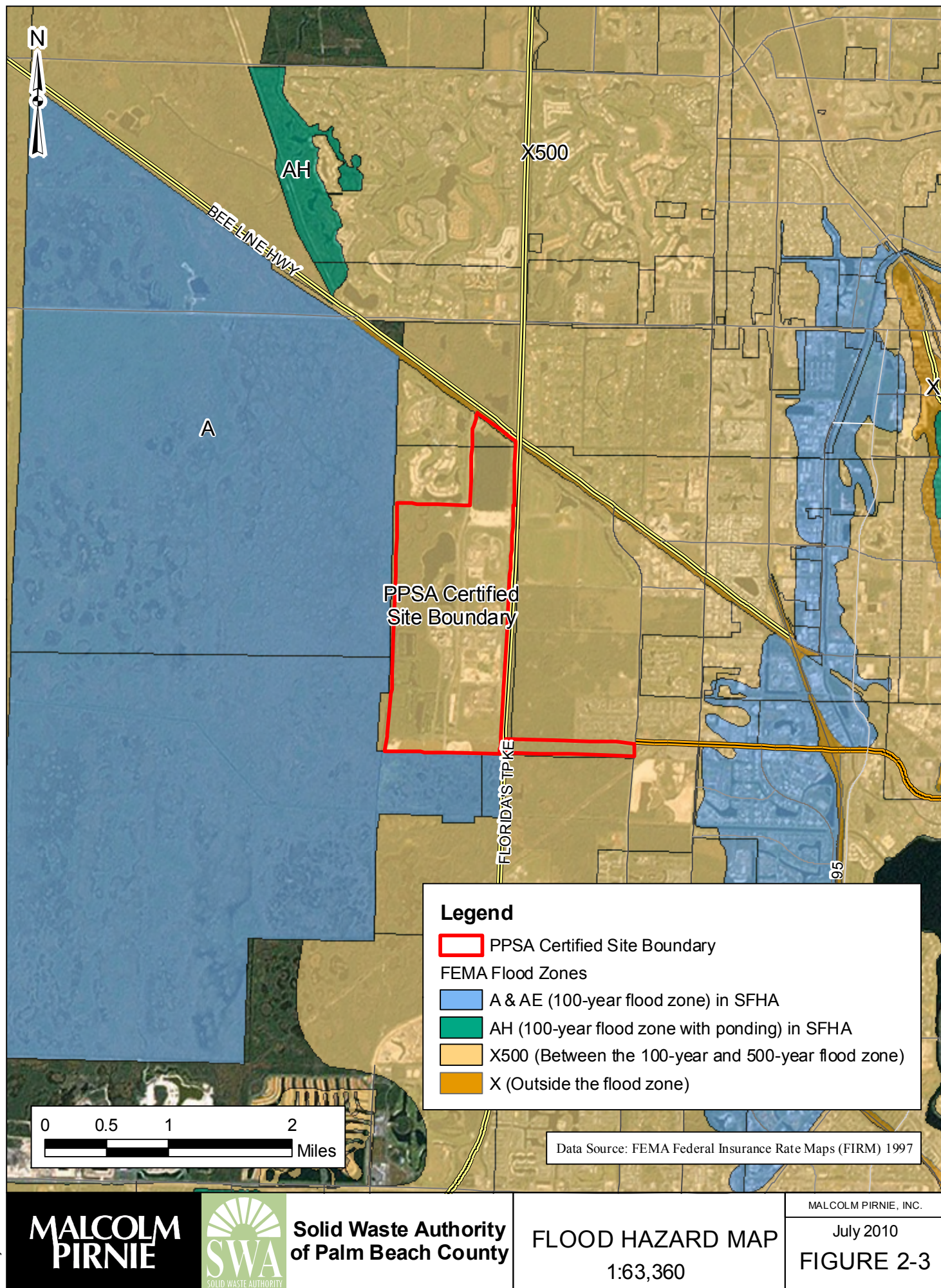
RENEWABLE ENERGY PARK FACILITIES

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FIGURE 2-2

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2.2. Social and Political Environment

2.2.1. Governmental Jurisdictions

Figure 2-4 illustrates the boundaries of towns, cities and local, regional, state, or federal areas within a 5-mile radius of the Proposed Facility that may be of interest with respect to the Proposed Facility construction. Figure 2.5 shows the same features in greater scale for the area within one mile of the Proposed Facility.

Table 2-2 provides a summary of occurrences of special category areas within one and five miles of the Project Site. Several local parks of the Cities of Palm Beach Gardens, Riviera Beach and West Palm Beach, and the Towns of Lake Park and Mangonia Park are located within 5 miles of the site as shown on Figure 2-4. The City of West Palm Beach Water Catchment Area (WCA), also known as the Grassy Waters Preserve, is directly adjacent to the western border of the Energy Park. This area of approximately 19 square miles is the drinking water source for West Palm Beach and is a wetland area. The WCA is managed for environmental protection by the City. This area is identified as an area of critical concern.

**Table 2-2
Occurrence of Special Category within 1 and 5 Miles of the Site**

Type of Area	Located Within 1 Mile Radius	Located Within 5 Mile Radius
National Parks	NO	NO
National Forests	NO	NO
National Seashores	NO	NO
National Wildlife Refuges	NO	NO
Wilderness Areas	NO	NO
National Monuments	NO	NO
National Memorials	NO	NO
National Marine Sanctuaries	NO	NO
Estuarine Sanctuaries	NO	NO
RARE Areas	NO	NO
National Wild and Scenic Rivers	NO	NO
Critical Habitat for Endangered Species	NO	NO
State Parks	NO	NO
State Forests	NO	NO
Game Management Areas	NO	NO
Areas of Critical Concern	YES	YES
Conservation and Recreation Lands	YES	YES
Save our Rivers Lands	NO	NO
State Archaeological Landmarks	NO	NO
State Archaeological Landmark Zones	NO	NO

Type of Area	Located Within 1 Mile Radius	Located Within 5 Mile Radius
Aquatic Preserve	NO	NO
Outstanding Florida Waters	NO	NO
State Wild and Scenic Rivers	NO	NO
County Parks	Yes	YES
Indian Reservations	NO	NO
Military Lands	NO	NO
Private Holdings for Environmental Protection	NO	NO

Table 2-3 lists the governmental jurisdictions within a five-mile radius of the Project Site.

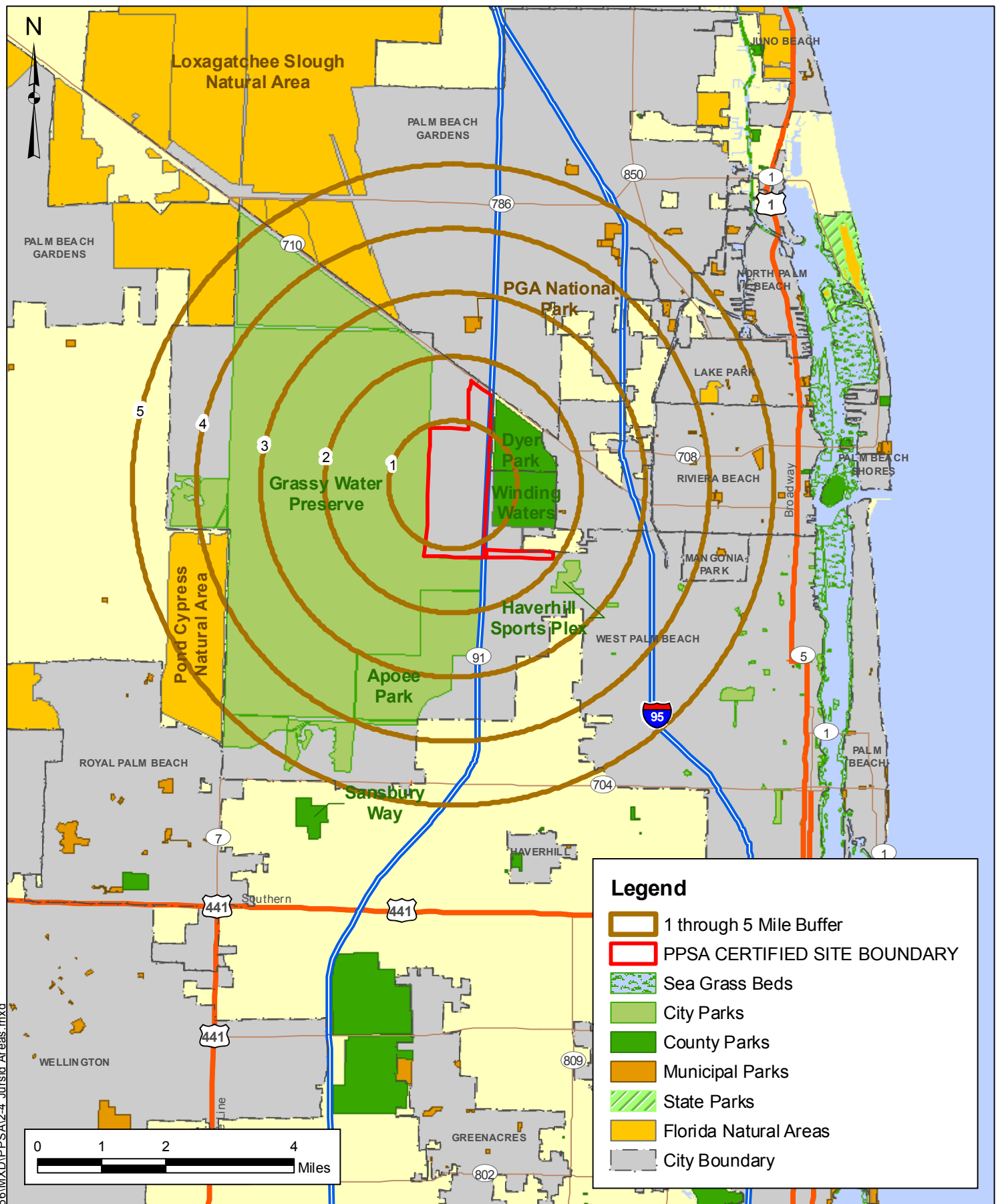
**Table 2-3
Governmental Jurisdictions within a Five-Mile Radius**

LOCAL GOVERNMENT
City of West Palm Beach
Town of Mangonia Park
Town of Lake Park
City of Riviera Beach
Village of North Palm Beach
City of Palm Beach Gardens
STATE OF FLORIDA
State of Florida Department of Transportation
State of Florida Division of State Lands
South Florida Water Management District
Florida Fish and Wildlife Conservation Commission
FEDERAL GOVERNMENT
United States Postal Service

2.2.2. Zoning and Land Use Plans

The Proposed Facility will be located in the City of West Palm Beach. Development and operation of the Proposed Facility is consistent with the approved City of West Palm Beach Comprehensive Plan. Land use and zoning designations on the Project Site are consistent with the Comprehensive Plan and the proposed use. The land use designation is Special Impact Zone/Community Service (SIZ/CS) and the zoning designation is Community Service (CS). A Class A special use permit allows a heavy utility use and construction of resource recovery and landfill facilities.

At the time of the initial PPSA application review in 1985, the Energy Park was in the unincorporated area of Palm Beach County. The County land use designation was Conservation/Very Low to Low Residential. The zoning was Agricultural Residential with a Special Exception to allow Public and Private Utility Service and Accessory Buildings and Structures including On-Site Sewage Treatment Facility.



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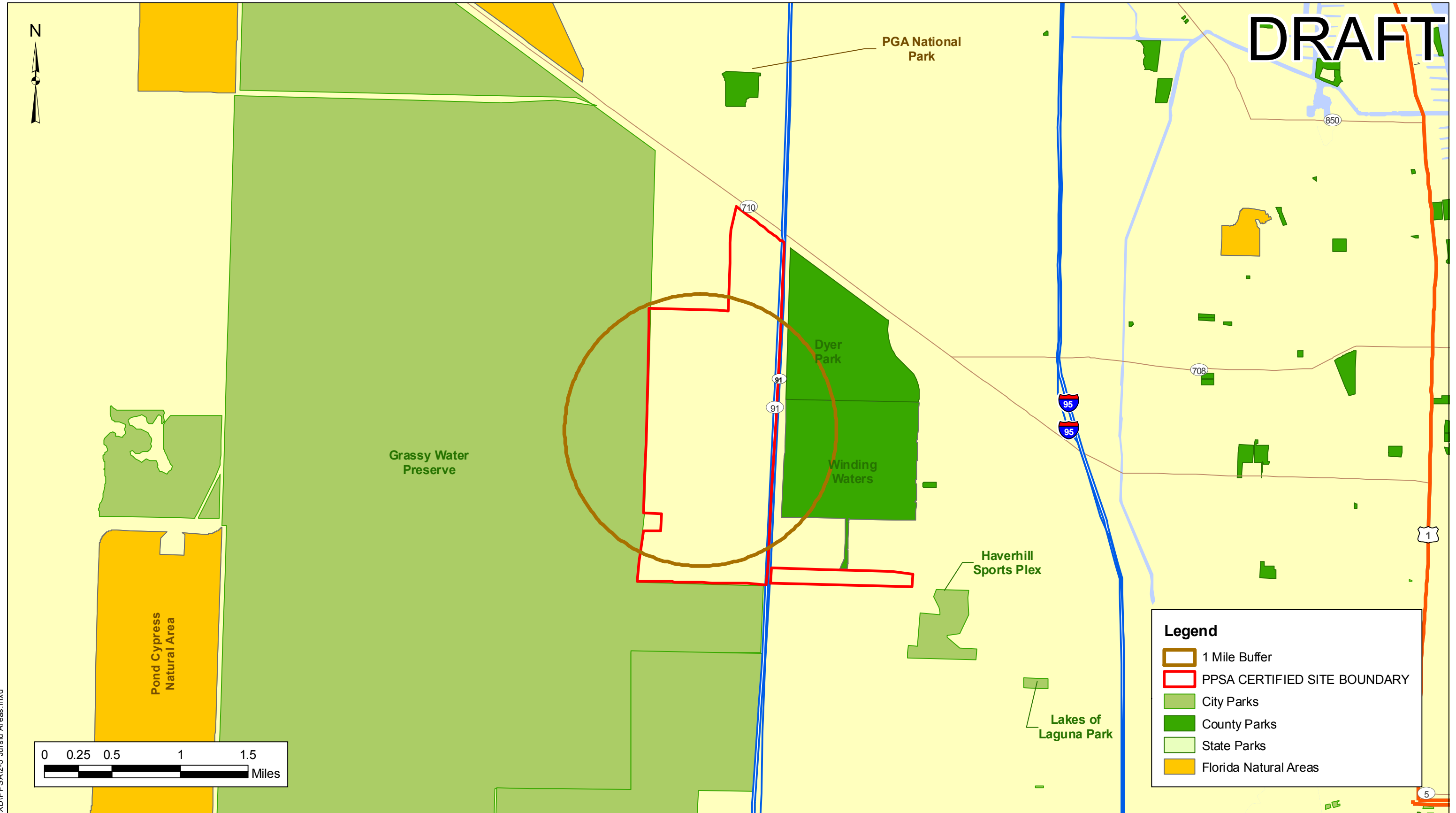
GOVERNMENTAL JURISDICTIONS
& SPECIAL CATEGORIES
WITHIN 5 MILES
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FIGURE 2-4

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GOVERNMENTAL JURSDICTIONS &
SPECAIL CATEGORIES WITHIN 1 MILE

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April 2010

FIGURE 2-5

During review of the Authority's initial PPSA application in 1985, a Hearing Officer conducted a formal hearing pursuant to Section 403.508(1), F.S., and found that use of the Energy Park, including the Project Site, for the Existing Facility, auxiliary facilities and transmission lines was consistent with the applicable land use plans and zoning ordinances. The Siting Board subsequently issued a Final Order adopting the Hearing Officer's finding and conclusions. The Hearing Officer's recommended order and Siting Board's Final Order are contained in Volume II, Appendix 10.2.1.

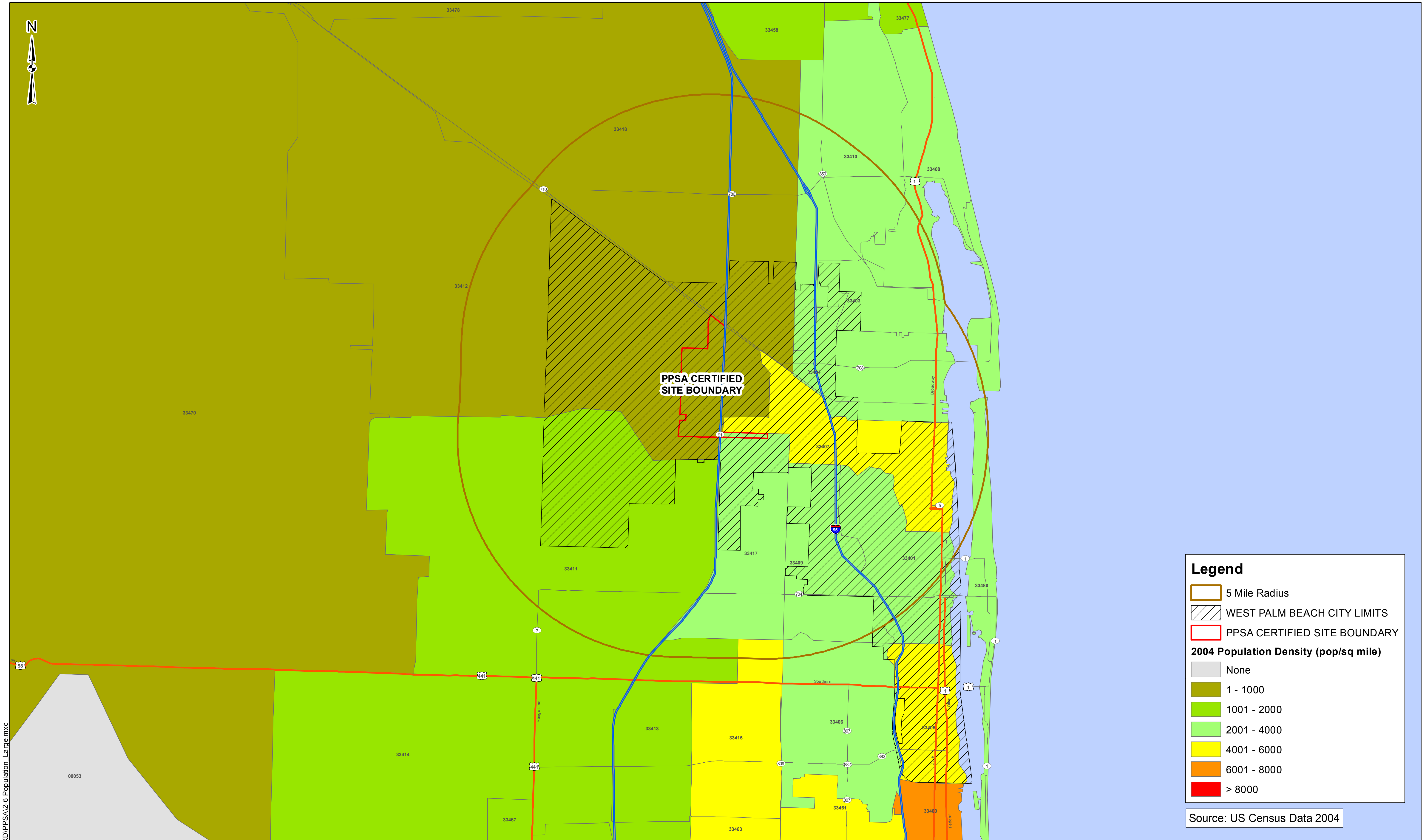
After the Siting Board issued its Final Order in 1986, the Energy Park was voluntarily annexed into the City of West Palm Beach in 1988 and 1989. The land use and zoning designations on the Energy Park were later changed to be consistent with the City's land use and zoning classifications in 1989 and 1990. The portion of the Energy Park west of Florida's Turnpike, (1,253 acres), including the site of the Proposed Facility, was changed to a land use designation of Special Impact Zone/Community Service (SIZ/CS) and a zoning designation of Community Service (CS). A Class A special use permit was granted which allows heavy utility use and implementation of resource recovery and landfill facilities. These actions were consistent with provisions of Chapter 403.50665, F.S., which restricts changes in land use and zonings once a consistency finding under the PPSA has been made. The statute reads in part, "the responsible zoning or planning authority shall not thereafter change such land use plans or zoning ordinances so as to foreclose construction and operation of the proposed site or directly associated facilities unless certification is subsequently denied or withdrawn."

The remainder of the Energy Park, approximately 74 acres, is located east of the Florida's Turnpike and south of 45th Street. This area is the site of the Authority's Recovered Materials Processing Facility (RMPF). This area was changed to a land use designation of Special Impact Zone/Industrial (SIZ/I) with a zoning designation of Industrial.

A history of land use and zoning on the proposed site and detailed discussion of the Proposed Project's consistency with the elements, goals and policies contained in the City of West palm Beach's Comprehensive Plan are contained in Volume II, Appendix 10.2. Zoning and Land Use Plans.

2.2.3. Demography and Ongoing Land Use

Table 2-4 provides a summary of the U.S. Census data for 1990, 2000 and the most recently estimated populations for Palm Beach County's cities and unincorporated area. Palm Beach County's population grew 50 percent between 1990 and 2008. Figure 2-6 shows the population density of the municipalities within five (5) miles of the Proposed Facility.



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POPULATION DENSITY MAP

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July 2010
Figure 2-6

**Table 2-4
Population: Palm Beach County 1990 – 2008 (estimated)**

Municipality	1990	2000	Estimated 2008
Atlantis	1,653	2,005	2,147
Belle Glade	16,177	14,906	17,141
Boca Raton	61,492	74,764	85,293
Boynton Beach	46,194	60,389	66,671
Briny Breezes	400	411	417
Cloud Lake	121	167	164
Delray Beach	47,181	60,020	64,220
Glen Ridge	207	276	262
Golf	234	230	266
Greenacres	18,683	27,569	32,548
Gulf Stream	690	716	716
Haverhill	1,058	1,454	1,553
Highland Beach	3,209	3,775	4,164
Hypoluxo	830	2,015	2,448
Juno Beach	2,121	3,262	3,674
Jupiter	24,986	39,328	49,783
Jupiter Inlet Colony	405	368	370
Lake Clarke Shores	3,364	3,451	3,427
Lake Park	6,704	8,721	9,112
Lake Worth	28,564	35,133	36,725
Lantana	8,392	9,437	9,850
Loxahatchee Groves	N/A	N/A	3,232
Manalapan	312	321	354
Mangonia Park	1,453	1,283	2,223
North Palm Beach	11,343	12,064	12,530
Ocean Ridge	1,570	1,636	1,630
Pahokee	6,822	5,985	6,352
Palm Beach	9,814	10,468	9,797
Palm Beach Gardens	22,965	35,058	50,282
Palm Beach Shores	1,040	1,269	1,418
Palm Springs	9,763	11,699	15,500
Riviera Beach	27,639	29,884	35,150
Royal Palm Beach	14,589	21,523	31,567
South Bay	3,558	3,859	4,702
South Palm Beach	1,480	699	1,522
Tequesta	4,499	5,273	5,898
Wellington	N/A	38,216	55,076

Municipality	1990	2000	Estimated 2008
West Palm Beach	67,643	82,103	103,663
SUBTOTAL	457,155	609,737	731,847
Unincorporated Area	406,363	521,447	562,807
TOTAL1	863,518	1,131,184	1,294,654

Source: 1. U.S. Census Bureau for 1990 and 2000 populations. The Subtotal and Un (http://factfinder.census.gov/servlet/SAFFPopulation?_event=Search&geo_id=16000US1242700&_geoContext=01000US[04000US12|16000US1242700&_street=&_county=&_cityTown=&_state=04000US12&_zip=&_lang=en&_sse=on&ActiveGeoDiv=geoSelect&_useEV=&pctxt=fph&pgsl=160&_submenuId=population_0&ds_name=null&_ci_nbr=null&q_r_name=nnull®=null%3Anull&_keyword=&_industry=)

2. Bureau of Economic and Business Research, University of Florida, *Florida Estimates of Population 2008*

The 2008 estimated population (most recent currently available data), according to the University of Florida's Bureau of Economic and Business Research, for towns and cities at least partially within 5 miles of the Proposed Facility are depicted in Table 2-5.

**Table 2-5
Estimated Populations of Municipalities within 5 Miles of the Site**

Municipality	Population
City of Palm Beach Gardens	50,282
Village of North Palm Beach	12,530
Town of Lake Park	9,112
City of Riviera Beach	35,150
Town of Mangonia Park	2,223
City of West Palm Beach	103,663
TOTAL	212,960

Source: Bureau of Economic and Business Research, University of Florida, *Florida Estimates of Population 2008*

Table 2-6 lists the low, medium, and high population projections for Palm Beach County for 2010 to 2035. The table indicates a significant difference in population projections utilizing the low, medium, or high figures. The medium set of population projections indicates an increase of 475,800 persons (36 percent) for Palm Beach County between 2010 and 2035.

**Table 2-6
Palm Beach County Population Projections (High, Medium, and Low)**

	2010	2015	2020	2025	2030	2035
LOW	1,299,000	1,353,900	1,395,400	1,426,400	1,445,600	1,453,100
MEDIUM	1,335,500	1,444,000	1,543,800	1,640,000	1,729,500	1,811,300
HIGH	1,407,200	1,589,300	1,776,000	1,969,700	2,168,400	2,370,900

Source: University of Florida Bureau of Economic and Business Research, Projections of Florida Population by County, 2007-2035, Volume 41, Bulletin 150, March 2008.

Existing land uses within a 5-mile radius of the Proposed Facility are predominantly light industry and very low to medium-high residential development, park, and conservation lands. Figure 2-7 shows the local land use designations for the Energy Park and five-mile radius surrounding area using the Florida Land Use and Cover Classifications – Level II codes. Figure 2-8 shows the future land use designations for the Energy Park and immediate area. The Proposed Facility will be located on land designated for industry and is next to the Existing Facility.

2.2.4. Easements, Title, Agency Works

The Proposed Facility will not require additional easements or titles from government agencies. Power generated by the Proposed Facility will be interconnected to the FPL system at the Recway Substation on the Energy Park which serves the Existing Facility. Power will be transmitted to the Riviera Beach Substation within the existing transmission corridor. Water and wastewater pipelines and other needed utilities are available within existing rights-of-way adjacent to the Project Site in the Energy Park.

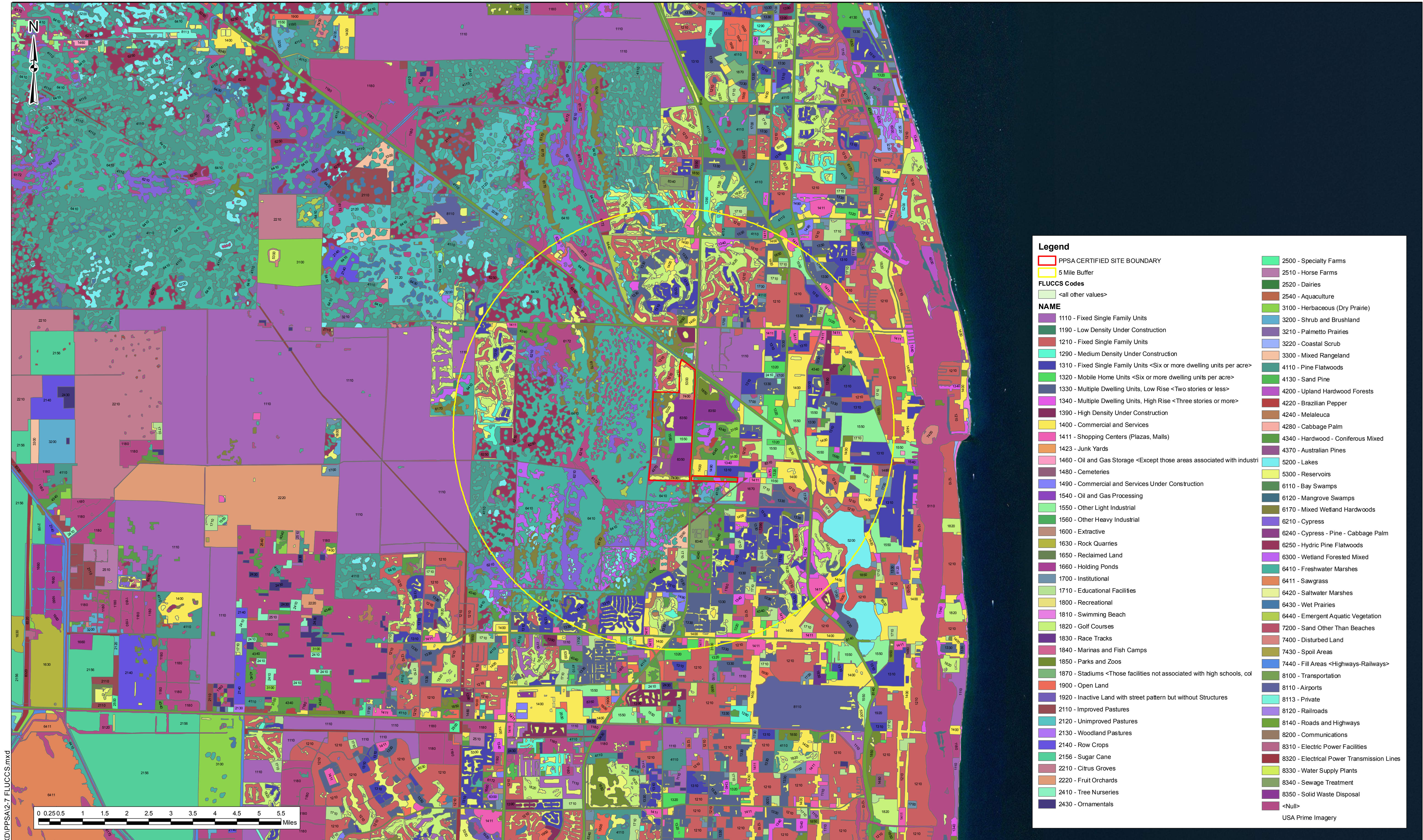
2.2.5. Regional, Scenic, Cultural and Natural Landmarks

As described in Tables 2-2, the following areas are located within a 5-mile radius of the Site:

- Areas of Critical Concern
 - Grassy Water Preserve
- Conservation and Recreation Lands
 - Pond Cypress Natural Area
 - Loxahatchee Slough Natural Area
- County Parks
 - Dyer Park
 - Winding Waters Park (Under Construction)

2.2.6. Archaeological and Historic Sites

As part of the approval process for the original certification of the Energy Park, the Florida Department of State, Division of Archives, History and Records Management (DAHRM) conducted a cultural resource assessment of the Energy Park. The DAHRM review concluded that there are no archaeological or historic sites in the area proposed for construction and it is unlikely for significant unrecorded sites to occur. For this reason, the Proposed Facility will have no effect on archaeological or historic sites. See Volume II, Appendix 10.8.1 for letter from DAHRM.



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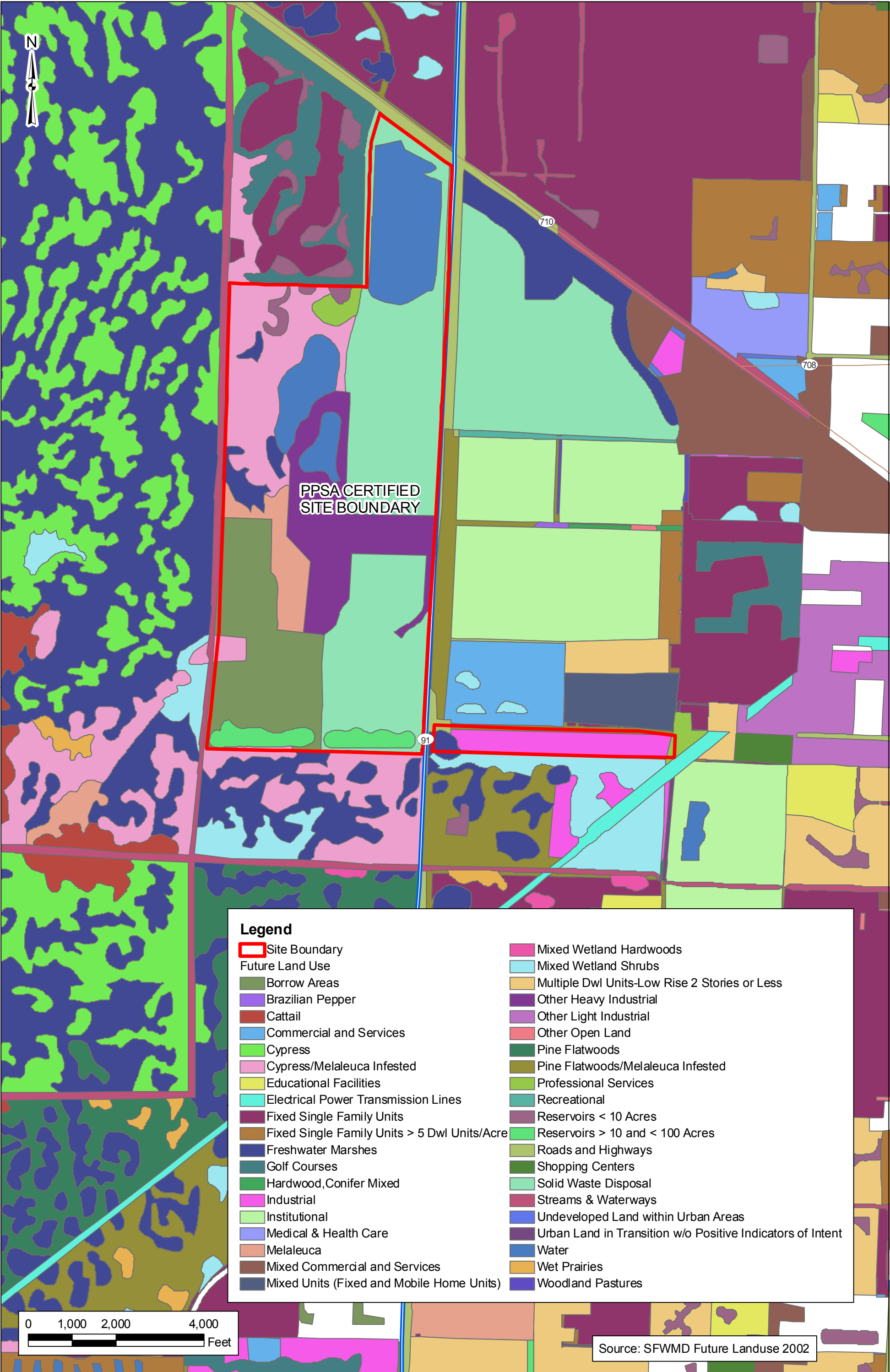
Solid Waste Authority
of Palm Beach County

FLORIDA LAND USE
& COVER CLASSIFICATION (FLUCCS) MAP

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July 2010
Figure 2-7



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2.2.7. Social and Economic Characteristics

In 2008, the labor force in Palm Beach County was estimated to be 654,138 by the Geographic Solutions Inc. Florida Research and Economic Data Base. Projections of future employment assume significant growth following the current recession.

2.2.7.1. Labor Force

Table 2-7 “Palm Beach County: Average Annual Labor Force 2001-2007,” lists the civilian labor force and number of employed and unemployed persons in Palm Beach County between 2001 and 2007. The table shows a nine percent increase in the civilian labor force during this period, growing approximately from 564,000 persons in 2001 to more than 621,000 by 2007.

**Table 2-7
Palm Beach County: Average Annual Labor Force 2001 - 2007**

Year	Civilian Labor Force	Employment	Unemployment	Unemployment Rate (%)
2007	621,672	594,711	26,961	4.3
2006	612,126	589,563	22,563	3.7
2005	599,515	574,055	25,460	4.2
2004	593,714	563,366	30,348	5.1
2003	585,256	551,698	33,558	5.7
2002	581,462	545,729	35,733	6.1
2001	564,996	536,701	28,295	5

Source: Florida Research and Economic Database (FRED) Website, Annual Not Seasonally Adjusted Labor Force, Employment and Unemployment data in Palm Beach County, Labor Market Statistics, Local Area Unemployment Statistics Program
<http://fred.labormarketinfo.com/analyzer/labforcedata.asp?geo=1204000099&cat=LAB&session=LABFORCE&subsession=99&areaname=Palm+Beach+County&tableused=LABFORCE&defaultcode=&roll=&rollgeo=04&time=20080100:20070100:20060100:20050100:20040100:20030100:20020100:20010100:20000100:19990100:19980100&currsubsessavail=&sqltime=0&siclevel=3&naicslvl=6>

2.2.7.2. Employment by Industrial Sector

Table 2-8 lists the average monthly employment by industrial sector for Palm Beach County from 2001 through 2007. The County’s private employment by industry increased 12 percent during the time period while government employment increased by approximately 10 percent.

**Table 2-8
Average Employment by Sector for Palm Beach County**

	2001	2002	2003	2004	2005	2006	2007
Total Private	440,587	444,135	444,166	457,802	482,988	497,320	494,756
Goods-Producing Domain	68,903	66,858	63,719	64,344	69,183	74,049	69,215
Nat. Resources/ Mining	9,900	9,476	8,942	8,079	7,784	8,140	8,228
Construction	34,092	34,406	34,220	36,299	41,968	45,759	42,167
Manufacturing	24,911	22,976	20,557	19,966	19,431	20,150	18,820
Service-Producing Domain	371,684	377,276	380,447	393,458	413,805	423,271	425,542
Trade, Transportation and Utilities	96,111	96,960	97,025	98,024	99,786	103,288	103,477
Information	12,310	11,426	10,906	10,647	10,931	11,135	10,798
Financial Activities	35,916	36,130	37,637	37,415	38,591	39,667	38,970
Professional and Business Services	85,460	83,232	84,055	91,191	102,019	102,196	102,101
Education and Health Services	63,568	68,725	69,143	70,495	72,366	74,136	76,227
Leisure and Hospitality	57,484	58,966	59,980	64,382	68,111	70,712	71,771
Other Services	20,260	21,543	21,028	20,787	21,383	21,533	21,658
Unclassified	215	529	491	172	286	160	490
Total Government	59,096	59,404	62,625	62,327	63,519	65,050	65,042
Federal	5,689	4,263	5,845	6,001	6,165	6,180	6,455
State	8,722	8,639	8,927	7,736	7,746	7,858	7,529
Local	44,685	46,502	47,853	48,590	49,608	51,012	51,058

Source: Florida Research and Economic Database, ES-202 data, *Labor Market Statistics, Occupational Employment Projections Unit*
<http://fred.labormarketinfo.com/analyzer/settime.asp?cat=IND&session=IND202&subsession=99&tableused=INDUSTRY&rollgeo=04&defaultcode=&time=&currsubsessavail=&siclevel=3&naicslvi=6&incsource=&sgitime=0&AreaAbr=cnty&blnFirStGeog=True&geo=1204000099&areaname=Palm%20Beach%20County>

Table 2-9 provides the most current average employment information available.

**Table 2-9
Average Employment by Sector for Q1 through Q3 in 2008**

	1st Quarter	2nd Quarter	3rd Quarter
Total Private	482,119	470,853	451,443
Goods-Producing Domain	66,268	61,589	57,004
Nat. Resources/ Mining	10,126	7,790	4,849
Construction	37,757	35,741	34,206
Manufacturing	18,386	18,058	17,949
Service-Producing Domain	415,851	409,264	394,439
Trade, Transportation and Utilities	104,405	101,904	98,953
Information	10,659	10,651	10,554
Financial Activities	38,576	37,977	37,400
Professional and Business Services	86,263	85,892	82,916
Education and Health Services	77,882	78,002	77,360
Leisure and Hospitality	74,566	72,651	66,557
Other Services	22,485	21,787	20,671
Unclassified	1,016	401	28
Total Government	66,695	65,643	63,495
Federal	6,616	6,664	6,727
State	7,622	7,566	7,510
Local	52,457	51,413	49,258

Source: Florida Research and Economic Database, ES-202 data, *Labor Market Statistics, Occupational Employment Projections Unit*

<http://fred.labormarketinfo.com/analyzer/seltime.asp?cat=IND&session=IND202&subsession=99&tableused=INDUSTRY&rollgeo=04&defaultcode=&time=&currsubsessavail=&siclevel=3&naicslvl=6&incsource=&sgltime=0&AreaAbr=cnty&blnFir stGeog=True&geo=1204000099&areaname=Palm%20Beach%20County>

2.2.7.3. Employment Projections

Table 2-10 “Projected Employment in Palm Beach County by Sector” estimates the projected employment in Palm Beach County from 2008 through 2016 by employment sector. The table predicts an anticipated 16 percent increase in County employment during the time period. The largest employment increases during this period are anticipated to be in the areas of Education and Health Services and Construction, which are projected to increase by 27,654 (24.5 percent) and 8,459 (21.9 percent) jobs, respectively. Natural Resources and Mining is expected to decrease by 1,130 (14.8 percent) jobs by 2016.

**Table 2-10
Projected Employment in Palm Beach County by Sector**

	2008 Estimated	2016 Projected	Change	Percent Change
Total Employment, All Jobs	654,138	758,862	104,724	16
Goods-Producing	64,728	73,054	8,326	12.9
Natural Resources and Mining	7,648	6,518	-1,130	-14.8
Construction	38,589	47,048	8,459	21.9
Manufacturing	18,491	19,488	997	5.4
Services-Providing	525,613	614,368	88,755	16.9
Trade, Transportation, and Utilities	106,534	119,360	12,826	12
Information	11,825	12,309	484	4.1
Financial Activities	40,254	48,017	7,763	19.3
Professional and Business Services	119,555	142,217	22,662	19
Education and Health Services	112,669	140,323	27,654	24.5
Leisure and Hospitality	74,148	85,404	11,256	15.2
Other Services (Except Government)	24,282	26,871	2,589	10.7
Government	36,347	39,867	3,520	9.7

Source: Florida Research and Economic Database, ES-202 data, *Labor Market Statistics, Occupational Employment Projections Unit* (<http://fred.labormarketinfo.com/analyzer/indprojNAIC.asp?cat=IND&session=INDPROJ&subsession=99&geo=1204000099&areaname=Palm%20Beach%20County&tableused=INDPRJ&defaultcode=&rollgeo=04&time=16&naicslvl=6&currsessavail=&sgltime=1&RolledData=>)

2.2.7.4. Average Wages and Salaries

According to the Palm Beach County Business Development Board, the average per capita personal income (PCPI) in the County was \$55,311 in 2006, which ranked third in the state and was 151 percent of the state and national average of approximately \$36,700.

Table 2-11 presents the average weekly salary by industrial sector for Palm Beach County from 2001 to 2007. Table 2-11 shows an increase of 21 percent in average wages earned by an employee in the private sector from \$688 in 2001 to \$835 in 2007. There also was an increase of 28 percent in average wages earned by an employee in the public sector, from \$769 in 2001 to \$986 in 2007. By 2007, the highest average weekly salary by sector was Financial Activities at \$1,346 while the lowest weekly salary was in

Leisure and Hospitality at \$443. Almost 15 percent of the employed individuals in Palm Beach County work in the Leisure and Hospitality sector.

Table 2-11
Average Weekly Wage by Industry Sector in Palm Beach County

	2001	2002	2003	2004	2005	2006	2007
Total Private	\$688	\$700	\$718	\$738	\$771	\$798	\$835
Goods-Producing Domain	\$766	\$770	\$787	\$819	\$809	\$863	\$903
Nat. Resources/ Mining	\$445	\$450	\$447	\$504	\$503	\$533	\$524
Construction	\$714	\$727	\$748	\$763	\$788	\$835	\$852
Manufacturing	\$965	\$967	\$1,000	\$1,046	\$979	\$1,059	\$1,185
Service-Producing Domain	\$673	\$687	\$707	\$725	\$764	\$787	\$824
Trade, Transportation and Utilities	\$623	\$647	\$668	\$642	\$670	\$688	\$705
Information	\$922	\$907	\$931	\$977	\$1,029	\$1,057	\$1,059
Financial Activities	\$1,035	\$1,028	\$1,113	\$1,153	\$1,247	\$1,271	\$1,346
Professional and Business Services	\$846	\$827	\$879	\$936	\$965	\$1,033	\$675
Education and Health Services	\$675	\$682	\$717	\$750	\$775	\$809	\$833
Leisure and Hospitality	\$350	\$354	\$371	\$384	\$387	\$405	\$443
Other Services	\$463	\$490	\$494	\$520	\$539	\$564	\$584
Unclassified	\$648	\$750	\$554	\$629	\$801	\$664	\$839
Total Government	\$769	\$774	\$825	\$896	\$917	\$963	\$986
Federal	\$992	\$973	\$1,082	\$1,156	\$1,186	\$1,253	\$1,236
State	\$610	\$627	\$645	\$748	\$761	\$793	\$865
Local	\$704	\$723	\$749	\$783	\$805	\$842	\$857

Source: Florida Research and Economic Database, ES-202 data, *Labor Market Statistics, Occupational Employment Projections Unit*
(<http://fred.labormarketinfo.com/analyzer/indprojNAIC.asp?cat=IND&session=INDPROJ&subsession=99&geo=1204000099&areaname=Palm%20Beach%20County&tableused=INDPRJ&defaultcode=&rollgeo=04&time=16&naicslvl=6&currsubs=essavail=&sgltime=1&RolledData=>)

Table 2-12 “Income by Household: Palm Beach County 2000,” presents the estimated mean household income and income distribution for Palm Beach County in 2000. The range of incomes within the County is from under \$10,000 to over \$200,000.

Table 2-12
Income by Household: Palm Beach County 2000

Income Range	Number of Households	Percentage of Households
Under \$10,000	36,110	7.6
\$10,000 - \$14,999	27,150	5.7
\$15,000 - \$24,999	59,414	12.5
\$25,000 - \$34,999	60,280	12.7
\$35,000 - \$49,999	76,861	16.2
\$50,000 - \$74,999	89,733	18.9
\$75,000 - \$99,999	47,767	10.1
\$100,000 - \$149,999	41,057	8.7
\$150,000 - \$199,999	14,025	3.0
\$200,000 or more	21,898	4.6
Median Household Income:	\$45,062	

Source: U.S. Census Bureau 2000 (http://factfinder.census.gov/servlet/QTTable?_bm=y&-qr_name=DEC_2000_SF3_U_DP3&-ds_name=DEC_2000_SF3_U&-_lang=en&-_sse=on&-geo_id=05000US12099)

2.2.2.5 Existing Housing Stock

Table 2-13 identifies the total number of year-round housing units and number of units per structure that are located within the City of West Palm Beach. As indicated by the table, 45.1 percent of housing consists of one-unit dwellings.

Table 2-13
Housing Unit Estimates in 2007 in West Palm Beach, FL

Housing Type	Number of Units	Percentage of Units
TOTAL	47,376	N/A
1-unit, detached	18,645	39.4
1-unit, attached	2,724	5.7
2 units	1,377	2.9
3 or 4 units	4,355	9.2
5 to 9 units	3,149	6.6
10 to 19 units	4,411	9.3
20 or more units	12,056	25.4
Mobile Home	610	1.3
Boat, RV, van, etc.	49	0.1

Source: U.S. Census Bureau, Census 2005-2007 Estimate (http://factfinder.census.gov/servlet/ADPTable?_bm=y&-geo_id=16000US1276600&-qr_name=ACS_2007_3YR_G00_DP3YR4&-ds_name=ACS_2007_3YR_G00_&-_lang=en&-_sse=on)

Table 2-14 “Age of Housing Stock Estimated as of 2007 – West Palm Beach, FL,” presents the age of the housing stock within the City of West Palm Beach. As indicated by the table, 17.3 percent of the units were built after 2000. Less than 10 percent of the existing housing stock was constructed before 1940.

Table 2-14
Age of Housing Stock Estimated as of 2007 - West Palm Beach, FL

Year Unit was Built	Number of Homes	Percentage of Homes
TOTAL	47,376	
2005 or later	1,642	3.5
2000 – 2004	6,553	13.8
1990 – 1999	6,362	13.4
1980 – 1989	9,354	19.7
1970 – 1979	7,358	15.5
1960 – 1969	4,226	8.9
1950 – 1959	4,587	9.7
1940 – 1949	2,788	5.9
1939 or earlier	4,506	9.5

Source: U.S. Census Bureau, Census 2005-2007 Estimate (http://factfinder.census.gov/servlet/ADPTable?_bm=y&-geo_id=16000US1276600&-qr_name=ACS_2007_3YR_G00_DP3YR4&-ds_name=ACS_2007_3YR_G00_&-_lang=en&-_sse=on)

2.2.7.6. Housing Costs.

Table 2-15 “Housing Values Estimated in 2007 in West Palm Beach, FL,” illustrates the estimated housing values for units in the City of West Palm Beach in 2007. As indicated by the table, over 56 percent of housing units are in the \$200,000 to \$499,999 range.

Table 2-15
Housing Values Estimated in 2007 in West Palm Beach, FL

Owner-Occupied Unit Value	Number of Units	Percentage of Units
TOTAL	20,305	N/A
Less than \$50,000	240	1.2
\$50,000 to \$99,999	815	4.0
\$100,000 to \$149,999	1,598	7.9
\$150,000 to \$199,999	2,902	14.3
\$200,000 to \$299,999	5,429	26.7
\$300,000 to \$499,999	6,003	29.6
\$500,000 to \$999,999	2,202	10.8
\$1,000,000 or more	1,116	5.5
Median (dollars)	\$275,600	N/A

Source: U.S. Census Bureau, Census 2005-2007 Estimate (http://factfinder.census.gov/servlet/ADPTable?_bm=y&-geo_id=16000US1276600&-qr_name=ACS_2007_3YR_G00_DP3YR4&-ds_name=ACS_2007_3YR_G00_-&-lang=en&-sse=on)

Table 2-16 “Building Permits: Palm Beach County 2009.” presents the 2009 building permit activity for Palm Beach County. The majority of the total building permit value was for residential construction and repairs, alterations and additions.

Table 2-16
Building Permits: Palm Beach County 2009

	Number of Permits Issued
Single Family	1,041
Multi Family	281
Total Permits	1,322
Total New Residential Value	\$342,473,535
Total Commercial and Industrial Value	\$50,164,949
Total Public Projects Value	\$19,390,932
Total Repairs, Alterations and Additions Value	\$401,447,682
TOTAL ALL PERMITS	\$813,847,097

Source: Palm Beach County Department of Planning, Zoning and Building (http://www.pbcgov.com/PZB/Planning/permitreports/2009_Annual.pdf)

2.2.7.7. Area Public Services and Utilities

Education. The closest public schools to the Project Site are:

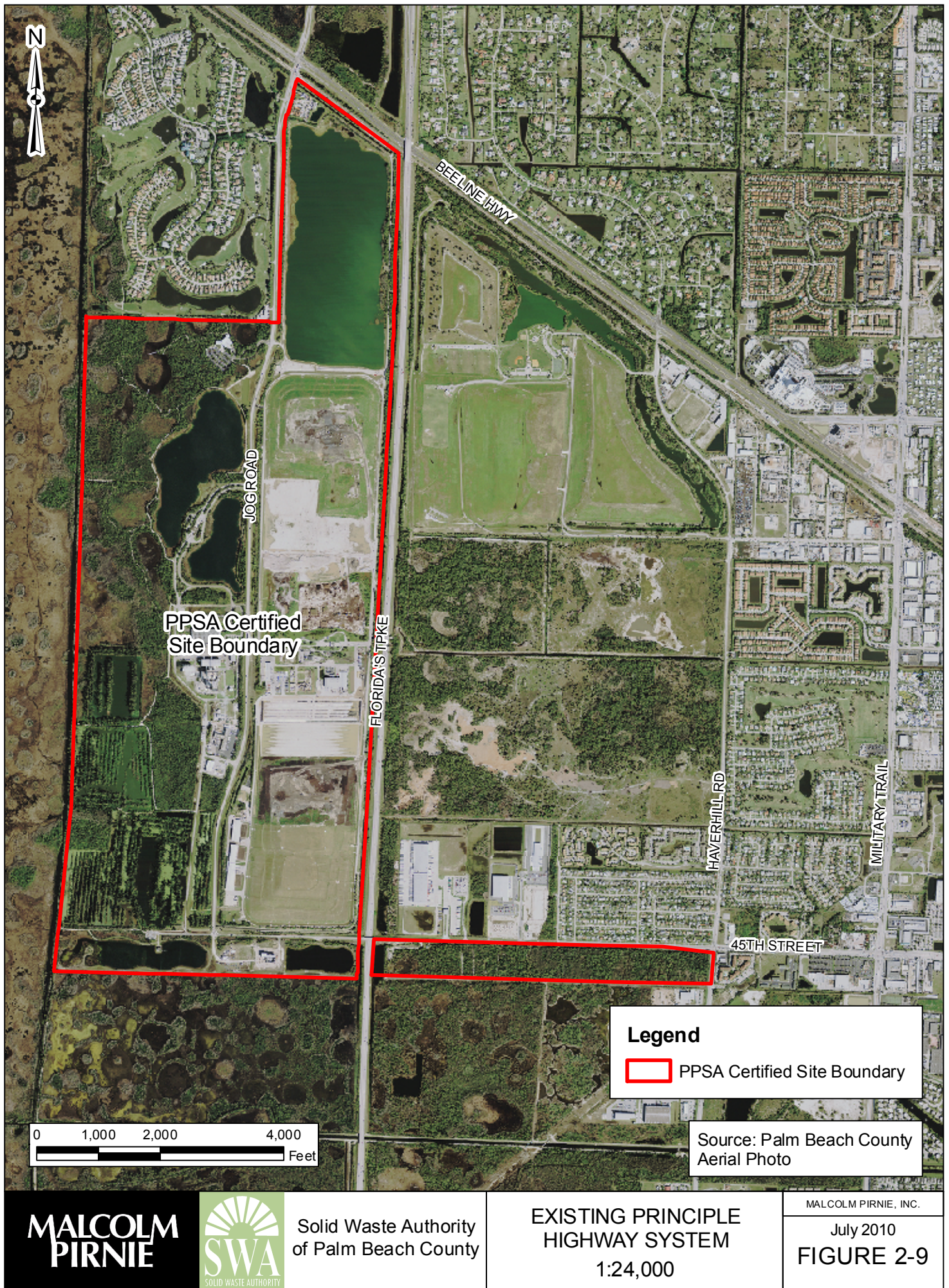
- Grove Park Elementary School at 8330 North Military Trail, Palm Beach Gardens, approximately 2.7 miles from the Project Site.
- JEAGA Middle School at 3777 N. Jog Road, West Palm Beach, approximately 2.5 miles from the Project Site.
- Palm Beach Lakes High School at 3505 Shiloh Drive, West Palm Beach, approximately 2.4 miles from the Project Site.
- Bear Lake Middle School 3505 Shenandoah Boulevard. West Palm Beach, Florida 33409 approximately 5.1 miles from the Project Site
- Egret Lake Elementary School 5115 47th Pl North, West Palm Beach, FL 33417 approximately 3.4 miles from the Project Site

Transportation. The Proposed Facility will be located adjacent to the Existing Facility at 6501 North Jog Road, in West Palm Beach, Florida. Major roads in the area include Florida's Turnpike, Haverhill Road, State Road 710 (Bee Line Highway, approximately one and a half miles to the north), State Road 702 (NW 45th Street, approximately one mile to the south) and North Military Trail (approximately two miles to the east). Figure 2-9 provides the existing principal street and highway system for the area. These roads are briefly described as follows:

- Florida's Turnpike (SR 91) is a four-lane, north-south toll road highway with a Sun Pass toll plaza at Jog Road and Bee Line Highway.
- Bee Line Highway (SR 710) is a four-lane, southeast to northwest highway that runs from Riviera Beach to Indiantown in Martin County.
- Haverhill Road is a two and four-lane, north-south road that runs through much of Palm Beach County.
- Military Trail is a six-lane north-south artery that runs from Jupiter in northern Palm Beach County to Deerfield Beach in Broward County.
- 45th Street (SR 702) is a four-lane, east-west road connecting the eastern and western part of the City of West Palm Beach.
- Jog Road is a two-lane, north-south road which bi-sects the Energy Park connecting State Road 710 (Bee Line Highway) or State Road 702 (45th Street).

The Proposed Facility is located in the Authority's Energy Park west of Jog Road.

Currently, MSW is delivered to the Energy Park and disposed of at either the Existing Facility or Landfill. Trucks delivering MSW to the Landfill currently enter by way of a scale house east of Jog Road. After construction of the Proposed Facility, most of the MSW currently being disposed of at the Landfill will be processed at the Proposed Facility on the west side of Jog Road. Consequently, the Proposed Facility will not increase the number of MSW delivery vehicles. It will only alter the destination, MSW will be delivered to the Proposed Facility rather than the Landfill both of which are located off Jog Road within the Energy Park.



Once the Proposed Facility is operational, the only anticipated additional vehicle traffic that will be added to the area will be for the average daily personnel occupied vehicle (POV) trips for employees on staff at the Proposed Facility and the occasional delivery of materials to the Proposed Facility. The Proposed Facility will have a full time staff of about 75 personnel. The Proposed Facility will have a rotational schedule utilizing one main shift of about 55 employees during tipping floor operational hours (when waste is delivered to the facility) and a reduced staff of about ten (10) to fifteen (15) employees during non-tipping floor operational hours. During a 24-hour period, operational staff will add an approximate maximum of 250 POV trips per day (Monday-Saturday) and approximately 40 POV trips per day during holidays and Sundays. A Traffic Concurrence letter was provided to the PBC Traffic Division. (See Volume II Appendix 10.11.4.)

The Proposed Facility will operate 7 days a week, 24 hours a day, with waste deliveries Monday-Saturday, 7:00 a.m. to 7:00 p.m.

Medical Facilities. Hospitals in the area include:

- Kindred Hospital – Palm Beaches, 5555 West Blue Heron Blvd, Riviera Beach, FL
- Columbia Hospital – 2201 45th Street, West Palm Beach, FL
- St. Mary’s Hospital – 901 45th Street, West Palm Beach, FL
- Palm Beach Gardens Medical Center – 3360 Burns Road, Palm Beach Gardens, FL

Fire Protection. The Project Site is within the Battalion 3 Fire Protection District of Palm Beach County Fire-Rescue. The nearest fire station is located at 8130 North Jog Road, which is in the Energy Park. There is another station at 1734 Seminole Boulevard.

The City of West Palm Beach also services the Energy Park from Fire Station 6, located at 3033 Cumberland Road, and Fire Station 8, 10835 North Lake Blvd.

Police Protection. The City of West Palm Beach Police Department provides police services to the Energy Park. The Palm Beach County Sheriff’s Office has a substation on the Energy Park site.

Recreation. There are several recreational facilities located within one and five miles of the Proposed Facility. Refer to Section 2.2.1 for information regarding recreational facilities.

Electricity. Construction power will be provided by PBREF No. 1 and Florida Power and Light Company through existing distribution systems that currently available on the Energy Park. Operating power will be provided by the Proposed Facility with back-up power being supplied by Florida Power and Light Company.

Gas. Natural gas is available on the east side of the Project Site along Jog Road from the existing distribution system of Florida Public Utilities.

Water Supply Facilities. Potable water is available on the east side of the Project Site along Jog Road from the existing distribution system of the City of West Palm Beach.

Sewage Treatment Facilities. Sanitary wastewater service is available on the east side of the Project Site along Jog Road from the existing collection system of the City of West Palm Beach. Process wastewater generated by the Proposed Facility that is not reused will be disposed of by use of the Authority's existing injection wells.

Solid Waste. Solid waste will be processed by the Proposed Facility or disposed of at the Landfill.

2.3. Bio- Physical Environment

2.3.1. Geology and Hydrology

2.3.1.1. Geologic Description of the Site and Area

Due to the long time period necessary for geologic conditions to change, the conditions in the vicinity of the Project Site have remained the same since the Original Certification application was submitted for approval in 1985. The following describes the geologic and subsurface conditions at the Project Site and surrounding area. This information is summarized from the Original Certification submitted in 1985 and is supplemented with more recent information.

Geologically, the materials within several thousand feet of the land surface in south Florida are sedimentary rocks. The subsurface material pertinent to these investigations lies at depths less than about 125 feet, and consists predominantly of sand, shell, sandstone, and limestone. This Application focuses on these upper sediments as the geologic material below this depth, in the Project Site vicinity, are generally considered to exhibit low permeability. The shallow aquifer is contained within permeable portions of the Anastasia Formation and the upper portion of the Tamiami Formation. The shallow aquifer is a source of drinking water in Palm Beach County

The geologic units in the vicinity of the Energy Park are described in detail by Fisher (1980). The nomenclature and definition of units in Palm Beach County have been refined over time and was most recently studied by Reese and Wacker (2009). According to Fisher (1980), the Pamlico Sand, of Pleistocene age, is present from land surface to a depth of about 12 feet bgs. The Pamlico Sand generally consists of fine, gray and brown sand, although organic materials and silt are occasionally encountered. The Anastasia Formation, of Pleistocene age, underlies the Pamlico Sand. The Anastasia Formation is composed of gray and tan quartz sand and shells. The Anastasia formation is approximately 20 feet to 30 feet bgs on the Energy Park. It is between 50 to 100 feet in depth, these deposits generally are cemented to form a coquina or sandstone. Fisher (1980) described the Anastasia Formation as extending from 12 feet to 250 feet bgs and including the entire shallow aquifer. The "shallow aquifer" is the name given to near-surface sediments that have sufficient permeability to yield water to wells in much of southern Florida. However, more recent interpretations by Reese and Wacker (2009) place the top of the Tamiami Formation at approximately 100 feet bgs and extending to a

depth of approximately 210 feet. The top of the Tamiami formation presumably corresponds to the bottom of the sandstone and coquina beds. Reese and Wacker (2009) defined permeable portions of the shallow aquifer as extending across both the Anastasia Formation and the upper portion of the Tamiami Formation. Both Reese and Wacker (2009) and Scott (1977) mark the bottom of the permeable layers, in the vicinity of the site, at a depth of about 125 feet.

The Tamiami Formation is underlain by the Hawthorn Group formations. Both the lower portion of the Tamiami Formation and the Hawthorn Group formations generally have low permeability and serve to confine the underlying Floridan aquifer from the overlying sediments. The top of the Floridan aquifer lies at a depth of about 1,000 feet. The Floridan aquifer in the vicinity of the site contains brackish water suitable only for use in certain types of irrigation applications or following desalinization.

The Anastasia and Tamiami Formations contain the permeable portions of the shallow aquifer, the principal source of drinking water in Palm Beach County. A particularly permeable portion of the shallow aquifer occurs in a band several miles wide in the east-west direction, and extends nearly the entire length of the County in the north-south direction. This zone tends to underlie the area in the vicinity of Florida's Turnpike at depths that vary between approximately 50 feet and 150 feet. This zone has been called the "cavity-riddled zone" or alternately, the "Turnpike aquifer." This zone contains cavities up to 2 inches in diameter that quite frequently are filled with sand. Portions of this cavity-riddled zone underlie the site.

The Energy Park is located in an area where the near-surface soils were deposited during the fluctuations of sea level that occurred in the last major period of glaciation. During the Pleistocene epoch, which occurred over the time period from 2 million to about 10,000 years ago, worldwide climatic changes were caused by the glaciers that periodically covered up to one-third of the earth's continental surface. Sediments already existing on the plateau were eroded and reworked while new sediments were deposited. Shell beds and limestone were formed in the shallow seas. In some places, they have become hardened and cemented while in other places, they are unconsolidated.

Since the deposits in the vicinity of the Energy Park are the result of many erratic changes in climate and fluctuations of sea levels, a careful evaluation will be made of the specific subsurface conditions, utilizing borings and standard penetration tests, in order to lessen the potential for prematurely terminating foundation elements such as piles and footings in very thin strata that may cause high penetration resistance for a short distance followed by very low impedance in underlying soft or loose strata.

2.3.1.2. Detailed Site Lithologic Description

As described in the Original Certification, the test borings performed by Jammal & Associates, Inc. in 1985 encountered a surface layer of very loose to medium dense,

relatively clean to slightly silty, and occasionally silty fine to medium sands. This surface layer was underlain at depths of 40 to 50 feet by mostly dense to very dense slightly silty fine to medium sands with shell and rock fragments. These dense, shelly, partially-cemented sands with intermittent, thin sandstone and limestone lenses extended to the bottoms of the borings at depths of 82 to 157-feet bgs.

Recent test borings were performed by Nutting Engineers in 2008 within the Project Site Boundary and the results dated February 2008, are provided in Volume II Appendix 10.10.1B and indicate similar subsurface conditions as observed in the 1985 investigation. These borings revealed “loose to medium dense sands” in the upper 35 feet, underlain by “medium dense to dense sands” to a depth of approximately 62 to 68 feet. The Nutting Engineers boring logs further indicate the presence medium hard to hard limestone/sandstone within intermixed sands extending to the terminal depth of the test borings. In test boring B-1, brown sandy clay was encountered from 26 to 29 feet. According to the boring logs, groundwater was encountered during drilling at five feet bgs in boring B-1; however, it was not encountered in the upper ten feet bgs in test boring B-2.

Subsurface conditions that, affect the occurrence and quality of groundwater, were investigated using a number of techniques that also yield lithologic information. The techniques included:

1. Examination of rock cuttings collected during well construction (Wells 1,2,3, and 4);
2. Collection and analysis of split-spoon samples (from the borings of Wells 5 through 14);
3. Performance of pumping tests (aquifer performance tests) and data analysis;
4. Review of boring logs;
5. Collection and interpretation of water-level measurements;
6. Compilation and evaluation of groundwater flow diagrams, and
7. Chemical analyses of groundwater samples.

2.3.1.3. Geologic Conditions

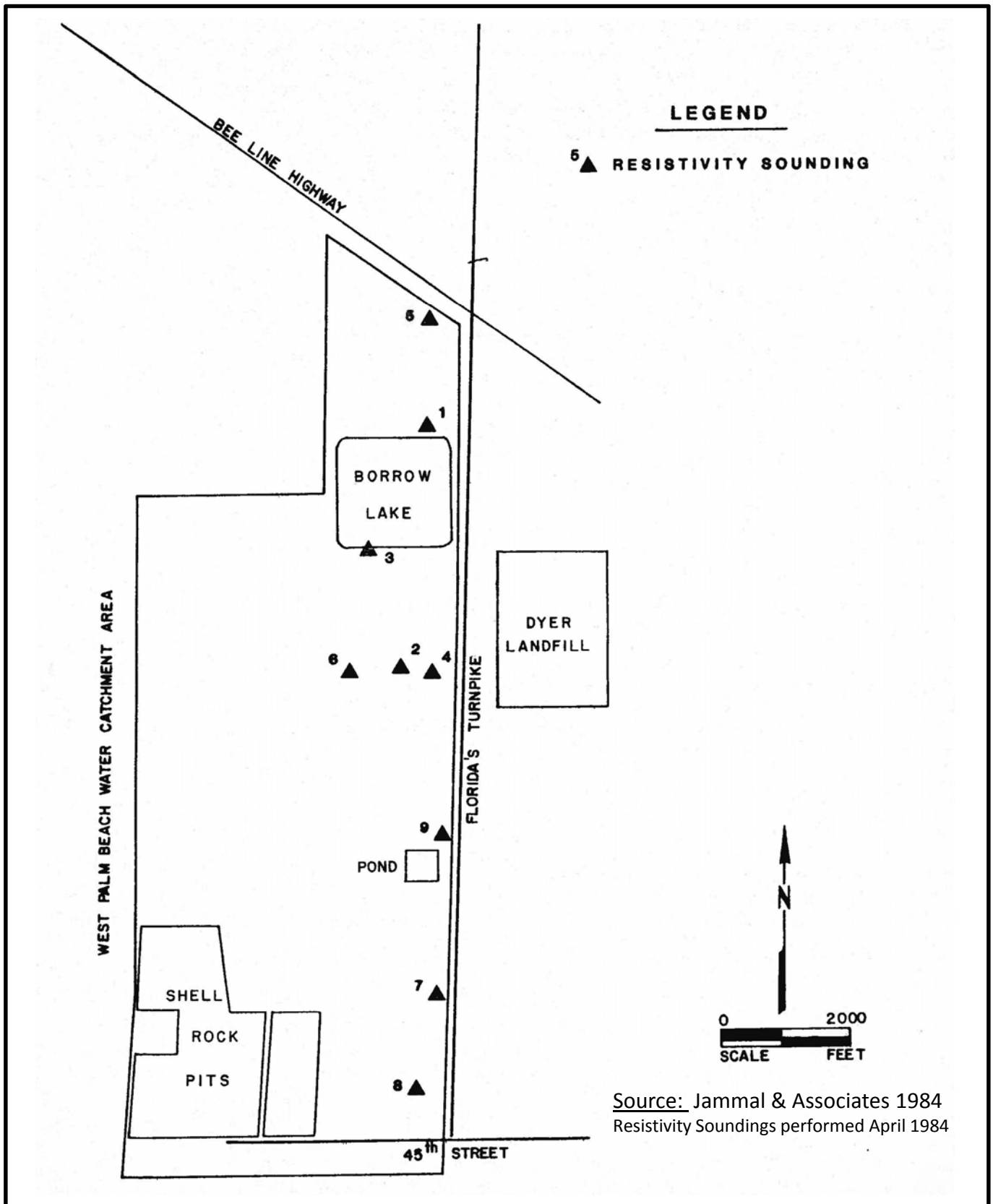
Cuttings generated during well construction in 1985, as part of the Original Certification process, were described and geologic logs were prepared as part of the investigation and are presented in Volume II, Appendix 10.10.1C. Generalized geologic cross sections are also provided in Volume II, Appendix 10.10.1C. The cross sections show that most major stratigraphic units can be traced across the Energy Park and beyond its boundaries in the north-south and east-west directions. Because of the orientation of Florida’s coastline and the influence it had on sediment deposition during Pleistocene time, there is generally

more conformity in thickness and extent of individual strata in the north-south than in the east-west direction. The cross sections show that the sediments consist of sand, shells, fine-sized particles (marl, clay, silt), sandstone, and limestone. Various strata are distinguished by dominant types.

The deepest layer noted on the sections is sandstone interbedded with shells, sand and finer-sized particles. Significant amounts of clay and marl were encountered in Wells 2, 3, and 4 at depths of 117, 120, and 109 feet bgs, respectively. Beneath the Project Site, the approximate bottom of the shallow aquifer is considered to be at a depth of 125 feet, in accordance with the analysis by Scott (1977). The subsurface material above the deepest layer and upward to depths of 50 to 60 feet are predominantly sandstone with shell and loose sand. Across the mid-section of the Project Site, the sandstone dips toward the east and thickens slightly; continuing eastward of Florida's Turnpike. Within the sandstone layers are a marly limestone bed and a layer of fine sand that enter from the north and pinch out beneath the Energy Park. The sandstone layers also contain the "cavity-riddled zone" described by Fischer (1980) or its apparent stratigraphic equivalent. Hydrogeologically, the sandstone is considered the principal portion of the shallow aquifer or the portion that would yield water most readily if intercepted by a well.

Predominantly unconsolidated sand and shell layers are present above the sandstone layers; two of these beds contain significant amounts of silt and clay (see Volume II, Appendix 10.10.1C for associated logs). The sand and shell layers also contain sandstone layers in places. As shown in Figure 2-10 A, Dutch Cone penetration tests were performed at 21 locations on and/or near the Project Site to evaluate the thickness of unconsolidated sediments and its suitability as landfill cover material. These tests indicated that several relatively hard layers of sandstone are present predominately in the northeastern and southwestern parts of the Project Site. These layers range in depth between about 29 feet and 52 feet bgs, but have thicknesses of only a few feet. Most consistently, these layers are present between depths of 29 and 36 feet bgs. These layers can be correlated only generally between test sites and appear to have a limited extent.

The uppermost portion of the sand and shell layers, containing silt and clay, are between depths of 10 and 25 feet bgs. The lower portion is generally between 25 and 57 feet bgs. These layers may affect (inhibit) the vertical movement of groundwater. The uppermost layer of sediment is sand with silt and organic materials encountered in this sand between depths of 2 and 12 feet bgs.



**MALCOLM
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**Solid Waste Authority
of Palm Beach County**

**Locations of
Resistivity Soundings**

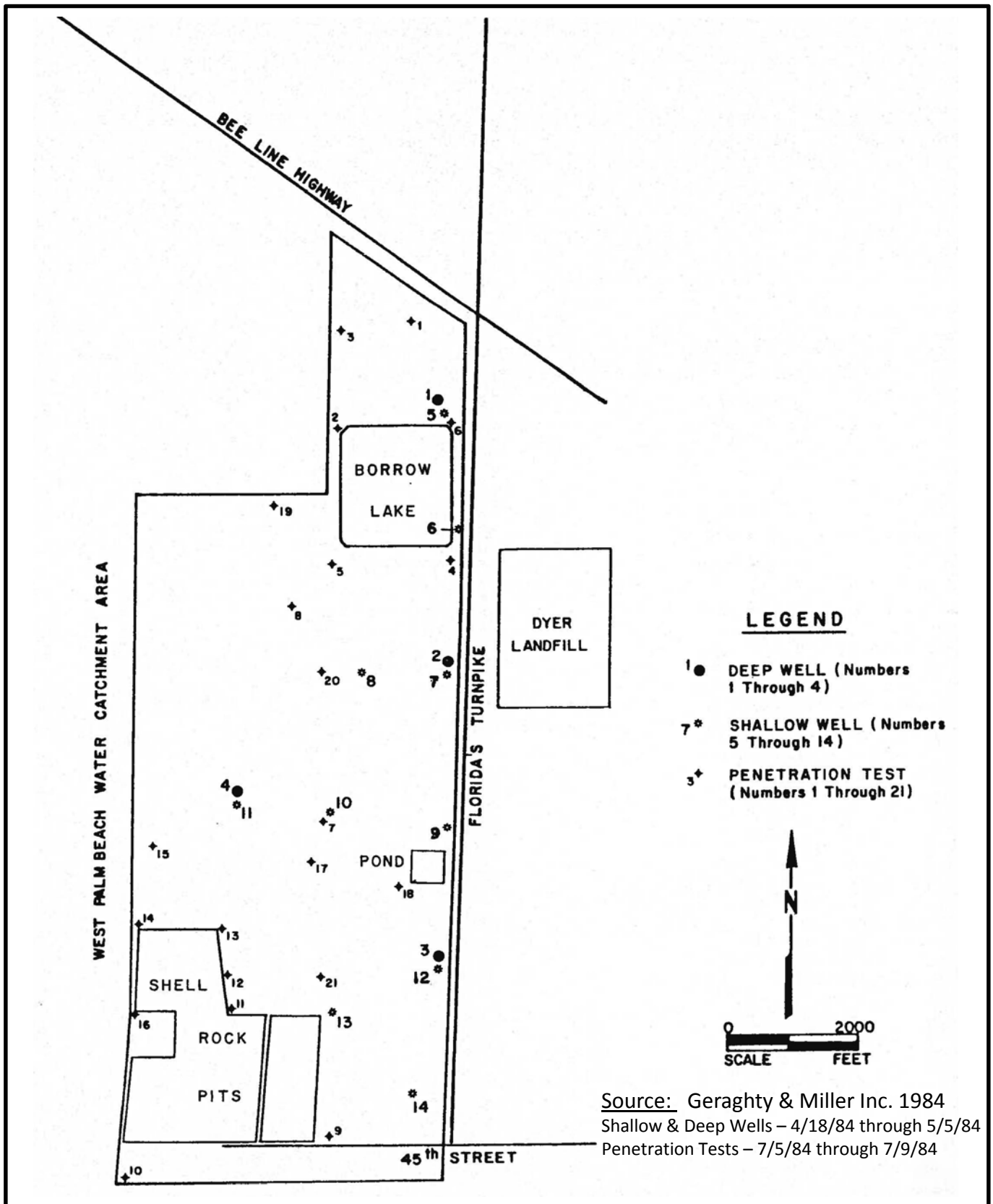
MALCOLM PIRNIE, INC.

July 2010
FIGURE 2-10A

The 1985 borings provided in Volume II, Appendix 10.10.1.C done on the Energy Park indicate the sandstone layer that forms the most permeable part of the shallow aquifer showed little sign of being cavity-riddled, unlike the area that was described further east by Fischer (1980). The cross-sections and boring log for well 4 indicate the possible presence of generally occurring the sandstone layer beneath some areas of the Energy Park. Evidence of cavities includes lost circulation of drilling fluids (in Well 4) the presence of calcite crystal faces in the cuttings indicating the presence of voids, and the appearance of etched surfaces on cuttings that are characteristic of dissolution. The zones indicating these signs are shown on the cross sections. These zones generally occur in the sandstone. Evidence from the short-term pumping tests suggests that the cavities that may be present are filled with sand, thus resulting in permeabilities that are lower than those that occur elsewhere.

From a hydraulic perspective, the geologic logs (as shown in Volume II Appendix 10.10.1C,) show a grain sizes range from clay size to consolidated masses of limestone. Sands, where they occur, are fine to medium grain. Shells apparently occur in broken dime-size fragments and smaller. The porosities of clay, marl, and silt-sized materials are estimated to range from 40 to 50 percent. Sand-size materials are estimated to have porosities between 30 and 40 percent. Intergranular porosities of sandstone and secondary porosities of limestone are estimated to range from 10 to 20 percent, except where large cavities have developed; cavity zones could have porosities as high as 40 percent. The only occurrences of the loss of drilling mud were at 65 and 72 feet below grade in Well 4; approximately 50 gallons was lost at each depth. The porosities estimated above are based on information provided by Walton (1970) and inspections of drill cuttings derived during well construction.

With few exceptions, geologic information obtained during well construction indicates only a general correlation with the surface resistivity data, primarily because of a lack of contrast in the electrical properties of the material. The method employed to determine resistivity is referred to as resistivity sounding (RS), wherein one pair of electrodes that induces current through the ground and another electrode pair which measures voltage potential are gradually expanded symmetrically from a center point with readings taken at each point. The method employed a “wenner” array in which the distance between the current electrodes, referred to as the distance “AB”, is three times the distance between the potential electrodes. The locations of the nine resistivity soundings are shown on Figure 2-10B.



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**Solid Waste Authority
of Palm Beach County**

**Locations of Shallow and
Deep Wells and Soil
Penetration Tests**

MALCOLM PIRNIE, INC.

July 2010
FIGURE 2-10B

Well 1 lies about 600 feet from RS 1. Resistivities from near land surface to perhaps 100 feet bgs vary generally in a range between 130 and 500 ohm-feet. Two low resistivity measurements occur at a ½ AB distance (not depth) near 90 feet and appear to reflect the marly materials present from 63 to 68 feet in depth bgs. A spike of high resistivity at a ½ AB distance of 260 feet cannot be attributed to any particular layer and probably is related to performance of the equipment. Well 2 is adjacent to RS4. The resistivity's decrease generally to a level of 110 ohm-feet at a ½ AB distance of 160 feet suggestive of the increasing clay content below a depth of 97 feet. Well 3 was constructed near RS7. The resistivity ranges generally between 185 and 460 ohm-feet; two exceptions suggest possible clayey layers at a ½ AB distance of 39 and 105 feet. These may correspond to a silty shell layer from 17 to 18 feet bgs and a clay layer from 47 to 54 feet bgs. The many thin layers of sediment possibly with different resistivities tend to complicate the resistivity sounding and make it difficult to attribute specific resistivity characteristics to specific sediments. The locations of the wells are shown on Figure 2-10A.

Gamma ray logs were made in Wells 1, 2, and 3 following well construction. By correlation with geologic logs prepared during well construction, the zones of major gamma ray activity were revealed to contain phosphatic mineral. Such occurrences are indicated in the geologic logs by gray and black sand and shell; and are common in most of Florida. On the geologic logs reviewed, the phosphatic minerals were encountered generally in the shallow unconsolidated sediments and in a shelly sand layer within the generally consolidated sediments between 68 and 75 feet bgs in Well 1.

The geologic information reviewed for the Energy Park, discussed above, indicates that the sediments present above 50 feet bgs are generally unconsolidated and have a permeability lower than the more consolidated sediments between 50 and 100 feet bgs. On this basis, it is assumed that the most rapid lateral flow of groundwater will occur in the zone from 50 to 100 feet bgs; however, sediments above 50 feet also are capable of transmitting lateral flow but at a lower rate. The upper sediments are more important in conducting water vertically between the surface and the deeper more permeable zone. As discussed in Section 2.3.3 of this application, the vertical direction of water movement depends on the water-level relationship between the two zones. It should be noted that localized variations in surface and subsurface conditions can affect the groundwater movement in a particular area (e.g. groundwater pumping, surface water features, man-made structures, etc.).

2.3.1.4. Geologic Maps

The major structure to be installed at the Energy Park is the Proposed Facility. As described in the initial Application, the geologic conditions beneath the proposed location of the Proposed Facility are not unique and geologic conditions on the entirety of the Energy Park are generally uniform. The land surface elevation is approximately +17.5 feet NGVD. The thickness of generally unconsolidated sediments varies little beneath

the Project Site as shown in Volume II, Appendix 10.10.1A. The thickness of the unconsolidated sediments averages approximately 50 feet. Infrared and conventional aerial photographs of the Energy Park revealed no obvious signs of fracture traces. Fracture traces are not known to be present and they are not expected. Figure 2-10C shows the surface soil conditions at the Energy Park.

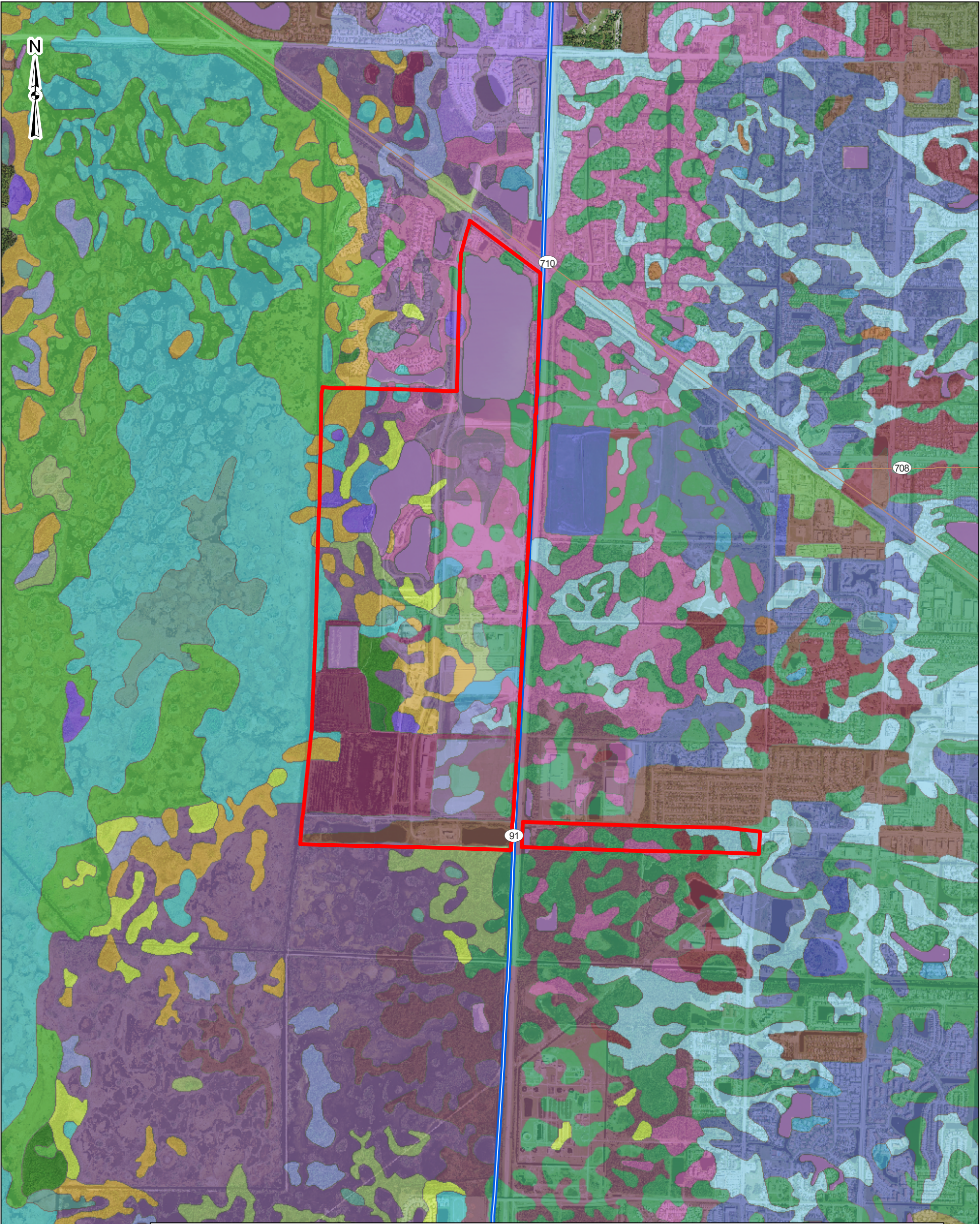
The organic carbon content of the soils and geologic materials beneath the Project Site was investigated by split-spoon soil sampling at the locations of Wells 5 through 14 for the purposes of the Original Certification process. At each of these wells, the split spoon soil samples was driven approximately at two-foot intervals to a depth of 10 feet, then at five-foot intervals to 20 feet and at 10-foot intervals to the terminal depth of the boring. The total depth was determined at the point where sediment hardness prevented further sampling.

At three of the 10 locations (adjacent to Wells 1, 2, and 4) samples were taken at depths greater than 30 feet bgs.

Soil samples were analyzed for their organic carbon concentration and their cation-exchange capacity (CEC). The significance of these analyses relative to contaminant attenuation and the results of analyses are reported in the Williams Earth Sciences, Inc. report provided in Volume II, Appendix 10.10.1b, conducted in February 2008. With regard to the OCC (organic carbon concentration), the depth of approximately 30 feet separates shallow soils having an average OCC of 1.22 percent from those at greater depths which have an average OCC of 2.19 percent. The higher average OCC soils tend to have a greater capacity to attenuate contaminants. Based on the analytical results reported there was little discernable difference between CEC values above and below a depth of 30 feet. The average CEC for all soil samples is 3.70 milli-equivalents per 100 grams. There is no basis for mapping the distribution of attenuation properties of the area.

2.3.1.5. Bearing Strength

The geotechnical analysis performed by Dunkelberger in 2010 found subsurface conditions at the site are suitable for construction from a geotechnical perspective and that a variety of foundation options are available. (See Volume II, Appendix 10.10.1A) These include conventional spread footings, high bearing pressure spread footings after treating the underlying soils via vibro-replacement and deep foundations including auger cast and driven piling. The foundation selection will be largely dependent on the structural loadings determined during detailed final design.



Legend

PPSA Certified Site Boundary

SSURGO

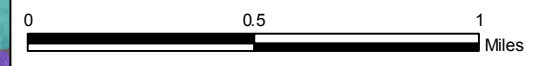
- Anclote fine sand
- Arents-Urban land complex, 0 to 5 percent slopes
- Basinger and Myakka sands, depressional
- Basinger fine sand
- Boca fine sand
- Chobee fine sandy loam
- Floridana fine sand
- Hallandale fine sand

- Holopaw fine sand
- Immokalee fine sand
- Jupiter fine sand
- Myakka fine sand
- Myakka-Urban land complex
- Okeelanta muck
- Oldsmar sand
- Pinellas fine sand
- Pits, 0 to 5 percent slopes
- Pompano fine sand

- Riviera fine sand
- Riviera fine sand, depressional
- Sanibel muck
- Tequesta muck
- Udorthents, 2 to 35 percent slopes
- Urban land
- Wabasso fine sand
- Water
- Winder fine sand

Source: SURGO soils data.

\\tampa\gsdata\Projects\3582\056\MXD\PPSA\2-10_Soils.mxd



Lightly loaded columns (of about 200 kip loads or less) can be supported on shallow foundations after normal site preparation (i.e. soil compaction using a heavy vibratory roller) while foundation areas for heavier column loads will require pre-treatment by vibro-replacement (for columns loads of about 200 to 800 kips) or piling (for column loads in excess of about 800 kips). For each of the structures slab-on-grade construction may be employed for the ground level floors. Retaining walls for the Tipping Floor and Truck Ramps will retain up to 30 feet or more of soil and will need to rest on soils that are treated with vibro-replacement in order to limit their settlements to tolerable values. Areas where roadways and structures will be constructed over the former South Burrow Lake will be surcharged to reduce further settlement. Vibro-replacement will be used where structures are constructed to further stabilize soils. (See Volume II, Appendix 10.10.1A)

2.3.2. Subsurface Hydrology

The hydrogeologic investigations conducted at the Energy Park in 1985 were performed to determine the physical controls on groundwater movement and the surface water/groundwater relationship, as well as geochemical controls on the ambient quality of the groundwater. Upon implementing the investigations, pertinent data and reports were reviewed and information was extracted for use in refining details of the site-specific testing and data collection program. The methods used for the investigations included well construction, geophysical well logging, surface-resistivity surveys, soil penetration tests, water and soil sampling and analysis, pumping tests, and water-level monitoring.

2.3.2.1. Subsurface Hydrologic Data for Project Site

The hydraulic character of an aquifer system is described in terms of parameters referred to as the transmissivity, porosity, storage coefficient, and depending on the nature of the aquifer, the specific yield or leakance coefficient. These parameters are a measure of the ease of water flow through the aquifer. The transmissivity of an aquifer equals the horizontal permeability multiplied by the aquifer thickness. Porosity is a measure of the open space within a volume of rock. The “effective” porosity refers to rock openings that are interconnected. The storage coefficient is the volume of water released from storage per unit surface area of the aquifer per unit change in head. The specific yield of an aquifer is the ratio of water volume that can be drained from a specific volume of aquifer, to the aquifer volume affected. The leakance coefficient is a property of confining material; it is the vertical permeability of the confining unit divided by the vertical thickness of the confining unit. With known aquifer parameters, water levels and flow rates in the aquifer can be predicted in response to a stress on the aquifer such as pumping or recharge. Additionally, the direction and rate of movement of groundwater solutes (dissolved substance) can be estimated.

Following the construction and development of the wells (Wells 1 through 4) in 1985, pumping and recovery, tests (aquifer performance tests) were conducted on each well.

Analyses of data from the wells by a method devised by Cooper and Jacob (Walton, 1970), yielded aquifer transmissivities that ranged from 30,000 to 70,000 gpd/ft and averaged 50,000 gpd/ft. Transmissivities calculated from analyses of the pumping test data are listed in Table 2-17. The wells intercept the “cavity-riddled” zone or its stratigraphic equivalent. Well screens were installed between depths of 60 and 90 feet bgs, below the silty and clayey layers present above 50 feet bgs, and above the less permeable and interbedded layers at 100 feet and below. Because the tests were short in duration and pumping is not likely to have affected the aquifer at depths shallower than 50 feet or deeper than 100 feet, the thickness of the aquifer affected during the tests averages 50 feet. The horizontal permeability of the cavity-riddled zone is estimated to average 1,000 gpd/sq.ft. The horizontal permeability of the deep zone is lower on the Energy Park Site than it is a few miles northeast and southeast. A probable reason for the relatively low permeability of the deep zone is that sand fills the poorly-developed existing cavities, thus resulting in a reduced permeability relative to a truly cavity-riddled rock. The vertical permeability of the deep zone cannot be estimated based on the pumping tests data, but because of the sedimentary layering encountered, it is estimated to be between 0.1 and 0.2 of the horizontal permeability. Based on observations of the drill cuttings collected during well construction, the porosity is estimated to be about 20 percent.

The recovery portions of the pumping-test data from Wells 5 through 14 also were analyzed by the Cooper and Jacob method and yielded transmissivities that ranged from 6,000 to 15,000 gpd/ft and averaged 9,000 gpd/ft. Four of the ten tests performed on shallow wells produced erratic data and could not be analyzed. The wells intercept sand and shell layers through the interval from 5 feet to 15 feet bgs. At the time of the aquifer performance tests, the water table was about two feet bgs. Based on the water table depth, the screen interval, and the depth of the underlying clayey layer, the thickness for the zone affected by the pumping was about 13 feet. The average horizontal permeability of this zone is calculated to be about 700 gpd/sq.ft.

The vertical permeability of sediment in the upper 15 feet was estimated based on the soil permeability within about 50 inches of the land surface. The materials in the uppermost 50 inches are similar in composition to those between 50 inches and 20 feet bgs. Of the dominant soils types found within the area (Figure 2-10C) of the Energy Park (these include the Hallendale, Oldsmar, and Riviera soils), all have vertical permeabilities that average about 160 gpd/sq.ft (USDA, 1978). This vertical permeability is about 0.2 of the average horizontal permeability determined in the shallow-well pumping tests.

The transmissivity of the entire aquifer thickness between the water table and 125 feet bgs was estimated based on the method above and the geologic logs. Based on apparently similar lithologic characteristics, the sand and shell layers between the approximate depths of 15 and 50 feet (including those that contain silt and clay) are estimated to have

an average horizontal permeability equal to the beds above 15 feet bgs, or 700 gpd/sq.ft. On the same basis, permeability is also estimated for sediments between 100 and 125 feet bgs. Multiplying the various permeabilities by their respective thicknesses and summing the results yields a transmissivity for the entire aquifer thickness of 101,000 gpd/ft.

Table 2-17
Aquifer Transmissivities Determined From Short-Term Pumping Tests
Conducted on the Energy Park Wells 1-14

Well Number	Coefficient of Transmissivity (a)
1	48,000 gallons per day per foot
2	54,000 gallons per day per foot
3	30,000 gallons per day per foot
4	70,000 gallons per day per foot
5	15,000 gallons per day per foot
6	(b)
7	(b)
8	(b)
9	24,000 gallons per day per foot
10	15,000 gallons per day per foot
11	13,000 gallons per day per foot
12	17,000 gallons per day per foot
13	12,000 gallons per day per foot
14	22,000 gallons per day per foot

(a) Derived by use of the water-level recovery data and the Cooper and Jacob method (Walton, 1970)

(b) Test results were inconclusive

Based on a comparison of water levels in the shallow (0 to 15 feet) and deep (50 to 100 feet) zones discussed below, the aquifer is concluded to perform as an unconfined system. As discussed below, there is generally only a small difference between shallow and deep water levels. Therefore, in addition to the aquifer transmissivity, the specific yield (analogous to the storage coefficient) must be estimated to allow the prediction of the aquifer response to stress such as pumping.

The specific yield of unconfined aquifers in south Florida generally ranges from 0.10 to 0.20. The particle size distribution of the Energy Park soils (including the Hallendale, Oldsmar, and Riviera soil types) were analyzed according to a method described by Fetter (1980) and concluded to have a specific yield of about 0.20. Because it is the unconsolidated sand that would be dewatered during pumping from the principal aquifer, a specific yield of 0.20 is concluded to be representative of the unconfined aquifer at the Energy Park.

In contrast to findings on the Energy Park, aquifer tests conducted about $\frac{3}{4}$ mile and $1\frac{3}{4}$ miles east of Florida's Turnpike (Fischer, 1980) suggested that the aquifer functions as a

leaky confined aquifer. The distinction between an unconfined aquifer and a leaky confined aquifer is related to the vertical permeability of the zone above the principal aquifer, the thickness of that zone, and the transmissivity of the aquifer.

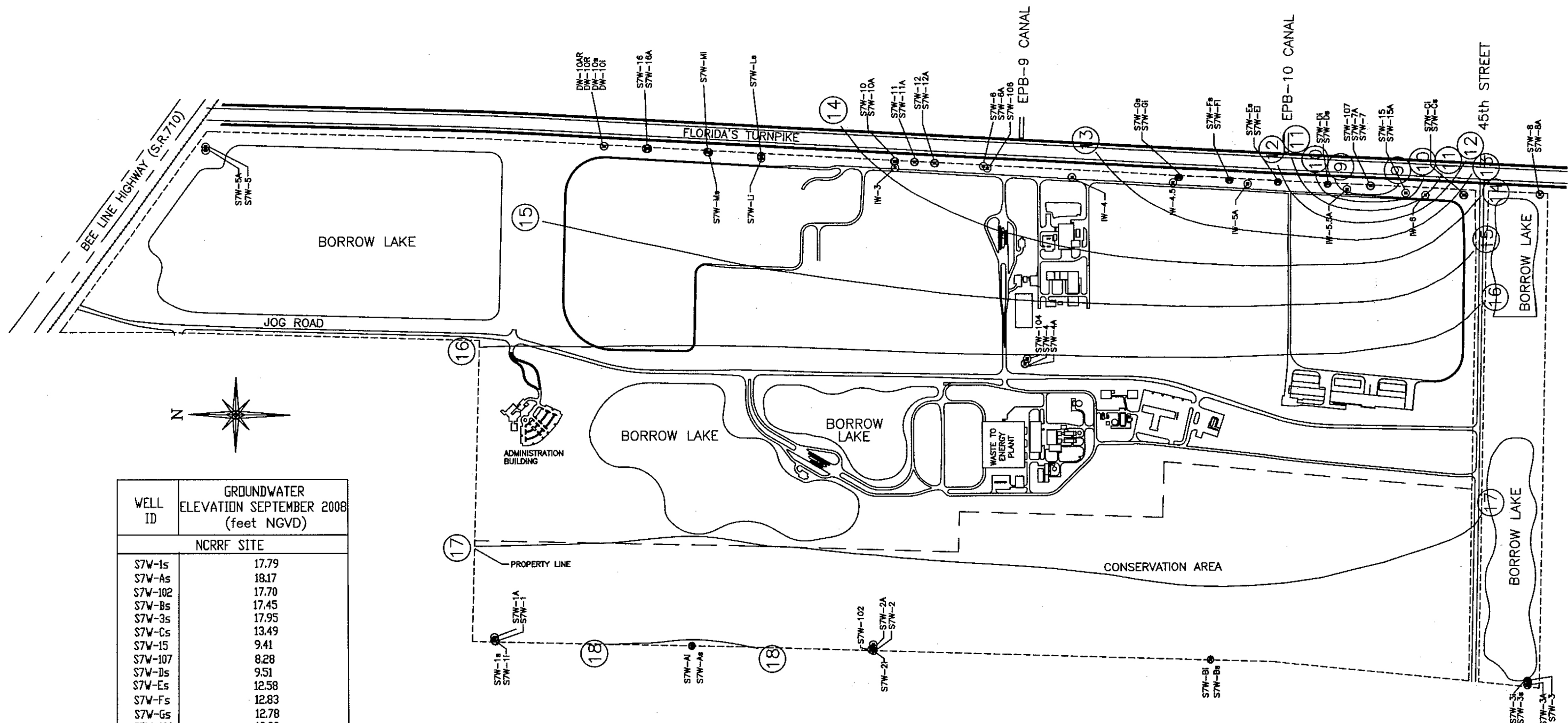
The groundwater flow direction at the Energy Park is generally from west to east. Groundwater elevations for the shallow zone during the wet season (September 24, 2008) and dry season (March 31, 2009) are depicted on Figures 2-11 and 2-12, respectively. The maximum groundwater elevations were 18.17 feet NGVD during the wet season and 17.01 feet NGVD during the dry season. The maximum groundwater elevations occurred beneath the northwest edge of the Energy Park. Minimum groundwater elevations were 8.28 feet NGVD during the wet season and 6.19 feet NGVD during the dry season. The minimum groundwater elevations occurred beneath the southeastern edge of the Energy Park near the locations of several interceptor wells.

The approximate average horizontal gradient across the Energy Park was 0.000752 ft./ft. during the wet season and 0.00103 ft./ft. during the dry season. However, the gradients were greater at the south end of the Energy Park near the interceptor wells and less at the north end of the Energy Park away from the interceptor wells. Utilizing the average estimated horizontal permeability for the shallow zone (700 gpd/sq. ft.) and a porosity of 20%, the approximate average rate of horizontal groundwater flow was 0.35 ft./day during the wet season and 0.48 ft./day during the dry season.

Groundwater elevations for the deep zone during the wet and dry seasons are depicted on Figure 2-13 and 2-14, respectively. The maximum groundwater elevations in the deep zone were 17.85 feet NGVD during the wet season and 16.71 feet NGVD during the dry season. The maximum groundwater elevations were located beneath the western edge of the site. Minimum groundwater elevations were 12.57 feet NGVD during the wet season and 6.60 feet NGVD during the dry season. Similar to the shallow zone, the minimum groundwater elevation in the deep zone occurred near the locations of the interceptor wells.

The horizontal gradients in the deep zone across the Energy Park were similar to those of the shallow zone. The approximate average horizontal gradients across the Energy Park were 0.000762 ft./ft. during the wet season and 0.00101 ft./ft. during the dry season. Utilizing the average estimated horizontal permeability of the deep zone (1,000 gpd/sq. ft.) and the estimated porosity of 20%, the approximate average rate of horizontal groundwater flow in the deep zone was 0.51 ft./day during the wet season and 0.68 ft./day during the dry season.

The groundwater elevations in the shallow and deep zone were generally similar to each other (generally within one-half of one foot). The exceptions are near the interceptor well locations where the groundwater elevations tend to be higher in the deep zone than in the shallow zone. The maximum differentials in groundwater elevations were 4.64 feet during the wet season and 1.56 feet in the dry season.

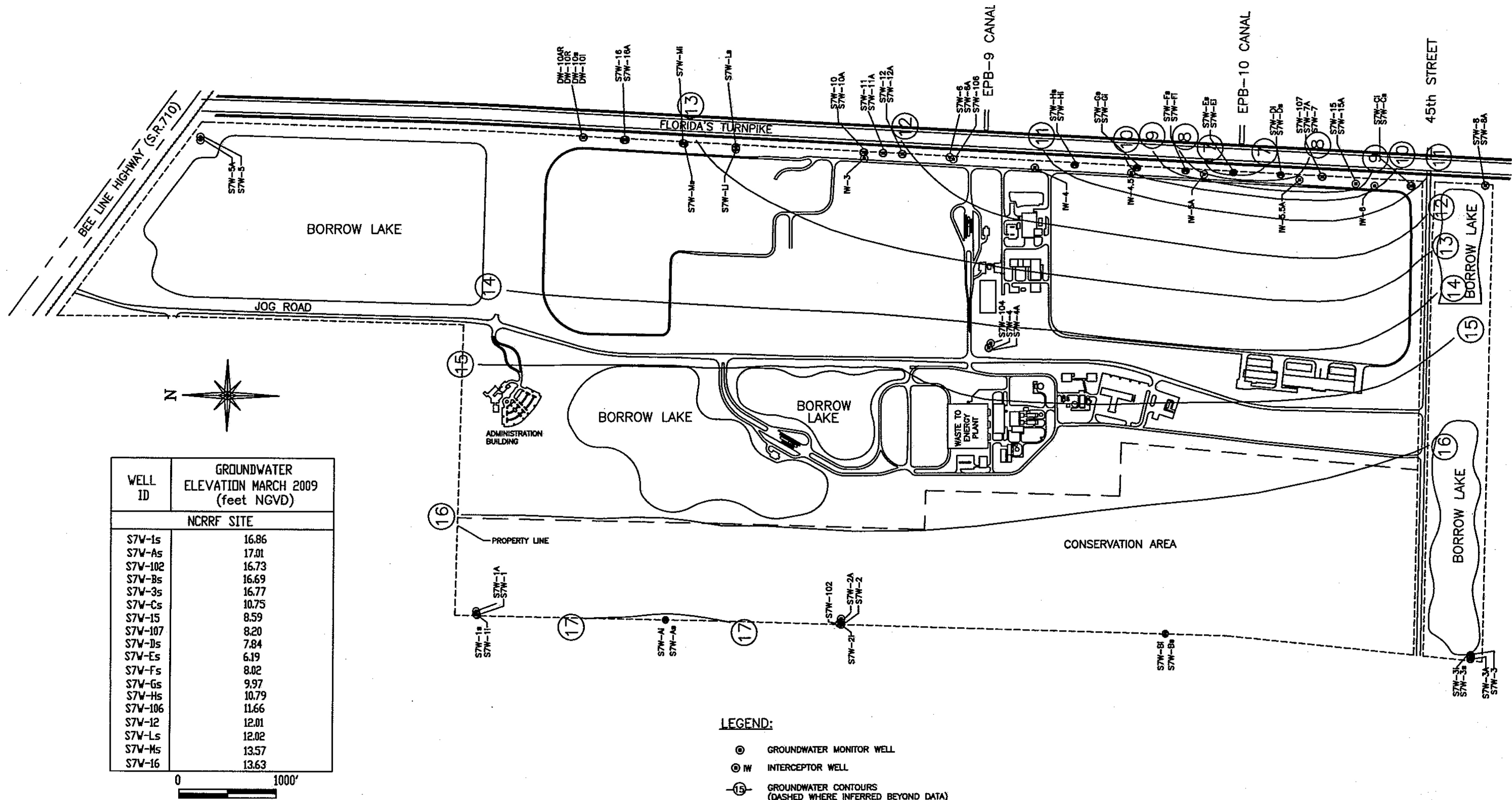


WELL ID	GROUNDWATER ELEVATION SEPTEMBER 2008 (feet NGVD)
NCRRF SITE	
S7W-1s	17.79
S7W-As	18.17
S7W-102	17.70
S7W-Bs	17.45
S7W-3s	17.95
S7W-Cs	13.49
S7W-15	9.41
S7W-107	8.28
S7W-Ds	9.51
S7W-Es	12.58
S7W-Fs	12.83
S7W-Gs	12.78
S7W-106	13.98
S7W-12	13.91
S7W-Ls	14.49
S7W-Ms	14.55
S7W-16	14.66

- LEGEND:
- ⊙ GROUNDWATER MONITOR WELL
 - ⊙ IW INTERCEPTOR WELL
 - 15- GROUNDWATER CONTOURS (DASHED WHERE INFERRED BEYOND DATA)

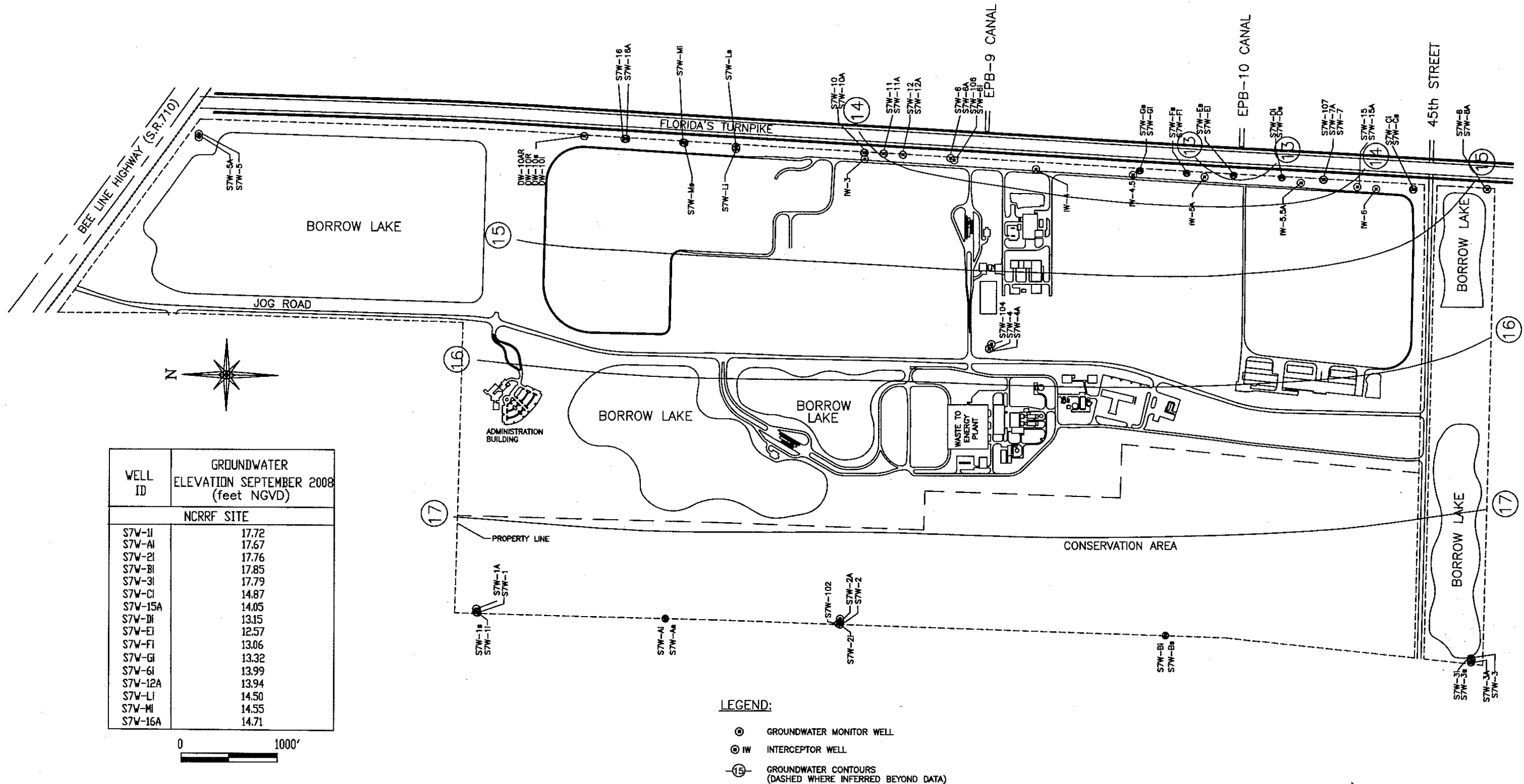
Thomas A. Scina
12/23/08

NCRRF Landfill Groundwater Contours for the Shallow Aquifer (20')
Source: SWA 2008 Second Half Semi-Annual NCRRF Landfill Wells Compliance Monitoring



NCRF Landfill Groundwater Contours for the Shallow Aquifer (20')
 Source: SWA 2009 First Half Semi-Annual NCRF Landfill Wells Compliance Monitoring

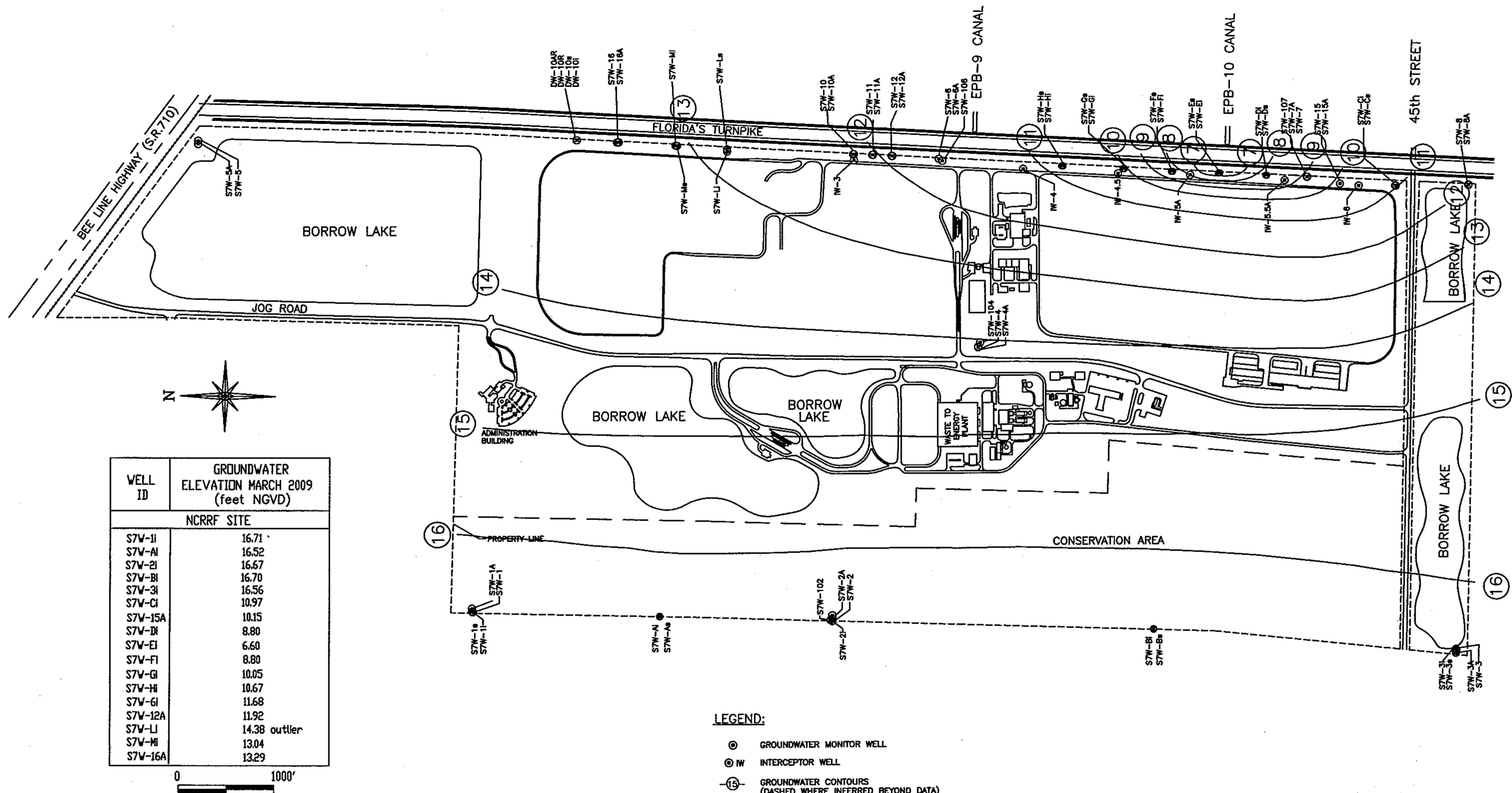
Shonaf. Sim
 6/31/2009



NCRRF Landfill Groundwater Contours for the Intermediate Aquifer (80')

Source: SWA 2008 Second Half Semi-Annual NCRRF Landfill Wells Compliance Monitoring

Shomara Sina
12/23/08



WELL ID	GROUNDWATER ELEVATION MARCH 2009 (feet NGVD)
NCRRF SITE	
S7W-11	16.71
S7W-A1	16.52
S7W-21	16.67
S7W-B1	16.70
S7W-31	16.56
S7W-C1	10.97
S7W-15A	10.15
S7W-D1	8.80
S7W-E1	6.60
S7W-F1	8.80
S7W-G1	10.05
S7W-H1	10.67
S7W-I1	11.68
S7W-12A	11.92
S7W-L1	14.38 outlier
S7W-M1	13.04
S7W-16A	13.29



- LEGEND:**
- GROUNDWATER MONITOR WELL
 - IW INTERCEPTOR WELL
 - - - GROUNDWATER CONTOURS (DASHED WHERE INFERRED BEYOND DATA)

NCRRF Landfill Groundwater Contours for the Intermediate Aquifer (80')
 Source: SWA 2009 First Half Semi-Annual NCRRF Landfill Wells Compliance Monitoring

Thomas Sina
 6/3/2009

2.3.2.2. Karst Hydrogeology

In the 1985 PPSA application, studies revealed no known or expected paleokarst features that may cause a change in the hydrologic regime beneath the Energy Park. Infrared and black and white aerial photography were inspected and, with the exception of wetland drainage sloughs near the center of the original project site, no apparent lineation of surficial features were deciphered. These sloughs conduct sheet flow toward the southeast and northeast from the west-central part of the original site; the center of the sloughs are as much as one foot lower than land on either side. These drainage ways appear to be entrenched where sandy surficial sediments were slightly lower upon deposition. No evidence exists suggesting that these sloughs are founded in subsided or faulted rock. Likewise, no apparent evidence of vertical or karstic development was exhibited in the results of the resistivity surveys.

Data generated during well construction revealed cavity zones at depths of 65 and 72 feet only at the location of Well 4. While such zones are common at that approximate depth in the region of the Existing Facility, the development of cavities generally is confined to a horizontal bed and not extensive in a vertical direction; the supporting capability of near-surface soils and geologic materials is therefore not compromised.

Aerial photographs and topographic maps show that the Energy Park prior to development contains numerous surficial circular-shaped depressions. These are typically 400 to 800 feet in diameter and are occupied by Basinger soils (sand, depressional) and Riviera soils (sand, depressional) (USDA, 1978). These circular-shaped features apparently were natural depressions in the surface of the Pamlico Sand Formation that received runoff from adjacent higher land. Because of the uniform nature of the surficial sands, surficial erosion apparently took place uniformly around the depression until a circular-shape depression resulted. There is no evidence that these depressions are traceable to depths greater than about five feet.

2.3.3. Site Water Budget and Area Uses

The annual average rainfall on the site is 61.4 inches (<http://www.idcide.com/weather/fl/west-palm-beach.htm>). The annual evapotranspiration from the water table on the Energy Park is estimated to be 39.5 inches; this number is a refinement of an evapotranspiration estimation based on a method described by Dohrenwend (1977), as derived from a site-specific groundwater flow model described fully in the “Proposed Plan for the Recovery and Use of Mineralized Groundwater by pumping at the Dyer Boulevard Sanitary Landfill,” March 1985. This report is located in Volume II, Appendix 10.13.5. Parameters considered in the initial estimate for evapotranspiration were the temperature, the climatic type, and the vegetative type and density. The annual gross recharge to the aquifer is estimated to be 30 inches (CDM, 1980). The water table evapotranspiration rate exceeds the estimated gross aquifer recharge, as indicated in the cited model. There is no net aquifer recharge on the Energy Park during the average year

because the water table is generally within three feet of the land surface, allowing a high rate of evapotranspiration from the water table. Groundwater levels are maintained because of the West Palm Beach WCA; water constantly seeps eastward from the WCA. One probable exception to this occurs in the extreme eastern part of the Energy Park where the canals along Florida's Turnpike receive some surface water runoff and have water levels generally above the underlying water table. Net recharge to the aquifer may occur in this area. East of the Energy Park, groundwater levels and water table evapotranspiration rates are lower and net groundwater recharge occurs in these areas.

Surface water runoff from the Energy Park, north of 45 Street is restricted to a single outlet with a connection to the EPB-10 canal east of the Turnpike. This outlet drains surface water from the southwestern portion of the Energy Park. Because of the restricted outlet and apparently small affect this outlet has on surface-water and groundwater levels, the annual rate of surface-water runoff considering the water budget for the Energy Park is estimated to be about 5 inches.

The remaining component of the water budget is the evapotranspiration that occurs from the unsaturated soil and surface water of the Energy Park. This residual in the water budget must equal 17.5 inches (rainfall of 62 inches equals the water table evapotranspiration of 39.5 inches plus surface water runoff of 5 inches, plus above water table evapotranspiration of 17.5 inches). This figure appears to be reasonable because of the large wetland areas present on the site.

The subsurface flow of groundwater beneath the site from west to east is estimated to be one million gallons per day during moderately dry periods. This flow is based on the application of Darcy's Law and includes use of the average groundwater gradient (0.0007) measured on May 23 and June 19, 1984 (when moderately dry conditions prevailed), the transmissivity of the shallow aquifer (101,000 gallons per day per foot), and the length of the site normal to the groundwater flow direction (14,000 feet). This flow is regarded as the base flow and originates from the WCA.

Other factors not included in the water budget discussed above but requested for this section of the Application are the annual distribution of rainfall and temperature on a monthly basis and the annual lake evaporation rate; these are shown in Table 2-18. The data for rainfall were obtained for the Palm Beach County International Airport for the climatic record of 1971- 2000 (NOAA, 2010). Daylight hours were summarized from the DBHYDRO database maintained by the SFWMD (2010). The temperature data are from the Palm Beach International Airport records from 1894-2000 (NOAA, 2010). The annual lake evaporation was calculated to be 49 inches per year, which correlates with District estimates of 50.45 inches per year as referenced in Abtew's Evapotranspiration Estimation for South Florida (2003).

Table 2-18
Hydrological Data Representative of the Proposed Facility Project Site

Month	Monthly Mean Precipitation City of West Palm Beach ^(a)	Monthly Mean Temperature (Degrees F) ^(a)	Monthly Mean Percentage of Daylight Hours	Monthly Calculated Evapotranspiration for Waterbodies in West Palm Beach ^(d)
	(Inches)			(Inches)
January	3.75	66.2	10.73	3.13
February	2.55	67.2	11.3	3.27
March	3.68	70.6	12.03	4.56
April	3.57	73.8	12.79	4.87
May	5.39	78.2	13.41	5.17
June	7.57	81.2	13.72	4.97
July	5.97	82.5	13.56	5.26
August	6.65	82.8	13.01	4.94
September	8.1	81.7	12.28	4.15
October	5.46	78.1	11.54	3.97
November	5.55	73.1	10.88	3.27
December	3.14	68.3	10.56	2.90
Total	61.4			50.45

Source: NOW data - NOAA Online Weather Data (<http://www.weather.gov/climate/>)

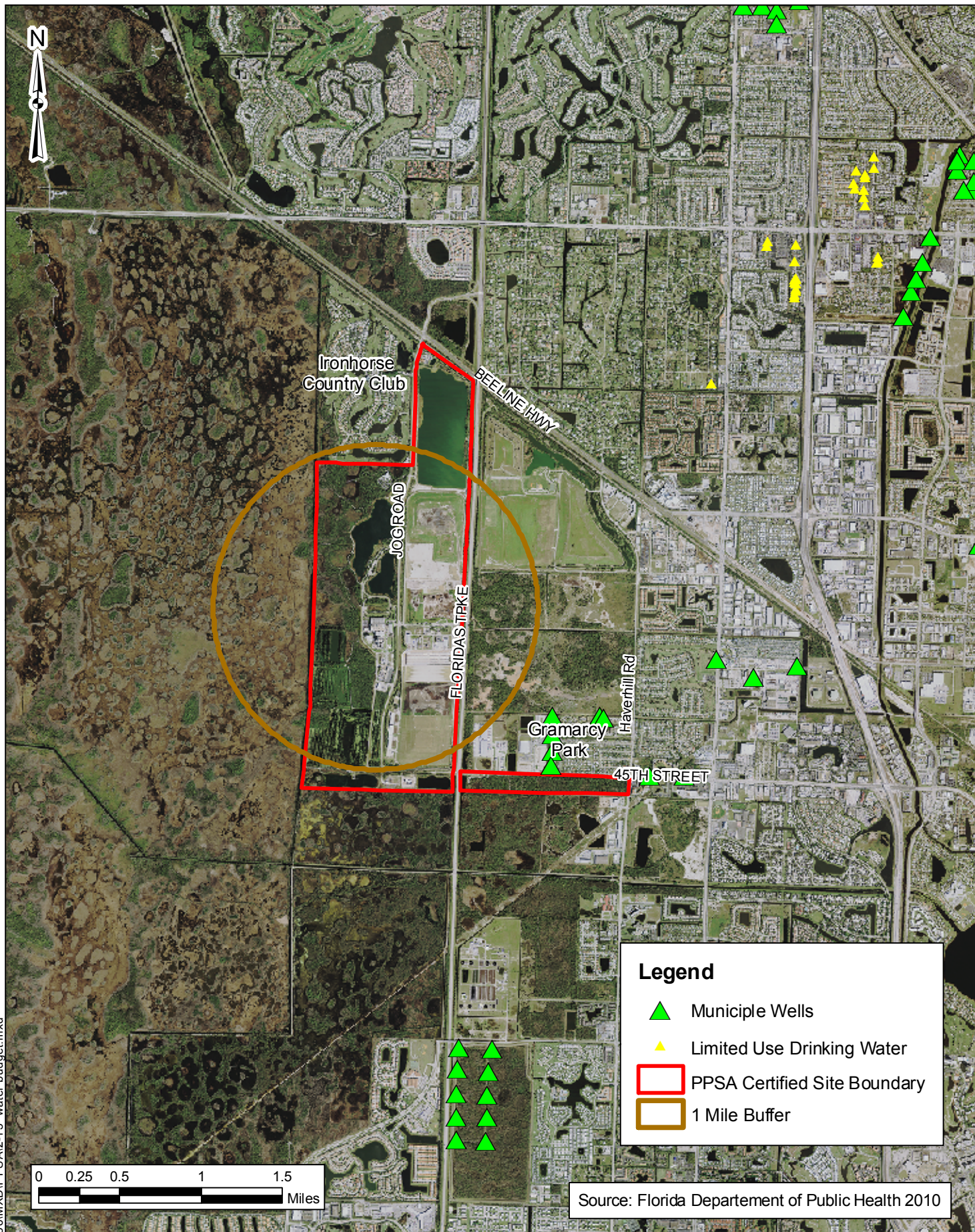
(a) Palm Beach International Airport Climatic Normals, 30-year period of record, 1971-2000

(b) Climatic Records period, 1894 – 2009.

(c) Daylight data is based on the data provided for the Forest Hills Weather Data Station in the vicinity of West Palm Beach.

(d) Evapotranspiration amounts were calculated for waterbody and wetland systems (continuously saturated soils) using equations described by Abtew (2003).

In the general region of the Energy Park, there are twenty-nine water supply sources for municipal and private utilities. These sources include one from a surface-water reservoir (WCA), 4 wells for the City of Riviera Beach, while the remaining are from private limited use wells in the shallow aquifer. These wells are predominantly northeast of the Energy Park. The nearest water supply well is located over two miles from the Project Site. The WCA is located along the western border of the site. Water captured from rainfall within this area is used to provide drinking water to the City of West Palm Beach. The WCA has been designated a Class I water by the Florida Department of Environmental Protection (DEP). Consequently, a 3,000-foot setback distance is required between the WCA and the nearest points of the Authority's Landfill. Water within the WCA is controlled at elevations generally between +17.5 and +18.5 feet NGVD.



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**MALCOLM
PIRNIE**



Solid Waste Authority
of Palm Beach County

Potable Water Wells
within 1 Mile
1:50,000

MALCOLM PIRNIE, INC.

July 2010
FIGURE 2-15

Based on review of the SFWMD records, it appears there are no major impacted water sources within five miles of Project Site. Major water users in the area may be categorized as domestic, industrial, irrigation, and public water supply. Figure 2-15 shows there are no potable water wells within one mile of the Proposed Facility. In addition, a database search was performed of the SFWMD records for all permitted wells greater than 500,000 gpd capacity within a five-mile radius of the Project Site and no such wells were identified. Figure 2-16 illustrates the location of all potable water wells based on the SFWMD records review within a five-mile radius of the Proposed Facility site.

2.3.4. Surficial Hydrology

2.3.4.1. Hydrologic Characterization

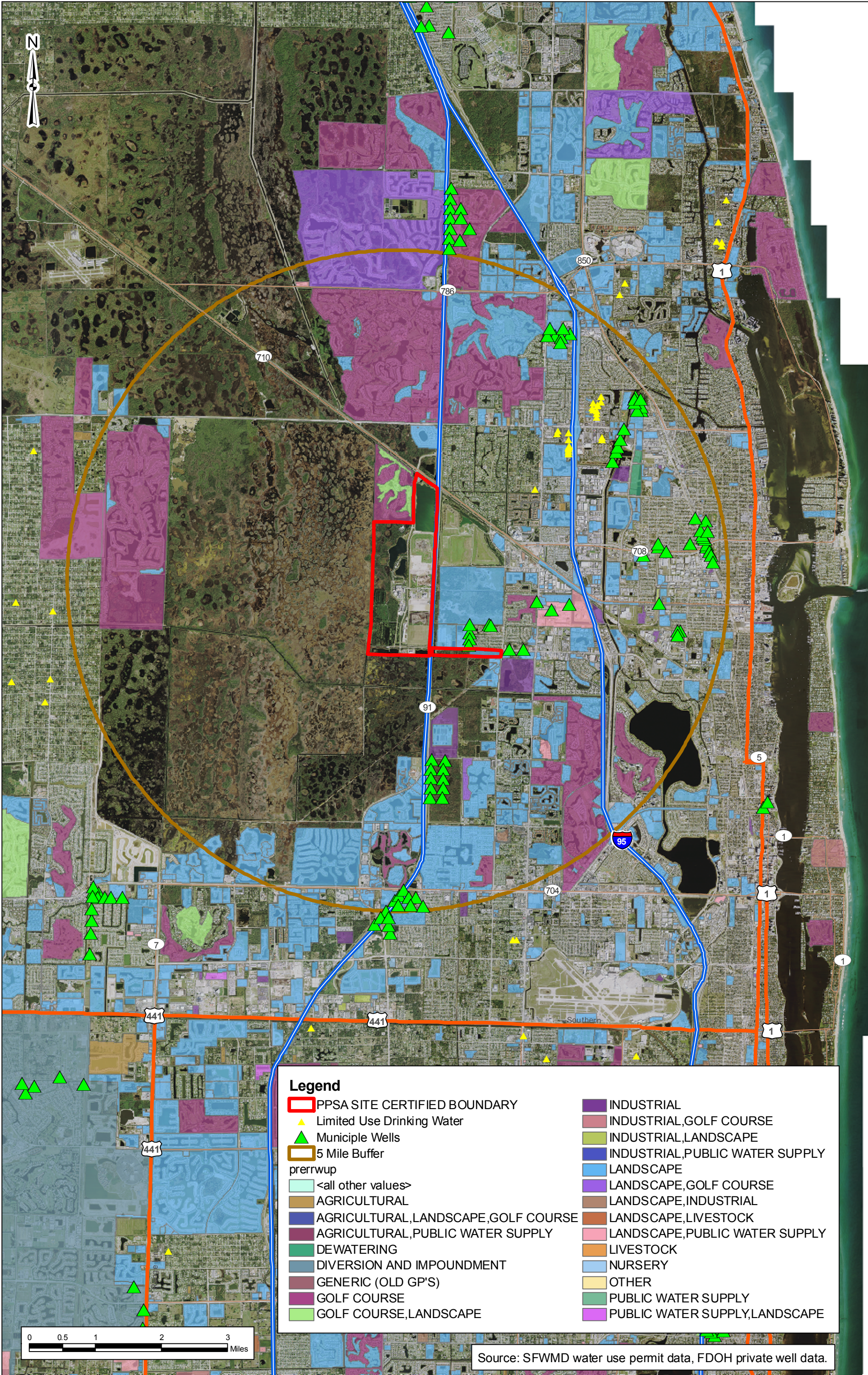
Surface water flow on the Energy Park is influenced by the stormwater retention areas and wetland areas present at the Energy Park. The average depth of standing water typically occurring in the wetlands ranges between one to three feet. All surface water is deposited directly into the Borrow lakes or is collected by the stormwater system. The borrow lakes are hydraulically separated from other surface waters on the property by earthen berms. The stormwater retention system flows into the conservation areas on the west side of the property and then off the property through a weir and canal, as discussed further in Section 3.8 On-Site Drainage System.

2.3.4.2. Measurement Programs

The background surface water quality of the site was established during the initial PPSA certification of the Existing Facility by means of analysis of surface waters found at eleven selected sample locations on the Energy Park. The sample points were located so as to: (1) determine if there was any surface water quality differential across the Energy Park; (2) reveal any change in water quality within an existing wetland network; and (3) allow evaluation of changes in surface water quality once the Existing Facility construction and/or operation began.

2.3.5. Vegetation and Land Use

Fourteen major land use and vegetation types have been identified on the Energy Park, as depicted in Figure 2-17. These types are classified to level III of the **Florida Land Use and Cover Classification System**. These types are: Single Unit, Low Density Housing (111), Broadcasting Tower (153), Palmetto Prairies (321), Pine Flatwoods (411), Other Hardwoods (422), Canals (513), Cypress Wetland Forest (611), Freshwater (621), Freshwater Marsh (641), Scraped Areas (741), Sand, Gravel or Clay Extractive (753), Abandoned Extractive (755), other Heavy Industrial (1560), and Solid Waste Disposal (8350).

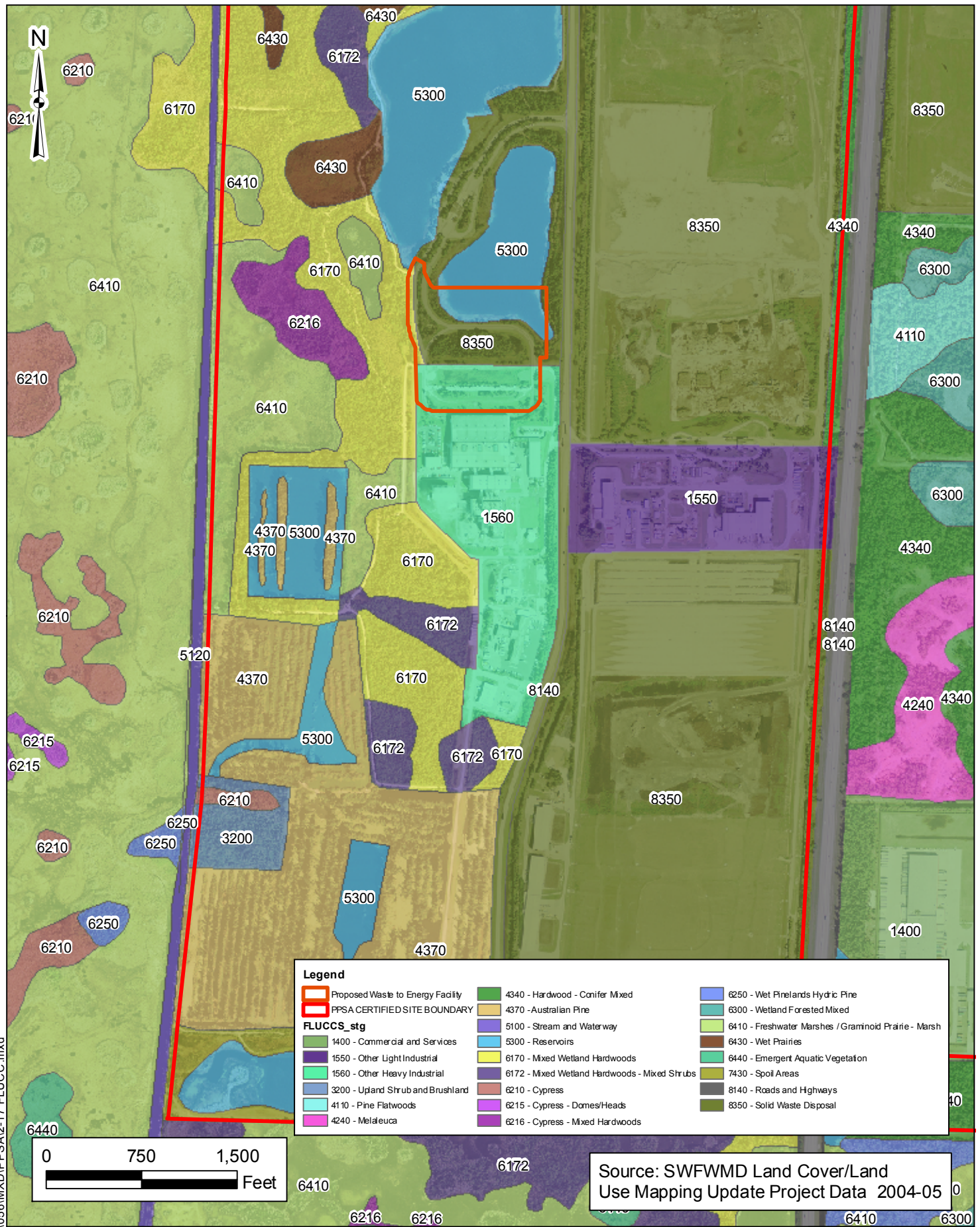


Legend

- | | |
|------------------------------------|--------------------------------|
| PPSA SITE CERTIFIED BOUNDARY | INDUSTRIAL |
| Limited Use Drinking Water | INDUSTRIAL,GOLF COURSE |
| Municipal Wells | INDUSTRIAL,LANDSCAPE |
| 5 Mile Buffer | INDUSTRIAL,PUBLIC WATER SUPPLY |
| <all other values> | LANDSCAPE |
| AGRICULTURAL | LANDSCAPE,GOLF COURSE |
| AGRICULTURAL,LANDSCAPE,GOLF COURSE | LANDSCAPE,INDUSTRIAL |
| AGRICULTURAL,PUBLIC WATER SUPPLY | LANDSCAPE,LIVESTOCK |
| DEWATERING | LANDSCAPE,PUBLIC WATER SUPPLY |
| DIVERSION AND IMPOUNDMENT | LIVESTOCK |
| GENERIC (OLD GP'S) | NURSERY |
| GOLF COURSE | OTHER |
| GOLF COURSE,LANDSCAPE | PUBLIC WATER SUPPLY |
| | PUBLIC WATER SUPPLY,LANDSCAPE |

Source: SFWMD water use permit data, FDOH private well data.

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There are five borrow lakes at the Energy Park that are categorized as Abandoned Extractive class (755). Portions of the littoral zones of the lakes have been used as wetland mitigation and have naturalized vegetative communities. The other areas are dominated by other herbaceous species. Abandoned Extractive is the primary land use classification, but these areas may also be classified as lakes.

The shell pits habitat in the Energy Park's Conservation Area has a dense growth of brazilian pepper and australian pine, which has been allowed to remain due to the consistent presence of the bird rookery since before the original construction of the Energy Park.

2.3.6. Ecology

The Project Site consists of areas classified as other Heavy Industrial, Solid Waste Disposal, and Reservoir. These areas were heavily disturbed by the original construction activities in the Energy Park. The South Borrow Lake and surrounding margins are the only naturalized habitats within the Project Site. These naturalized habitats consist of a freshwater lake, herbaceous and forested littoral shelf, and myrtle shrub habitats. Various species use these areas for forage.

A review of the known habitats and species occurrences at the Energy Park produced a list of known protected species. Many of these species are found in association with the rookery and are monitored by the Authority and USFWS since 1987. Data from those monitoring events is compiled by the Authority for the following species: White Ibis, Cattle Egret, Great Egret, Little Blue Heron, Tricolor Heron, Everglades Snail Kite and Woodstork. The rookery has become an important nesting area for Woodstorks but because this species nests later in the year than the other species in the rookery, Woodstorks are not included in the USFWS bird nesting counts.

A complete list of threatened and endangered species that have been observed on or in proximity to other areas of the Energy Park is available in table 2-19. These species are not currently inhabitants of the Project Site, but it is possible for these species to use the Project Site for foraging as they move between the WCA location west of the Existing Facility or the rookery located south of the Energy Park. Table 2-19 lists the species that have been observed at the Energy Park.

**Table 2-19
Threatened and Endangered Species Observed on the Energy Park**

Common Name	Genus and Species	Federal Status	State Status
American Alligator	Alligator mississippiensis	SAT	SSC
Gopher Tortoise	Gopherus polyphemus	*PL	LT
Limpkin	Aramus guarauna		SSC
Little Blue Heron	Egretta caerulea		SSC
Snowy Egret	Egretta thula		SSC
Tricolored Heron	Egretta tricolor		SSC
White Ibis	Eudocimus albus		SSC
SE American Kestrel	Falco sparverius paulus		SSC
Florida Sandhill Crane	Grus canadensis pratensis		SSC
American Oystercatcher	Haematopus palliates		SSC
Bald Eagle	Haliaeetus leucocephalus	**BEGEPA	
Wood Stork	Mycteria Americana	LE	LE
Osprey	Pandion haliaetus		SSC
Roseate Spoonbill	Platalea ajaja		SSC
Snail Kite	Rostrhamus sociabilis plumbeus	LE	LE

**BEGEPA – Protected under Bald Eagle & Golden Eagle Protection Act of 1929.. Amendments to act are currently under review.

LE – Listed Endangered

LT – Listed Threatened

*PL – Currently under review to be listed under the Federal Endangered Species Act by U.S. Fish and Wildlife Service.

SSC – Florida Species of Special Concern

SAT – Listed as threatened in areas with the Endangered American Crocodile due to the probability of mistaking the alligator for the protected crocodile. The Energy Park does not qualify as crocodile habitat.

2.3.6.1. Species-Environmental Relationships

The Energy Park has a mixture of uplands, wetlands, and edge habitats that are utilized by the fauna of the area. These habitats, defined by their vegetation, soils, topography and hydrology, support the resident species populations. While the Energy Park was altered

with the construction of the Existing Facility, the wildlife communities and populations at the Energy Park have adjusted to new conditions that were created due to the construction by utilizing the on-site conservation areas, landfills and related structures adjacent to the WCA.

In 2008, Malcolm Pirnie conducted a field survey for threatened and endangered species on the Project Site. During this field survey, no known threatened and endangered species were observed on the Project Site, which is likely due to the lack of suitable habitat. There are no protected species that inhabit the Project Site. There are no protected species that are endemic or unique to the Project Site and the species and habitats on the Project Site are common to Palm Beach County and South Florida. However, the close proximity of the Project Site to the City of West Palm Beach WCA and the Energy Park's conservation area (rookery) may increase the potential for protected species foraging on the Project Site. The rookery serves as a refuge that many species may utilize as the center of their home range, when foraging in surrounding areas. The location of the Proposed Facility is not within any protected species habitat.

Although no listed species were found to nest or inhabit the Project Site, three species were reviewed for impacts by the USFWS (April 20, 2010); Wood Stork, Everglades Snail Kite and the Eastern Indigo Snake. The wood stork has historically nested in the rookery at the Energy Park and has been observed occasionally foraging in the littoral zones of the South Borrow Lake. However, because the Energy Park conservation areas represent a larger and higher quality foraging habitat than those on Project Site, the project, although may affect some foraging habitat, it is not likely to adversely affect the wood stork populations.

The Everglades Snail Kite (*Rostrhamus plumbeus sociabilis*), which is also known to nest in the rookery area and WCA, has foraging habitat in the South Borrow Lake wetlands. These herbaceous littoral shelves have supported stocked populations of the Kite's main food source, the Florida apple snail. Although, due to the habitat's location, the apple snail is not found in large numbers and none were found during the surveys by the USFWS or Malcolm Pirnie. The Corps determined the South Borrow Lake project "may affect, but is not likely to adversely affect" the Everglade snail kite.

The USFWS has also reviewed the project's impact on the Eastern Indigo Snake. Suitable habitat for the threatened eastern indigo snake (*Drymarchon corals couperi*) may exist on site. The USACE has determined the project "may affect, but is not likely to adversely affect" the eastern indigo snake. Because indigo snakes use a variety of habitat types and have large home ranges, it is possible they occur within the project area. The Authority has agreed to adhere to the USFWS's Standard Protection Measures for the Eastern Indigo Snake to minimize potential of harm or harassment to any resident snakes during land clearing and construction.

Based upon an evaluation during various database reviews, field surveys, and consultation results, the Project Site offers no critical habitat for wildlife. Prior to construction of the Existing Facility, the conservation areas were heavily impacted by exotic and invasive species. These species decrease native diversity and offer fewer habitats for forage and reproduction. Since the construction of the Existing Facility, habitat management efforts have enhanced the conservation areas of the Energy Park constructing new wetland habitats, buffer areas and the implementation of stormwater retention systems. The location of the Proposed Facility will have no impact upon protected species habitat.

2.3.6.2. Pre-Existing Stresses

Pre-existing environmental stresses as the result of development within the Energy Park are evident. One of the changes is the alteration of land use by the creation of the Borrow Lakes. The removal of natural biotic communities, primarily wetlands, and their replacement with deepwater habitat of the Borrow Lakes and the disturbed areas that surround them has altered these areas of the Energy Park. The negative impacts of this shift have replaced viable and productive upland and wetland habitats with the Borrow Lakes.

A benefit that has resulted from the Energy Park land alteration is the abandoned shell pit at the south end of the Energy Park which receives heavy use by White Ibis (*Eudocimus albus*), as a roost and rookery.

A second major stress imposed on the Energy Park is the establishment of a network of ditches and culverts to drain interior areas of the Energy Park. This alteration has caused a shift in the species composition of these areas. Myrtle (*Myrica cerifera*) and Willow (*Salix caroliniana*), dominate some areas that have been drained. Sawgrass (*Cladium jamaicensis*) and a number of other herbaceous wetland species are underrepresented in these drained areas.

Wild hog, a game animal, is an introduced species. Hogs can cause considerable disturbance of ground cover flora by rooting. Ground dwelling birds, animals and their young may suffer predation. Wild hogs prey heavily on native species of snakes. The fact the area is closed to hunting eliminates a check on the hog population but this problem has been addressed with a program with the US Department of Agriculture. This species may constitute a stress on the biota of the Energy Park.

The last stress on the Energy Park is again caused by the presence of humans. Although the Energy Park is patrolled by the Authority and security, trespassing still occurs. The activity on the access road and business of the Authority, the presence of trespassing fishermen and the possible hunting, poaching and off-road vehicles on the Energy Park all may have an impact on the biota. The network of trails on the Energy Park provides public access to some areas, with a resultant impact on the flora. The more sensitive and

secretive wildlife species are probably excluded from parts of the Energy Park by man's presence. The current and continuing use and alteration of the Energy Park exerts a significant impact, however, the area also benefits from the continued conservation, maintenance and enhancement by the Authority.

2.3.6.3. Measurement Programs

Plant species were surveyed through a series of on-site visits. The time period for these surveys was from February 2008 to November 2009. Over five separate surveys were conducted, totaling over 40 observer hours. Initially, aerial photographs of the Energy Park were examined to delineate major communities. Examples of each community type were visited in vehicles and on foot. Random walk surveys were performed, and a species list compiled. Dominance was estimated visually. Unknown specimens were collected and pressed in the field. Specimens not in flower were usually identified to the genus level based on vegetative characteristics. The manuals used as ecological and taxonomic guides are listed in Volume II, Appendix 10.13.4.

Wildlife surveys were conducted on specific portions of the Energy Park over four days from February 2008 to November 2009. Observations were made on foot and from vehicles. The individual locations at the Energy Park were visited each day but a more concentrated effort was made to survey the marshes and hammocks habitats, and the surrounding areas of the rookery. Random walk surveys were conducted. Species were identified by direct observation, songs or calls, and scats, tracks or sign. Total observer hours for the survey exceeded 40 hours. Manuals used as ecological and taxonomic guides are listed in Volume II, Appendix 10.13.4.

Table 2-20 lists the indicators that were reviewed to evaluate if any change in abundance or condition has occurred. These indicators fall into two groups: positive and negative. The positive group contains species indicative of high quality habitat or conditions. The negative group indicates habitat conditions, which may be adversely affected. The negative group also includes introduced and pest species.

**Table 2-20
Positive and Negative Indicator Species**

Positive Indicator Species	Negative Indicator Species
Cypress	Melaleuca
Sawgrass	Torpedo grass
Spikerush	Brazilian pepper
Red Maple	Hydrilla
Willow	Cattails
Slash Pine	

Note: No correspondence between positive and negative species is implied by their position in the table.

The undeveloped areas of the Energy Park consists of palmetto prairies, pine flatwoods, exotic hardwoods / brazilian pepper, bay swamp, wetland coniferous forest / cypress, and freshwater marshes. These habitats are consistently maintained by the Authority to remove exotic and invasive species, which do not exceed more than 25% of the Project Site, as referenced in the Unified Mitigation Assessment Method (UMAM) analysis for wetland mitigation. Although many of the negative indicator species exist at the Energy Park, the proportion of positive and negative species is relatively stable.

The USACE has reviewed the filling of the South Borrow Lake for wetland impacts and the Authority has agreed to purchase the appropriate mitigation credits from Loxahatchee Mitigation Bank. After conducting a site visit and reviewing the functionality of the wetland, the USFWS has stated in a letter to the USACE (04/10/2010), “it appears the compensation is sufficient to offset the impacts.”

2.3.7. Meteorology and Ambient Air Quality

2.3.7.1. Meteorology

The Proposed Facility will be located in Palm Beach County on the lower east coast of Florida. Palm Beach County, along with the rest of southern Florida, has a subtropical climate. Figure 2-18 shows the location of the Project Site. The nearest National Weather Service (NWC) station is located at Palm Beach International Airport (PBIA), approximately seven miles from the Project Site. The monthly and annual average temperatures and extremes, based on long-term data at this station from the National Climatic Data Center (NCDC), are presented in Table 2-21. The annual average temperature is 75.3°F. Record extreme temperatures ranged from 24°F minimum to 101°F maximum.

Table 2-21
Palm Beach International Airport Monthly and Annual Average Daily
Temperatures and Extremes

Month	Daily Temperatures (°F) ¹			Extremes (°F) ²	
	Average	Maximum	Minimum	Maximum	Minimum
January	66.2	75.1	57.3	89	26
February	67.2	76.3	58.2	90	27
March	70.6	79.2	61.9	95	26
April	73.8	82.1	65.4	99	38
May	78.2	85.9	70.5	99	45
June	81.2	88.5	73.8	100	60
July	82.5	90.1	75	101	66
August	82.8	90.1	75.4	99	65
September	81.7	88.7	74.7	97	61
October	78.1	85	71.2	95	46
November	73.1	80.4	65.8	92	36
December	68.3	76.4	60.1	90	24
Annual	75.3	83.2	67.4	101	24

¹30-year period of record, 1971-2000

² Climatic records period, 1894 - 2009

Source: NOW data - NOAA Online Weather Data (<http://www.weather.gov/climate/>)

Between May and October, the weather is hot, humid, and wet with average temperatures ranging between 78.1°F and 82.8°F. This season is characterized by occasional afternoon thunderstorms and sea breezes that result in cooler temperatures in the afternoons. The weather from November through April tends to be warm and generally dry with a range of average temperatures from 66.2°F to 73.1°F. On occasion, short-term cold fronts can result in temperatures in the 40s and 50s.

The variation in the annual and seasonal diurnal temperatures, based on historical data from Palm Beach International Airport, is presented in Figure 2-19. The patterns are similar in each of the seasons; however, the rise in temperature from morning until mid afternoon is strongest in the winter.

Table 2-22 presents monthly and annual average precipitation and relative humidity. Showers and thunderstorms associated with sea-breezes account for a significant portion of the annual precipitation in South Florida. Annual average precipitation is 61.4 inches; however, it has varied from 27 inches to almost 107 inches. Most of the precipitation occurs during the summer and wet period from May through October. The dry season is associated with the winter months. Hurricane season is officially from June 1st through November 30th. The annual average relative humidity is 71.5%, with humidity in the mornings generally in the 80% range (when temperatures are coolest), and in the 60% range in the afternoons (when temperatures are highest).

Table 2-22
Palm Beach International Airport Monthly and Annual Average Precipitation and Relative Humidity

Month	Precipitation (inches) ^{1, 2}			Relative Humidity (%) ^{3, 4}	
	Average	Maximum	Minimum	Morning	Afternoon
January	3.75	11.18	0.13	84	59
February	2.55	8.71	0	83	57
March	3.68	16.78	0	82	56
April	3.57	18.26	0.04	79	55
May	5.39	16.19	0.39	80	59
June	7.57	25.19	0.12	84	66
July	5.97	23.28	0.51	85	64
August	6.65	20.12	0.91	86	64
September	8.1	29.4	1.77	87	66
October	5.46	27.81	0.01	84	63
November	5.55	14.63	0.23	84	61
December	3.14	15.22	0.66	84	60
Annual	61.4	108.6	37.3	83	61

¹. Climatic Normals, 30-year period of record, 1971-2000

². Climatic Records period, 1894 - 2009

³. From 38 years of historical data, 1964 - 2002.

Source: NOAA (<http://lwf.ncdc.noaa.gov/oa/climate/online/ccd/avgrh.html>)
<http://www.weather.gov/climate/index.php?wfo=mfl>

The occurrence of a daytime sea-breeze and a nighttime land-breeze is a frequent phenomenon in South Florida throughout the calendar year. A sea-breeze typically develops from the daytime heating of the land when the boundary over the land surface heats up quicker than the boundary layer over the nearby water body. The Atlantic Ocean and Lake Okeechobee are the main large water bodies affecting the Palm Beach County area. Conceptually, as the sun heats up the land area a pressure gradient is formed between the land area and the water body. This pressure gradient cause the movement of the low level air to travel from the sea to the land in the form of a sea-breeze with a return flow aloft to close out the sea-breeze circulation.

The sea-breeze is enhanced over the summer months due to the presence of more instability over the land and the temperature gradient between the land and the water bodies. The sea-breeze usually starts out as a gentle breeze in the early morning period when the solar radiation from the sun starts to heat the land surface. As the land surface heats up, the air parcel rises and returns to the area over the water body. As the air ascends over the land surface during the sea-breeze circulation, cloud development often occurs. Clouds are usually absent over the water body where the returning air descends

in the boundary layer to complete the circulation cycle. The sea-breeze is at its greatest in the afternoon when the heating over the land is at its daily maximum.

Table 2-23, includes the seasonal and annual average wind speed and direction developed from five years of meteorological data (2001 to 2005) measured at Palm Beach International Airport (PBIA) and provided by Florida Department of Environmental Protection (FDEP). This data was used in the air quality analysis for the Proposed Facility. The average wind speed is approximately 4 meters per second (m/s), which is nine miles per hours (mph). The prevailing wind direction over the course of the year is from the east.

Table 2-23
Palm Beach International Airport Seasonal and Annual Average Wind
Direction and Wind Speed¹

Season ²	Average Wind Speed		Calm ³ (%)	Prevailing Wind Direction
	(m/s)	(mph)		
Winter	4.00	8.9	9.4	NW
Spring	4.53	10.1	7.6	E
Summer	3.35	7.5	17.3	SE
Autumn	4.17	9.3	10.6	E
Annual	4.01	9.0	11.2	E

Notes:

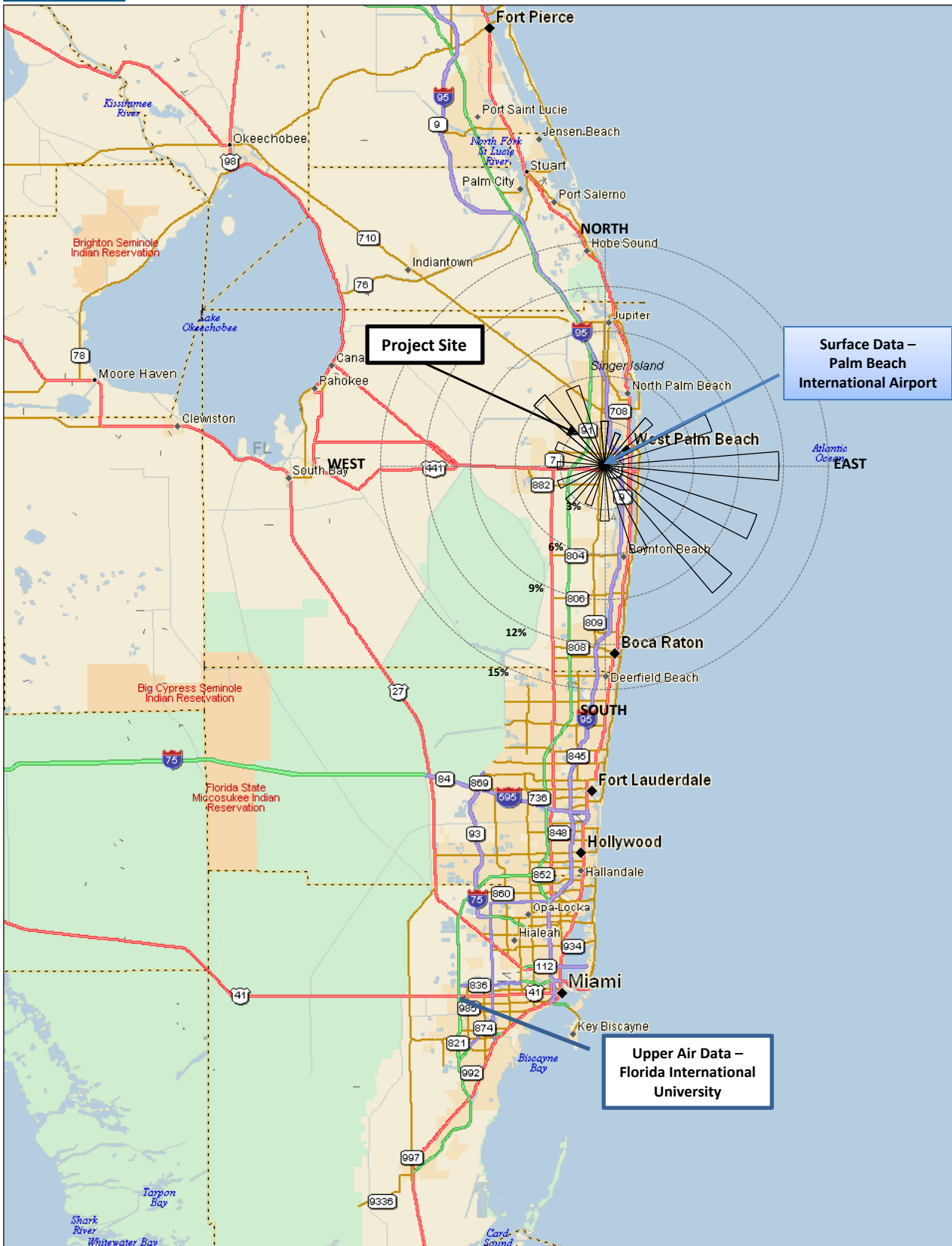
¹ 5-year period of record, 2001 to 2005. The meteorological data for this period were also used in the air quality impact analyses for the Project.

² Seasons were defined as Winter: January, February, December; Spring: March, April, May; Summer: June, July, August; Autumn: September, October, November

³ Wind speeds up to and including 1.5 m/s (3.4 mph) are considered to be calm.

Source: FDEP, 2001-2005

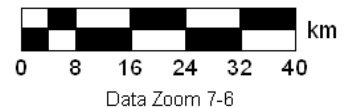
Due to the shape of the coastline in the Palm Beach County area, the sea-breeze from the Atlantic Ocean blows from the east to the west. In addition, a lake-breeze from the northwest due to Lake Okeechobee may also affect this region, as does a strong sea-breeze from the Gulf of Mexico side of the Florida Peninsula. Under the sea-breeze/land breeze circulation patterns, rain showers may occur and can be enhanced in areas under the influence of merging these sea-breeze fronts. The presence and strength of the daily sea-breeze is dependent on all of the other environmental factors affecting the land area on that particular day. As a sea-breeze front passes a particular location, the location will experience an increase in wind speed and humidity as well as a decrease in ambient temperature because the moist air parcel is moving in from over the water body is now situated over the land area.



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Data Zoom 7-6

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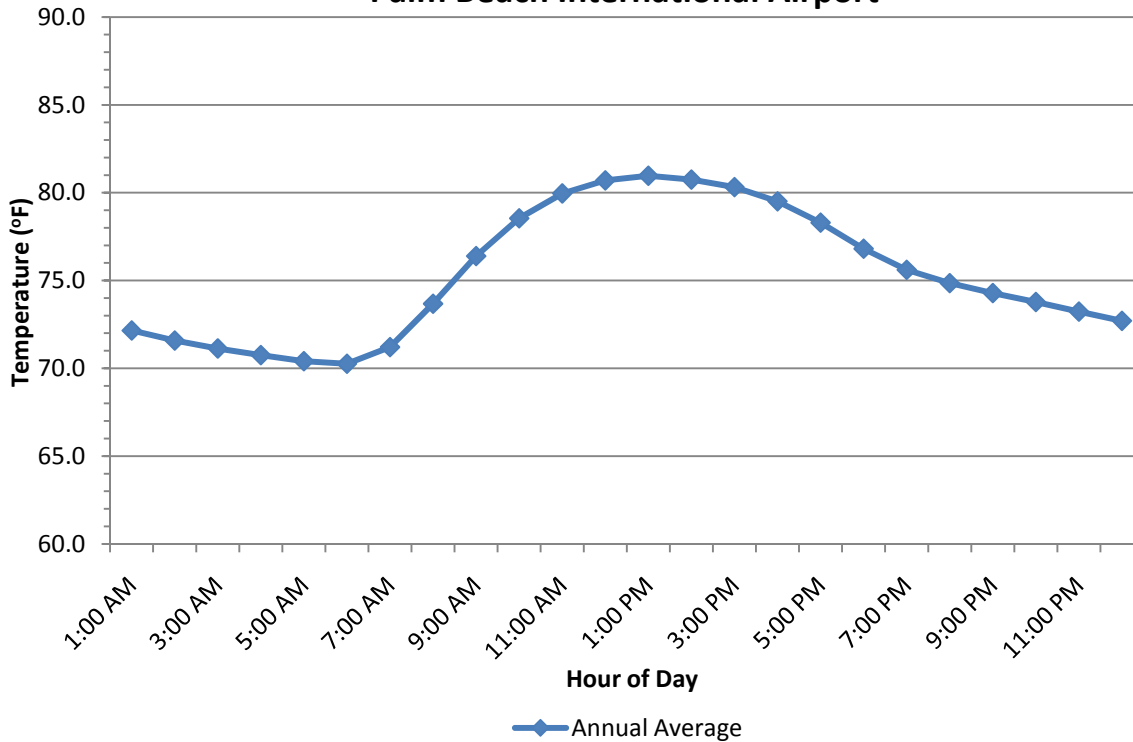
Solid Waste Authority
of Palm Beach County

**Location of Project Site
and Prevailing Wind
Patterns**

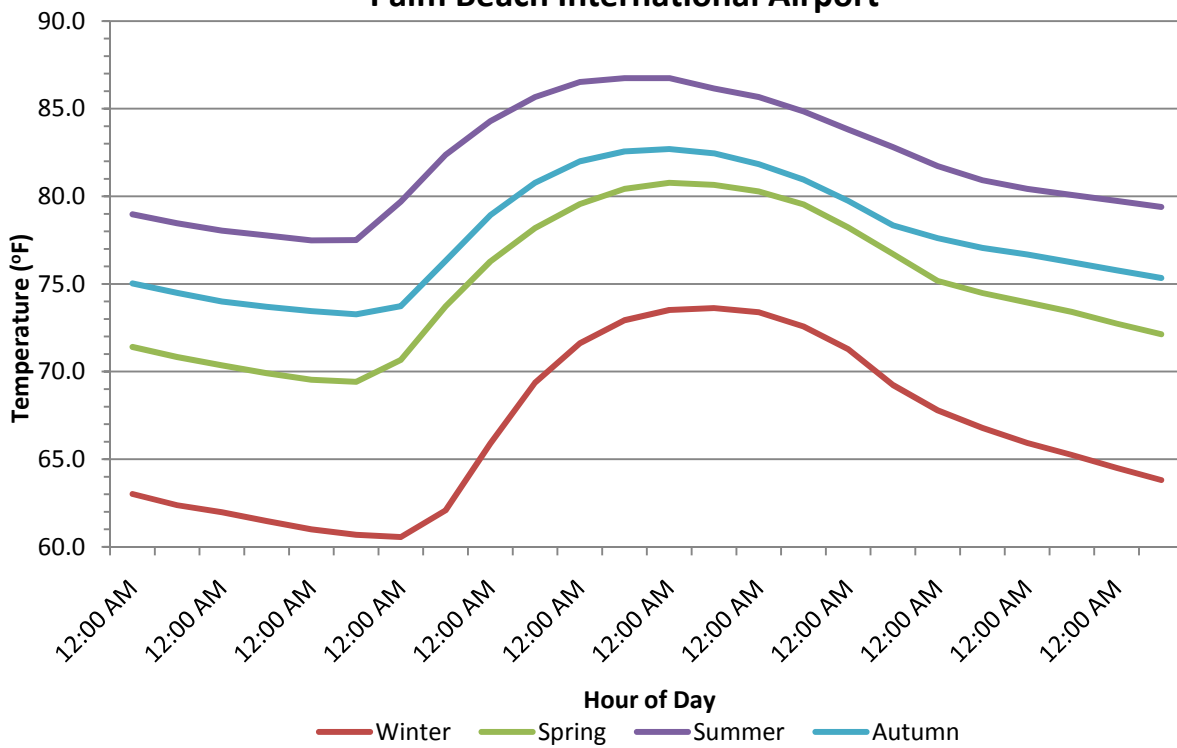
MALCOLM PIRNIE, INC.

July 2010
FIGURE 2-18

Annual Diurnal Temperature Palm Beach International Airport



Seasonal Diurnal Temperature Palm Beach International Airport



Land cools faster than water bodies at nighttime. This event has the opposite effect of what occurs during the day. If the land cools to a temperature below that of the adjacent water body (ocean, lake, etc.), the pressure of the air parcel over the water body will be lower than that of the air parcel over the land area. If the environmental surface wind pattern is not strong enough to oppose it, these conditions will result in a land-breeze in which the wind blows from the land towards the ocean. If this land-breeze is strong enough and moisture as well as instability is present, showers may develop over the water body. Previous land-breeze studies in central Florida have found that the average onset of a land-breeze is around four to five hours after sunset in the summertime months and 6 ½ to 8 hours in the autumn and winter months.

Atmospheric stability is a measure of the turbulence within the atmosphere. During a sunny day with strong solar heating, considerable turbulence is generated by the difference in temperature between the air and the ground surface. This enhanced turbulence is classified as unstable conditions. At night, under clear skies with low wind speeds, the atmospheric turbulence level is low (stable). When wind speeds are moderate during daytime or nighttime, dispersion is moderate, and the stability is labeled neutral. The seasonal distribution data in Table 2-24 indicate that neutral conditions and slightly stable conditions dominate throughout most of the year.

The five-year average annual wind rose shown in Figure 2-20 and the seasonal wind roses are shown in Figure 2-21. These wind roses were developed from the five-year meteorological dataset provided by FDEP. These seasonal wind roses show that winds blow predominantly from the east through most of the year; however, there is a shift to a more northwesterly direction in the winter months. High wind speeds are relatively rare, except during exceptional weather events such as hurricanes and tropical storms.

Table 2-24
Palm Beach International Airport Seasonal and Annual Average Stability Classes

Season	Occurrence (%) of Stability Class					
	Very Unstable A	Moderately Unstable B	Slightly Unstable C	Neutral D	Slightly Stable E	Moderately Stable F
Winter	0.6%	0.7%	3.3%	36.7%	43.3%	15.5%
Spring	0.8%	0.9%	3.4%	44.9%	39.1%	10.9%
Summer	1.9%	2.2%	7.5%	47.4%	24.8%	16.1%
Fall	0.6%	1.1%	4.1%	40.5%	40.2%	13.5%
Annual	1.0%	1.2%	4.5%	42.3%	37.0%	14.0%

Notes:

¹. The P-G stability classes were derived from surface roughness and calculated Monin-Obukhov length in the 2001-2005 AERMET using the Golder method (1972).

Source: FDEP 2001-2005

The seasonal morning and afternoon mixing heights are shown in Table 2-25. Mixing height refers to the depth of the atmosphere above ground level at which vertical mixing of the air occurs. Low mixing height indicates the air is stagnant and confined closer to surface with little turbulence present. The higher mixing height leads to a greater mixing depth. The lowest mixing heights often occur at night and early morning, with the highest mixing heights occurring mid to late afternoon. This diurnal pattern is seen in the PBIA meteorological data. The afternoon mixing heights are highest in the summer. Likewise, the lowest morning mixing heights on average occur in the winter months.

Table 2-25
Palm Beach International Airport Seasonal and Annual Morning and Afternoon Mixing Heights

Season	Mixing Height (m)	
	Morning	Afternoon
Winter	380	1449
Spring	496	1684
Summer	407	1863
Fall	470	1687
Annual	439	1740

Source: FDEP 2001-2005 AERMET data

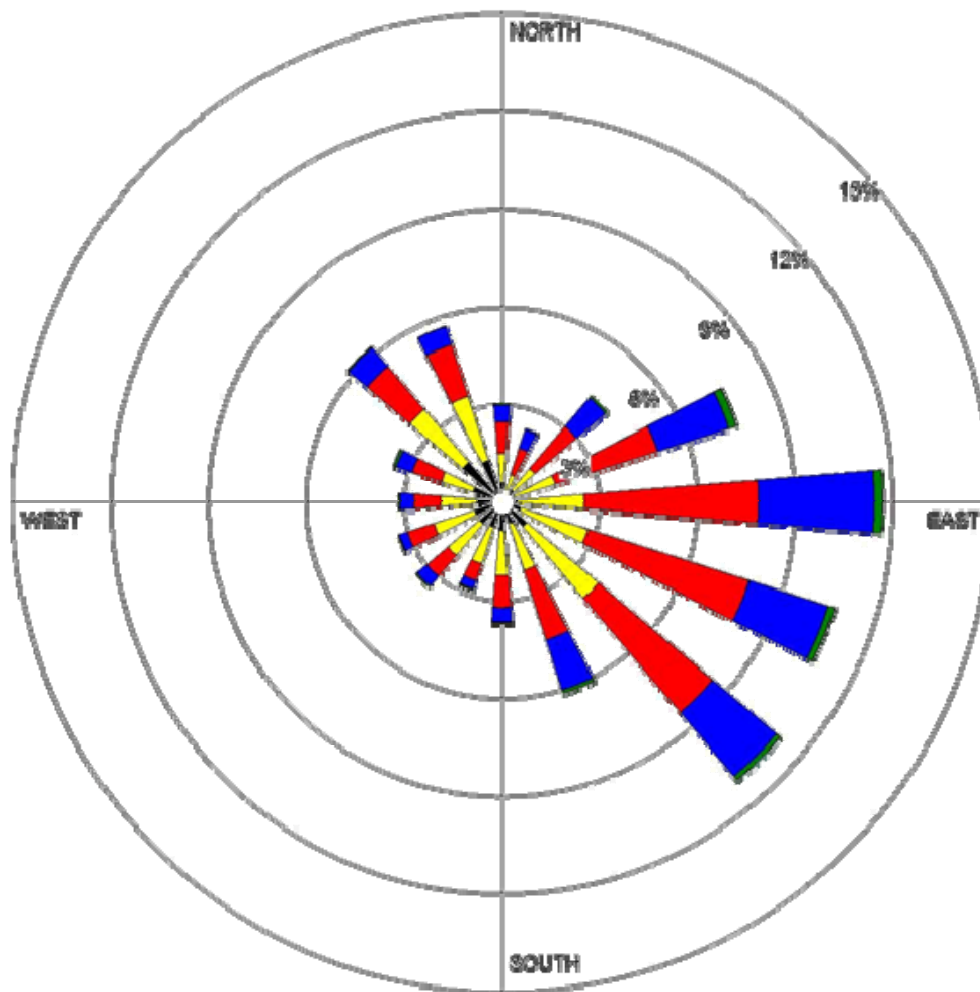
Historically, tropical cyclones can occur in the North Atlantic in almost any month of the year. However, with few exceptions, the primary season for tropical cyclone activity in Palm Beach is during the traditional tropical cyclone season of June through November based on long-term data from 1886 to 2000. A total of 153 tropical storms and hurricanes (98% of the 156 storm total) occurred during that period. Of the 156 storms, 130 (83% of the 156 storm total) occurred during the months of August, September, and October. September and October are the most active months, with 44 and 49 storms recorded, respectively. Thunderstorms can generate strong, gusty winds along with heavy rain. Although thunderstorms can occur any time of the year, they are most prevalent during the months of June through September where they occur on about 10-16 days per month.

WIND ROSE PLOT:

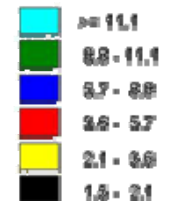
Station #12844 Palm Beach International Airport
Five-year Annual Wind Rose 2001 - 2005

DISPLAY:

Wind Speed
Direction (blowing from)



WIND SPEED
(m/s)



Calm: 11.23%

COMMENTS:

January - December

DATE PERIOD:

2001-2005
Jan 1 - Dec 31
00:00 - 23:00

CALM WIND:

11.23%

AVG WIND SPEED:

4.01 m/s

TOTAL COUNT:

43824 hrs.

PROJECT NO.

PBREF2

WRPLOT View - Lotus Environmental Software

**MALCOLM
PIRNIE**

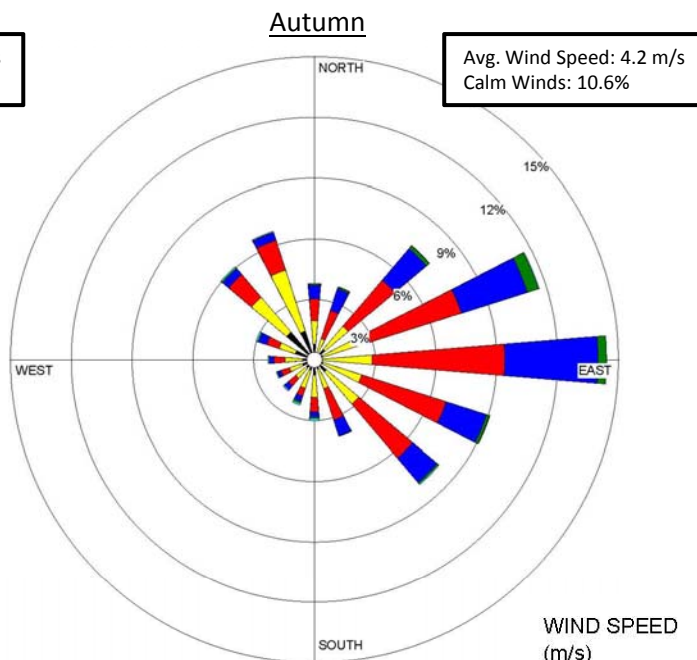
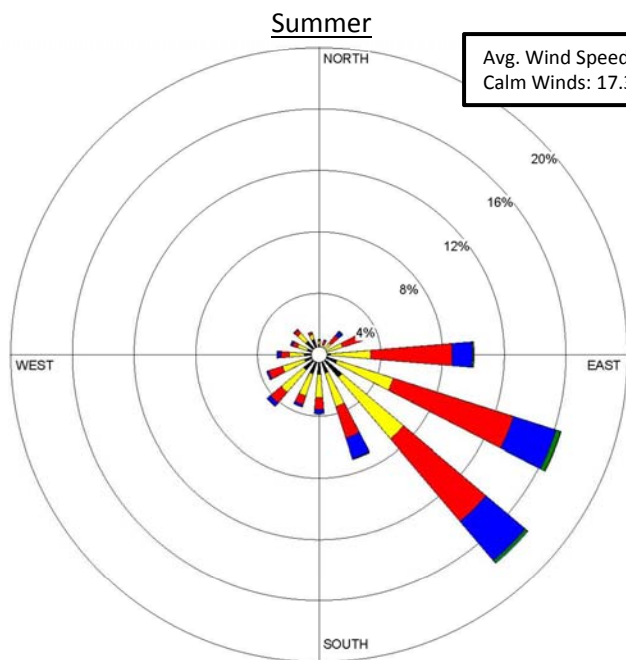
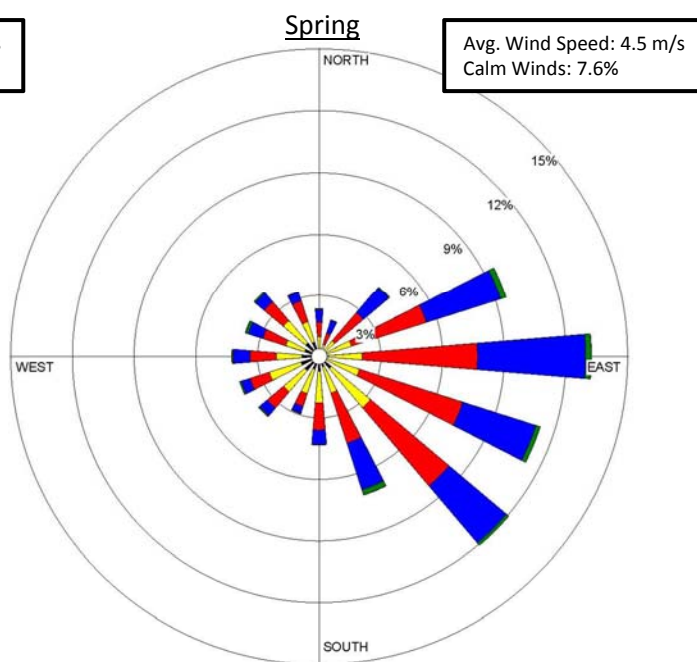
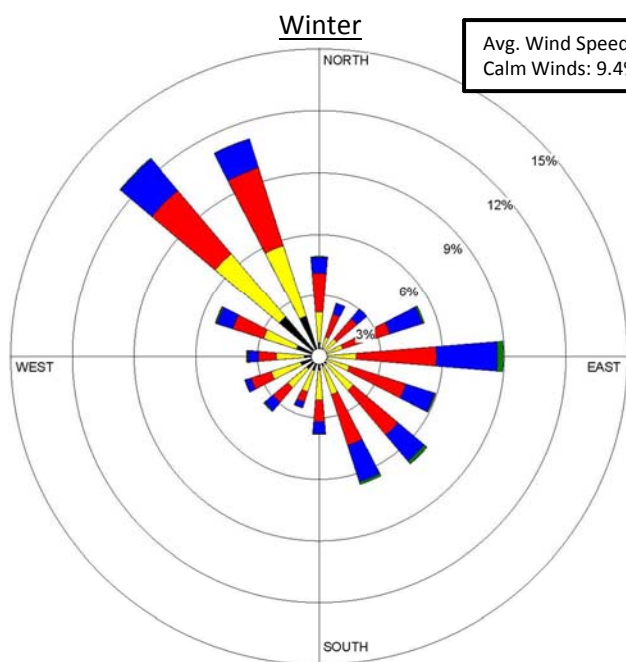


Solid Waste Authority
of Palm Beach County

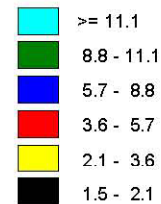
Five-year
Annual Wind Rose
2001 - 2005

MALCOLM PIRNIE, INC.

July 2010
FIGURE 2-20



WIND SPEED
 (m/s)



2.3.7.2. Ambient Air Quality

Air Quality Standards

The Clean Air Act Amendments (CAAA) require the United States Environmental Protection Agency (USEPA) to set national ambient air quality standards (NAAQS) for widespread pollutants from numerous and diverse sources considered harmful to public health and the environment. There are currently NAAQS designated for six pollutants: sulfur dioxide (SO₂), nitrogen dioxide (NO₂), carbon monoxide (CO), lead (Pb), ozone (O₃), and particulate matter (PM₁₀ and PM_{2.5}). The CAAA also established two types of national air quality standards. Primary standards set limits to protect public health, including the health of "sensitive" populations such as asthmatics, children, and the elderly. Secondary standards set limits to protect public welfare, including protection against visibility impairment, damage to animals, crops, vegetation, and buildings. Florida has incorporated the NAAQS by reference into state regulations (F.A.C. Section 62-204.800). In addition, Florida has established state ambient air quality standards (FAAQS) in F.A.C. Section 62-204.240. Table 2-26 lists the current Florida state and national AAQS.

The USEPA recently revised particulate matter ambient air quality standards, rescinding the annual PM₁₀ NAAQS, and lowering the 24-hour PM_{2.5} NAAQS; however, most states, including Florida, have not yet promogated regulations for the control of PM_{2.5} emissions.

**Table 2-26
Florida And National Ambient Air Quality Standards**

1. Not to be exceeded more than once per calendar year.

Pollutant	Averaging Time	FAAQS	NAAQS	
			Primary	Secondary
Carbon Monoxide (CO)	8-hour ¹	9 ppm	9 ppm	---
	1-hour ¹	35 ppm	35 ppm	---
Nitrogen Dioxide (NO ₂)	Annual	100 ug/m ³ (0.5 ppm)	100 ug/m ³ (0.053 ppm)	Same as primary
	1-hour ²	---	0.100 ppm	---
Sulfur Dioxide (SO ₂)	Annual	60 ug/m ³	0.03 ppm (80 ug/m ³)	Same as primary
	24-hour ¹	260 ug/m ³	0.14 ppm (365 ug/m ³)	Same as primary
	3-hour ¹	1300 ug/m ³	---	0.5 ppm (1300 ug/m ³)
PM ₁₀	Annual ³	50 ug/m ³	---	Same as primary
	24-hour ⁴	150 ug/m ³	150 ug/m ³	Same as primary
PM _{2.5}	Annual ⁵	---	15 ug/m ³	Same as primary
	24-hour ⁶	---	35 ug/m ³	Same as primary
Lead (Pb)	3-month rolling ⁷	---	0.15 ug/m ³	Same as primary
	Quarterly	1.5 ug/m ³	1.5 ug/m ³	Same as primary
Ozone	8-hour ⁸ (2008)	---	0.075 ppm	Same as primary
	8-hour ⁹ (1997)	---	0.08 ppm	Same as primary
	1-hour ¹⁰	0.12 ppm	0.12 ppm	Same as primary

2. The 1-hour primary standard is met when the three-year average of the annual 98th percentile of the daily maximum 1-hour average concentration is less than or equal to 100 ppb.
3. Due to a lack of evidence linking health problems to long-term exposure to coarse particle pollution, the USEPA revoked the annual PM₁₀ standard in 2006 (effective December 17, 2006).
4. The 24-hour PM₁₀ standard is not to be exceeded more than once per year on average over 3 years.
5. To attain the annual PM_{2.5} standard, the 3-year average of the weighted annual mean concentrations must be less than or equal to the standard.
6. The Federal 24-hour PM_{2.5} standard was changed from 65µg/m³ to 35 µg/m³ on December 17, 2006. The 24-hour PM_{2.5} standard is met when the 3-year average of the 98th percentile is less than or equal to the standard.
7. Final rule signed October 15, 2008.
8. To attain this standard, the 3-year average of the fourth-highest daily maximum 8-hour average ozone concentrations measured at each monitor within an area over each year must not exceed 0.075 ppm (effective May 27, 2008).

9. The standard is attained when the 3-year average of the fourth-highest daily maximum is less than or equal to the standard.
10. The standard is attained when the expected number of days per calendar year with maximum hourly average concentrations above 0.12 ppm is less than or equal to 1. As of June 15, 2005, the USEPA revoked the 1-hour ozone standard in all areas except the fourteen 8-hour ozone non-attainment Early Action Compact (EAC) areas.

Source: F.A.C. Chapter 62-204.240 and 40 CFR Part 50.

Existing Air Quality

The Proposed Facility will be located in Palm Beach County, which is part of the Southeast Florida Intrastate Air Quality Control Region (40 CFR 81.49). The Project Site is in attainment of the NAAQS for all criteria pollutants, and classified as attainment/maintenance for ozone by FDEP. Background air quality is established by ambient air monitoring stations that are maintained by FDEP and local agencies and located throughout the state. These stations monitor ambient levels of the criteria pollutants (CO, NO₂, SO₂, lead (Pb), ozone, and particulates, PM₁₀ and PM_{2.5}). Background air quality data for the Project Site from 2006 through 2008 are presented in Table 2-27. As indicated in the table, and when compared to Table 2-26 the available monitoring data from these regional monitoring stations demonstrates that the concentrations of criteria pollutants in the ambient air near the Project Site are well below the NAAQS for all pollutants.

Table 2-27
Monitored Background Concentrations (2006 - 2008)

Pollutant	Averaging Period	Monitoring Location		2006		2007		2008	
		County (City)	Address	(g/m ³)	(ppm)	(g/m ³)	(ppm)	(□g/m ³)	(ppm)
CO	1-hour ¹	Palm Beach (West Palm Beach)	3730 Belvedere Road	3,206	2.8	2,405	2.1	1,718	1.5
	8-hour ¹	Palm Beach (West Palm Beach)	3730 Belvedere Road	2,061	1.8	1,489	1.3	1,145	1.0
NO ₂	1-hour ¹	Palm Beach (West Palm Beach)	3730 Belvedere Road	98	0.052	105	0.056	68	0.036
	Annual ²	Palm Beach (West Palm Beach)	3730 Belvedere Road	18	0.0096	15	0.0079	--	**
SO ₂	3-hour ¹	Palm Beach (Riviera Beach)	1050 15th St W	5	0.002	10	0.004	10	0.004
	24-hour ¹	Palm Beach (Riviera Beach)	1050 15th St W	5	0.002	3	0.001	10	0.004
	Annual ²	Palm Beach (Riviera Beach)	1050 15th St W	3	0.0011	3	0.001	4	0.0015
PM ₁₀	24-hour ¹	Palm Beach (Belle Glade)	38745 SR 80	42	--	37	--	49	--
		Palm Beach (Delray Beach)	225 S Congress	49	--	43	--	48	--
	Annual ²	Palm Beach (Belle Glade)	3875 SR 80	20.1	--	16.4	--	18.9	--
		Palm Beach (Delray Beach)	225 S Congress	25.9	--	**	--	22.2	--
PM _{2.5}	24-hour ³	Palm Beach (Belle Glade)	38745 SR 80	**	--	18.6	--	16.2	--
		Palm Beach (Royal Palm WW)	980 Crestwood Blvd N	18.2	--	20.9	--	14.1	--
		Palm Beach (Delray Beach)	225 S Congress	17.0	--	20.5	--	17.2	--
	Annual ²	Palm Beach (Belle Glade)	38745 SR 80	**	--	**	--	**	--
		Palm Beach (Royal Palm WW)	980 Crestwood Blvd N	**	--	7.29	--	6.05	--
		Palm Beach (Delray Beach)	225 S Congress	7.76	--	**	--	**	--
Pb	Quarterly ⁴	Hillsborough (Tampa)	Gulf Coast Lead	0.83	--	1.65	--	0.6	--
		Hillsborough (Tampa)	Patent Scaffolding	0.27	--	0.39	--	0.39	--
		Pinellas (Pinellas Park)	11401 47th St N	0.01	--	0.01	--	0.01	--
	3-month ⁵	Hillsborough (Tampa)	Gulf Coast Lead	NA	NA	NA	NA	1.77	--

Section 2
Site and Vicinity Characterization

Pollutant	Averaging Period	Monitoring Location		2006		2007		2008	
		County (City)	Address	(g/m ³)	(ppm)	(g/m ³)	(ppm)	(□g/m ³)	(ppm)
		Hillsborough (Tampa)	Patent Scaffolding	NA	NA	NA	NA	0.40	--
Ozone	1-hour ¹	Palm Beach (Royal Palm Beach)	980 Crestwood Blvd N	--	0.093	--	0.078	--	0.074
		Palm Beach (Lantana)	1199 Lantana Road	--	0.086	--	0.092	--	0.075
	8-hour ⁶	Palm Beach (Royal Palm Beach)	980 Crestwood Blvd N	--	0.071	--	0.066	--	0.066
		Palm Beach (Lantana)	1199 Lantana Road	--	0.069	--	0.068	--	0.065

Notes:

1. Short-term concentrations are based upon highest, second highest monitored concentrations.
2. Annual concentrations are based on arithmetic means for the 12-month averaged monitored concentrations
3. PM2.5 24-hour concentration is the 98th percentile value.
4. Pb quarterly concentration is based on the maximum quarterly arithmetic mean concentration.
5. Pb 3-month concentration is based on the maximum 3-month rolling average.
6. O3 8-hour concentration is based on highest, fourth highest monitored concentrations.

** - there was insufficient data to produce a valid average.

NA - Pb 3-month averaging period was signed into effect October 15, 2008.

Prevention of Significant Deterioration (PSD) Increments

USEPA promulgated regulations to prevent deterioration of air quality under the Prevention of Significant Deterioration (PSD) program. This program provides a system of classifying areas in attainment of the ambient air quality standards to allow states to identify local land use goals. Under PSD, there are three area classifications: Class I, Class II, and Class III, and each area classification permits a different level of growth before significant deterioration would be assumed to occur. Class I areas are areas of special national or regional value from a natural, scenic, recreational, or historic perspective, and are afforded the greatest degree of air quality protection. Very little deterioration of air quality is allowed in Class I areas. Class II areas were designed to accommodate normal, well-managed growth. Class III areas are permitted to have greater development than either Class I or Class II areas.

Congress has established 156 mandatory Class I areas, including wilderness areas and national parks. All other areas of the country were designated as Class II. Currently, no areas of the country have been designated as Class III. In order to maintain air quality in areas that meet the NAAQS, the CAAA established maximum allowable increases over baseline concentrations, called PSD increments. The PSD increments were established for the three area classifications. Table 2-28 presents the Class I and Class II PSD increments. The Palm Beach County area is designated as a Class II area for increment consumption (F.A.C. Section 62-204.340). The nearest Class I area is Everglades National Park, which is managed by the National Park Service and approximately 118 kilometers (73 miles) from the Project Site. The next closest Class I area is the Chassahowitzka National Refuge Area, which is managed by the United States Fish and Wildlife Service, and approximately 320 kilometers (199 miles) from the Project Site.

As part of the PSD permitting process, an air quality analysis was conducted in order to demonstrate that the Proposed Facility will not adversely affect air quality, nor cause or contribute to an exceedance of an AAQS or PSD increment. The details of this air quality analysis are found in Appendix F of the PSD Application located in Volume III of this Application.

Table 2-28
Class II and I PSD Increments

Pollutant	Class II PSD Increments ($\mu\text{g}/\text{m}^3$)			Class I PSD Increments ($\mu\text{g}/\text{m}^3$)		
	Annual	24-hour	3-hour	Annual	24-hour	3-hour
Nitrogen Dioxide (NO_2)	25	-	-	2	5	25
Sulfur Dioxide (SO_2)	20	91	512	2.5	-	-
Particulate matter < 10 μm (PM_{10})	17	30	-	4	8	-

Source: 40 CFR 52.21

Notes:

Long-term (annual) increments are not to be exceeded.

Short-term (3-hour and 24-hour) increments are not to be exceeded more than once per year.

2.3.7.3. Measurement Programs

The information used in the air quality analysis (i.e., the meteorology and air data) were obtained from Florida DEP and were collected from monitoring stations maintained by the Department and other governmental agencies, such as the National Weather Service. The meteorological data were collected at the NWS station at the Palm Beach International Airport (PBIA), approximately 6.9 miles southeast of the project site. Upper-air data were measured at Florida International University (FIU) in Miami. These data were obtained for a 5-year period (2001 through 2005) from which the wind direction, wind speed, atmospheric stability and mixing heights were developed for use in the air quality analysis. The wind sensors at the Palm Beach International Airport are located 33 feet (10 m) above grade. Regular surface observations are taken just before each hour, 7 days per week. Upper-air soundings are conducted twice per day at 7:00 a.m. and 7:00 p.m., Eastern Standard Time.

Since the predicted impacts due to the Proposed Facility do not exceed the Prevention of Significant Deterioration (PSD) *de minimis* monitoring concentrations, and representative ambient air quality data are available in the vicinity of the Project Site, pre-construction ambient air quality monitoring is not required under PSD regulations.

2.3.8. Noise

2.3.8.1. Sound Criteria for Human Receptors

The City of West Palm Beach has promulgated a noise regulation that applies to sound originating within its jurisdictional limits. The regulation, however, provides an exemption from the regulation for activities on or in publicly owned properties and facilities where such activities have been authorized by the public authority owning the properties or facilities. Consequently, the Existing Facility and Proposed Facility are

exempt from the City's noise regulation. A copy of the City's noise regulation is contained in Volume II, Appendix 10.11.3.

Although the Proposed Facility is exempt from the City's noise regulations, the Authority evaluated the potential sounds associated with the Proposed Facility to determine whether it will cause any increases in sound levels in the nearest residential community. The findings are described in the section 2.3.8.3 below.

2.3.8.2. Sound Criteria for Ecological Receptors

In addition to solid waste management facilities, the Energy Park has a large conservation area with a bird rookery. The birds in the rookery were identified as potential ecological receptors and were, therefore, also considered when evaluating the potential sounds impacts from the Proposed Facility.

According to the United States Fish and Wildlife Service (USFWS) and the Florida Fish and Wildlife Conservation Commission (FWC), there are no noise regulations that apply directly to the birds in the rookery, however, any bird that is listed as a threatened or endangered species under the federal Endangered Species Act is protected against a "take" and "harassment". Implementing regulations define harassment as "... an intentional or negligent act or omission which creates the likelihood of injury to wildlife by annoying it to such an extent as to significantly disrupt normal behavioral patterns which include, but are not limited to, breeding, feeding or sheltering" [50 CFR §17.3].

A number of threatened or endangered bird species are found in the rookery as discussed in Section 2.3.6. For the purposes of the noise study, it was assumed that noise from current operations at the Existing Facility is not harassing the birds in the rookery, as defined in federal regulations, or they would not continue to be present.

2.3.8.3. Ambient Sound Levels and Affect of the Proposed Facility

Sound levels at the Existing Facility and the Energy Park boundary near the closest residential area were measured during normal operations in February 2010 using Larson Davis Model 831 Class 1 Integrating Sound Level Meters/Analyzers. The instrumentation operating procedure met the "Type 1-Precision" requirements set forth in American National Standards Institute standard for acoustical measuring devices. Current on-site ambient sound levels were not expected to exceed 76 dBA, according to the original 1985 Environmental Noise Study contained in Volume II, Appendix 10.11.1. Sound level measurements in February 2010 confirmed that the 1 hour Leq for current operations is at or below 76 dBA.

The design of the Proposed Facility calls for all of the major equipment, with the exception of the Air Cooled Condenser (ACC), to be enclosed in order to minimize potential noise emitted from the operations. The greatest sound source at the Proposed Facility is, therefore, expected to be the ACC. The ACC design specifications require the

sound level during operations to be no greater than 65 dBA at 400 feet. Consequently, the Proposed Facility is expected to generate sound levels less than or equal to the Existing Facility.

Taking into consideration that sound levels are expressed on a logarithmic decibel scale, the combined sound level from the Existing Facility and the Proposed Facility is expected to be approximately 3.3 dBA greater than existing conditions at nearest residential community north of the Energy Park and equivalent to existing conditions at the bird rookery. The estimated 3.3 dBA sound level increase in the vicinity of the community north of the Energy Park amounts to a slightly perceptible increase given that sound level changes must be on the order of 3 dBA or greater to be perceptible to the human ear.

2.3.9. Other Environmental Features

None.

3. The Plant and Directly Associated Facilities

3.1. Background

The Proposed Facility will contain three stoker waterwall combustion/steam generation units. Each unit will have a continuous design-rated capacity of 1,000 tpd when burning a reference waste of 5,000 Btu/lb. The total design capacity of the Proposed Facility will be 3,000 tpd. Each boiler unit will operate independently; therefore, it is possible to shut down each unit individually for maintenance and inspection.

The Proposed Facility will also include a tipping building, refuse storage pit, air pollution control systems, stack, air cooled condenser, ash handling/storage building, turbine-generator (T-G), lime silos, carbon silos, maintenance building, spare parts building, administration building, visitor center, firewater pump and tank, and ancillary equipment and structures and interior roadways within the Project Site. With the exception of the air cooled condenser, all major equipment will be enclosed. The tipping area and refuse storage pit will be sized to regularly handle deliveries up to 4,500 tpd. The Proposed Facility will generate approximately 97.5 MW at 3,000 tpd of reference waste. Electrical lines from the Proposed Facility electrical switch yard will be connected to the FPL's Recway Substation on the Energy Park.

Since the Proposed Facility will use mass-burn technology, there will be no significant pre-processing of wastes prior to combustion. Separation of recyclables will continue to be at the source of generation with processing at the Energy Park RMPF. Metal recovered from the Proposed Facility ash will be processed at the Energy Park's ferrous processing facility or similar facility. MSW will be delivered to the Proposed Facility and unloaded directly into the refuse pit by transfer trailers and packer trucks. All waste will be unloaded and stored inside. There will be no waste unloaded or stored outside. Three overhead bridge cranes will mix the waste in the storage pit and load the charging hoppers of the three MWC units.

It is anticipated that MSW will be reduced by the combustion process to less than 10 percent of its original volume and 30 percent of its original weight. The resulting ash will be quenched to approximately 25 percent moisture. Ferrous and non-ferrous metals will be removed from the bottom ash. The bottom ash and fly ash from the APC systems will be commingled and stored in the ash management building prior to removal from the Proposed Facility.

Each of the new MWC units will be equipped with fabric filters (baghouses) for particulate removal and dry scrubbers for acid gas removal. The Proposed Facility will

have a carbon injection system for mercury control and a selective non-catalytic reduction system (SNCR) for NOx control.

3.2. Site Layout

The conceptual Project Site layout plans are provided in Figures 3-1A through 3-1D. These plans depict the Proposed Facility buildings, perimeter, and profile. The structures comply with the requirements of local setback ordinances. An access road loops around the Proposed Facility. Roads are arranged to separate most of the truck traffic from parking, visitor and administration areas. The Proposed Facility includes landscaping to comply with local development standards.

Roadway grades on access roads do not exceed six percent for inbound traffic and nine percent on egress to minimize gear shifting by trucks and the associated noise. All roads will be all-weather construction for heavy traffic and comply with FDOT design standards and requirements. Traffic patterns will be regulated by signs and control lights as needed to allow efficient and safe traffic flow. Parking spaces will be provided to accommodate the work force, potential visitors, and shift overlaps. Automobile parking will be separated from truck circulation to minimize potential conflicts.

3.2.1. PBREF No.2 (Proposed Facility)

The Proposed Facility consists of several contiguous and separate buildings, as shown in Figures 3-1A through 3-1D. A profile with dimensions is provided in Figures 3-1C and 3-1D. The exact dimensions will be determined during final design, but will be consistent with the Proposed Facility dimensions as outlined in Figure 3-1A.

Currently, no structures exist on the Project Site. The proposed location includes an access roadway for truck traffic that delivers waste to the Existing Facility and the South Borrow Lake that is being filled pursuant to a Initial Proffered Permit (Joint ERP Dredge and Fill permit see Volume II Appendix 10.9.17) and modification to the Conditions of Certification (see Volume II Appendix 10.7.1). In order to provide for independent operations, a 50-foot ROW was established between the Existing Facility and the Proposed Facility. The ROW will provide a bypass lane and fire fighting access to both facilities. The current fire piping loop will be relocated to this area. This proposed setback is consistent with and greater than building code requirements (30 feet setback) and will provide the necessary roadways and access. This setback area will be brought up to the grade of the Existing Facility's tipping floor.

The Proposed Facility will be located in a stormwater basin that is part of the Existing Facility's stormwater management system. This location is also in the pathway of the central culvert system which connects the Authority facilities on the east side of Jog Road with the conservation area on the west side of the scale house access road. Further

discussion of stormwater management for the Proposed Facility is provided in Section 3.8 of this Application.

The scale house, which currently serves the Existing Facility, is sufficient to accommodate the traffic associated with the Proposed Facility. The scale house facility and associated footprint has space for two (2) additional lanes to the west, if needed, at a future date.

A description of each proposed structure and purpose is provided in the following subsections:

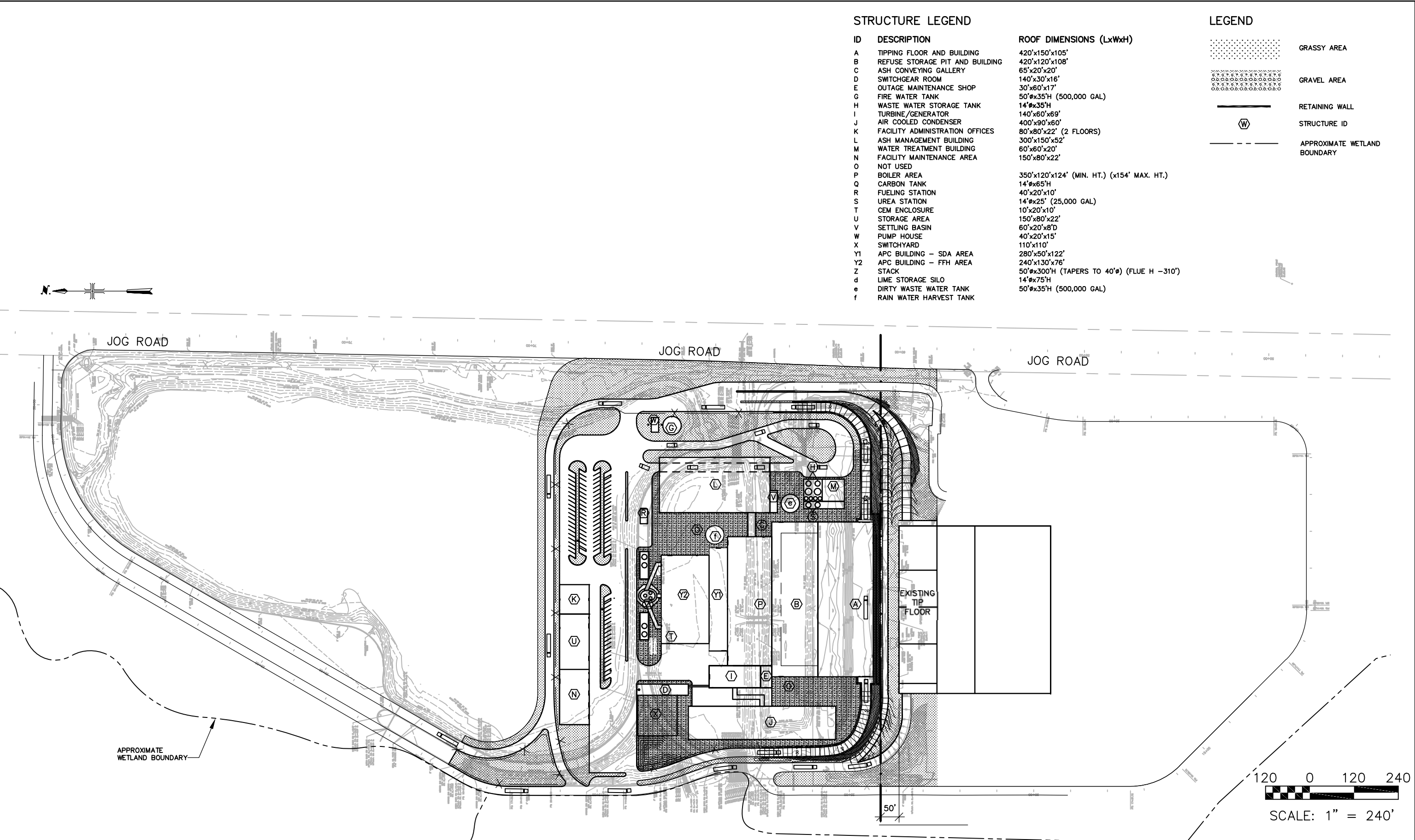
3.2.1.1. Tipping Building/Refuse Storage Building

The design of the Tipping Building and Refuse Storage Building will be coordinated to meet the refuse receiving and delivery requirements without the need to regularly store waste on the tipping floor. The storage pit design, refuse handling crane design, and tipping bays will be sized appropriately. It is anticipated that up to 900 tons per hour of MSW will be delivered to the Proposed Facility during the peak receiving hours. The tipping floor will provide adequate spacing for transfer trailers and waste collection vehicles to enter the tipping floor from the west and have room to maneuver towards the refuse storage pit while allowing traffic to pass through the building concurrently. This portion of the Proposed Facility is elevated to allow waste delivery vehicles to discharge refuse into the storage pit. The entry and exit doorways will be 20 feet wide and will be offset 10 feet from the southwest and southeast corners of the building. Doorways will have both metal doors and quick opening fabric roll-up doors. The tipping floor will be brought up to an elevation of 54 feet, 35 feet above grade assuming a base elevation of 19 feet NGVD. The structure will be designed without internal columns and an unobstructed ceiling of not less than 35 feet.

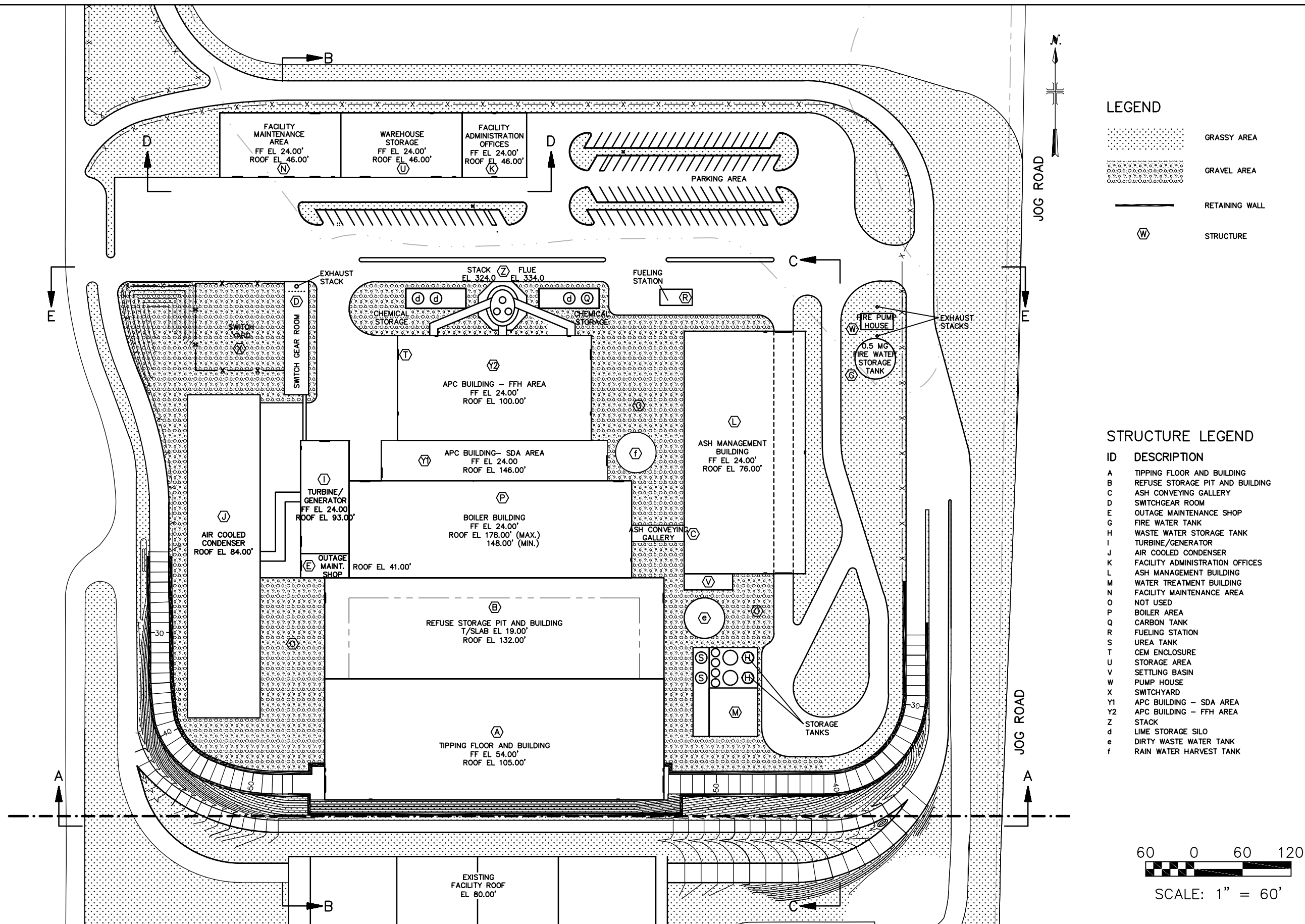
3.2.1.2. Refuse Storage Pit

The refuse pit will be designed for a minimum storage capacity of four days of material. The refuse storage pit will be a minimum 360 feet long, a minimum finished floor elevation of 19 feet NGVD and a minimum storage capacity of 46,700 cubic yards measured to the level of the tipping floor. The Refuse Storage Building will be structurally coordinated with the Boiler Building. The crane support columns at the tipping bays will be at a minimum 30-foot on center to allow the simultaneous unloading of two collection vehicles between columns. A minimum of 12 unobstructed unloading bays will be provided.

User: TurkB Spec: PIRNIE STANDARD File: F:\rturk\Palm Beach\Figures\FIGURE 3-2A.DWG Scale: 1:1 Date: 02/02/2010 Time: 12:05 Layout: Layout1



User: Turb Spec: PIRNIE STANDARD File: F:\Turk\Paln Beach\Figures\FIGURE 3-2B.DWG Scale: 1:1 Date: 02/02/2010 Time: 09:04 Layout: Layout1



**MALCOLM
PIRNIE**



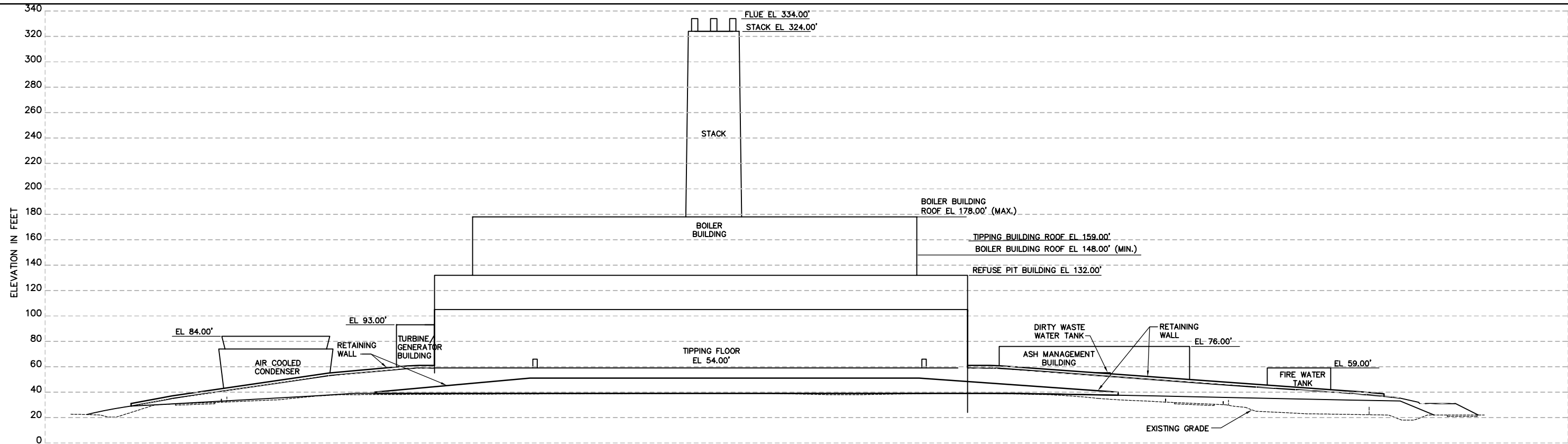
**Solid Waste Authority
of Palm Beach County**

**CONCEPTUAL LAYOUT
PLAN**

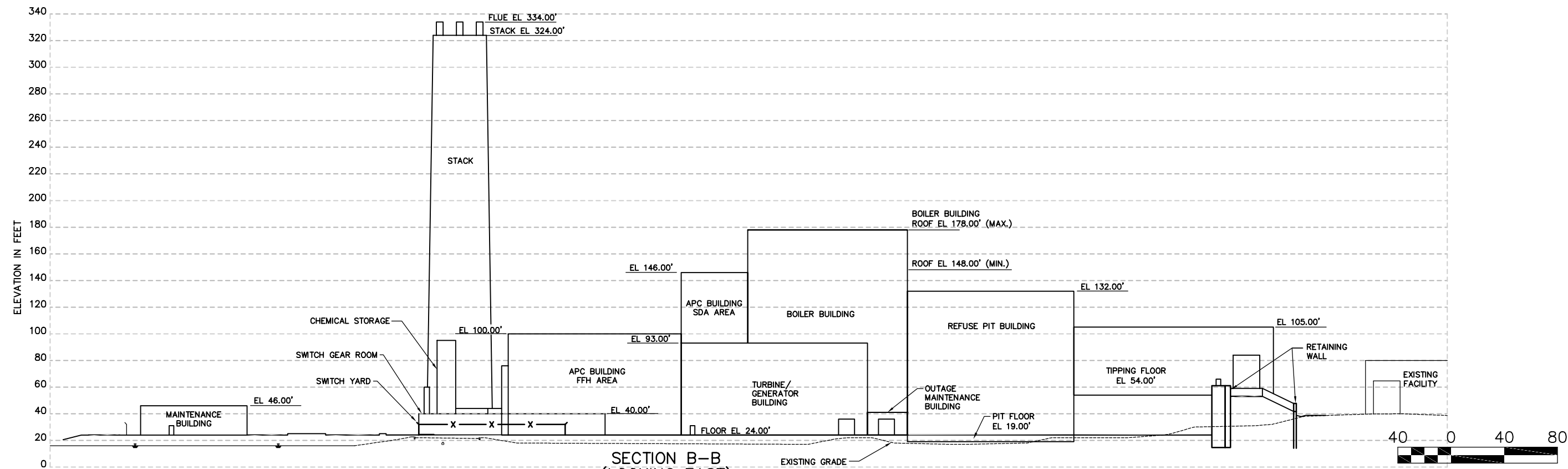
MALCOLM PIRNIE, INC.

July, 2010

FIGURE 3-1B



SECTION A-A
(LOOKING NORTH)



SECTION B-B
(LOOKING EAST)

SCALE: 1" = 80'

**MALCOLM
PIRNIE**



**Solid Waste Authority
of Palm Beach County**

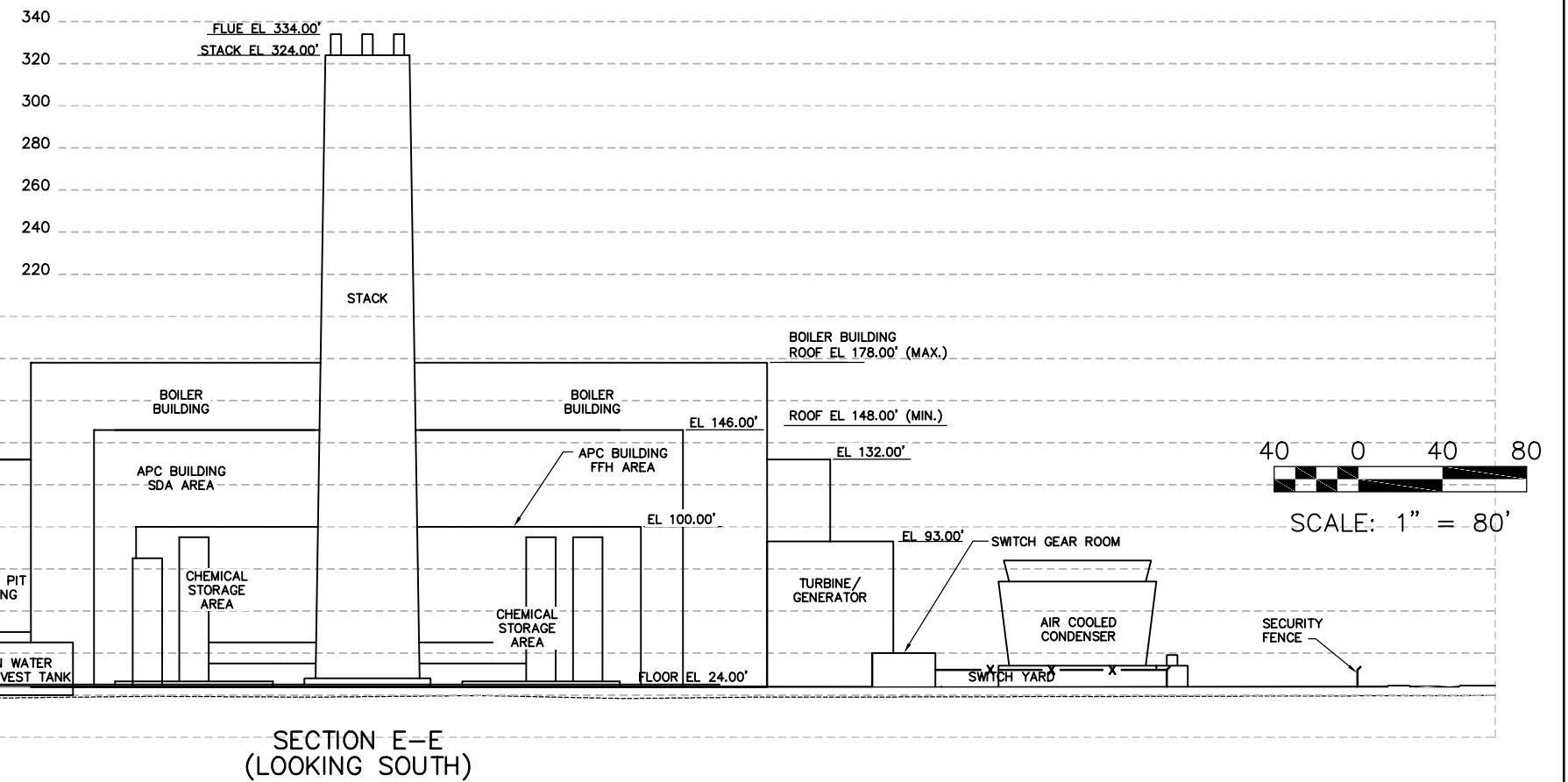
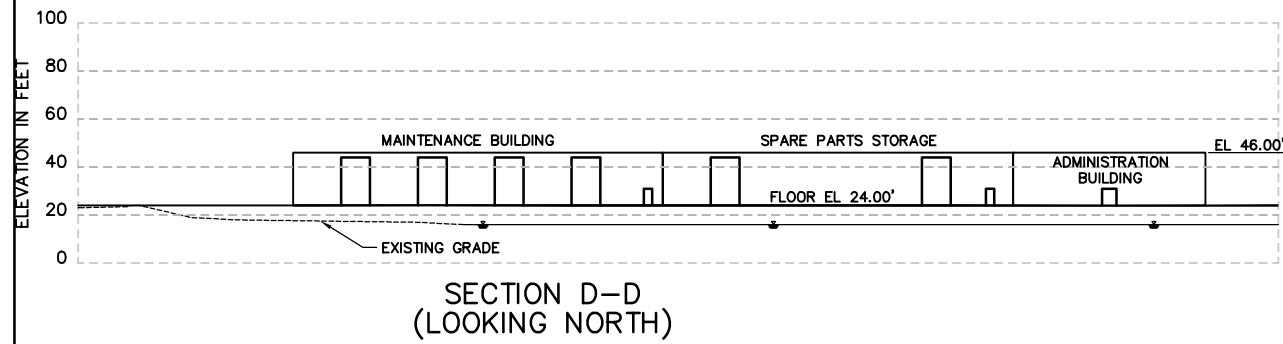
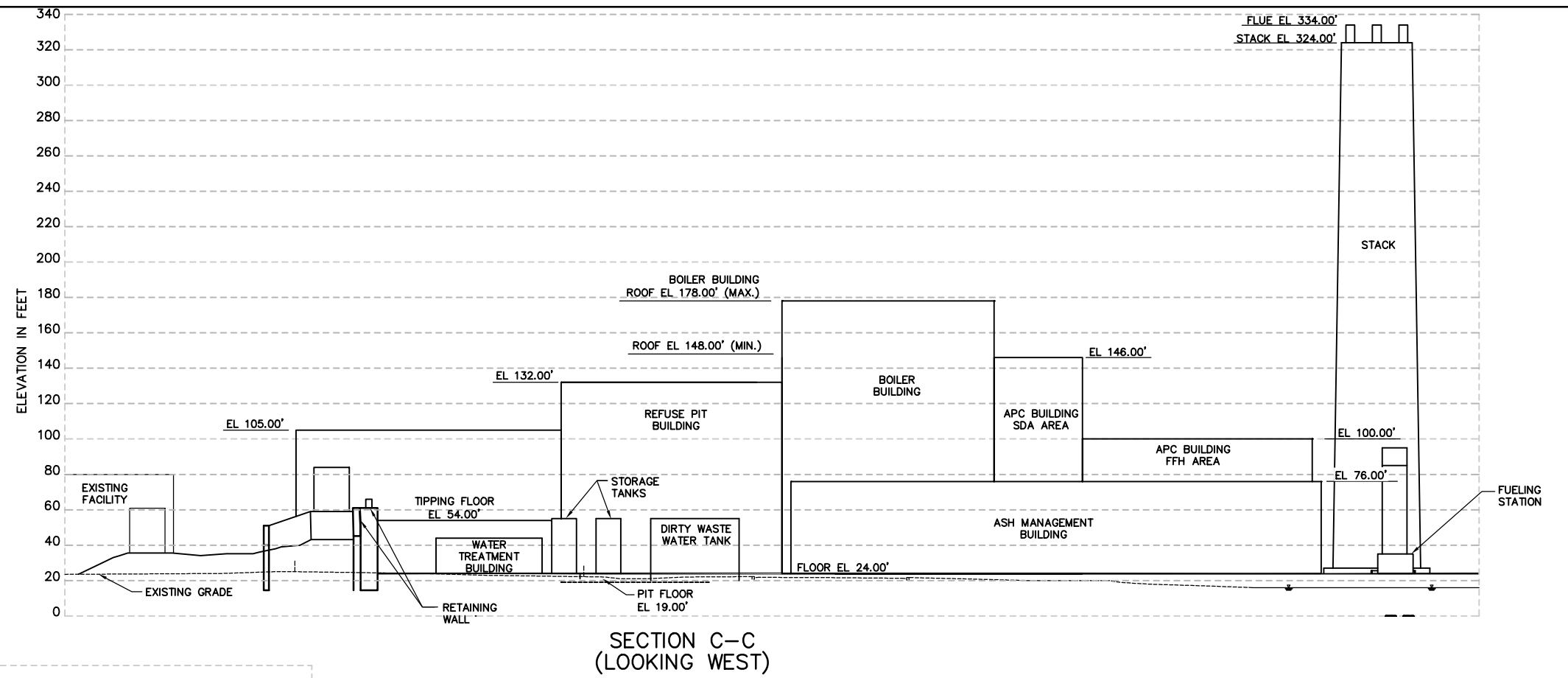
**CONCEPTUAL LAYOUT
SECTIONS I**

MALCOLM PIRNIE, INC.

July, 2010

FIGURE 3-1C

User: TurMB Spec: PIRNIE STANDARD File: F:\TurMB\Point Beach\Figures\FIGURE 3-2D.DWG Scale: 1"=80' Date: 02/02/2010 Time: 14:27 Layout: Layout1 (2)



**MALCOLM
PIRNIE**



**Solid Waste Authority
of Palm Beach County**

**CONCEPTUAL LAYOUT
SECTIONS II**

MALCOLM PIRNIE, INC.

July, 2010

FIGURE 3-1D

3.2.1.3. Boiler Building

The Boiler Building will be designed to accommodate three (3) 1,000 ton per day boilers along with adequate spacing for efficient operations and maintenance of the units. The Boiler Building will have a minimum finished floor elevation of 24 feet NGVD, and the building height will be no lower than 124 feet (148 feet NGVD), and no higher than 154 feet (178 feet NGVD). This building will house the mass burn boilers and related auxiliary equipment. The Boiler Building will be attached to the Air Pollution Control Building, Refuse Pit and Storage Building, with shared common areas.

3.2.1.4. Air Pollution Control Building

The air pollution control (APC) building will be located north of the Boiler Building and will include a 10-foot long x 20-foot wide x 10 feet high continuous emissions monitoring system (CEMs) enclosure. The Air Pollution Control Building will have a minimum finished floor elevation of 24 feet NGVD. This building will house the fabric filter baghouses and other APC equipment. The APC Building will be attached to the Boiler Building with shared common areas.

3.2.1.5. Stack

The Stack will be designed and erected in accordance with ASCE “Minimum Design Loads for Buildings and Other Structures” requirements and other applicable codes and regulations. The Stack will be designed for all conditions, loads and effects to which it may be subjected, including wind loading, thermal load, earthquake loading, dead loading, reaction forces, and vibration effects from vortices produced.

The Stack will consist of an oblong concrete shell 300 feet tall (324 feet NGVD) with three flues extending an additional 10 feet for a total height of 310 feet (334 feet NGVD). The maximum width on the narrow (north) side of the concrete shell shall be 26 feet. The top ten feet of the individual flues shall be stainless steel. The height of the Stack was established based on considerations of pollutant dispersion analysis using the latest USEPA approved models along with FAA requirements.

The Stack will include access platforms and ladders with safety railings and cages; a test platform located at a point required by the testing procedures; test ports; access door at the base of each flue; lightning protection; aviation lighting in accordance with the latest FAA requirements; and electrical service consisting of lighting and electrical receptacle at the sampling platform location and at the base.

3.2.1.6. Ash Management Building

The Ash Management Building will be approximately 45,000 sf. Space will be provided for metals separation equipment and recovered metals and ash storage. The Building will have five days storage of ferrous and non-ferrous metals and four days storage of ash.

The building will have a minimum finished floor elevation of 24 feet NGVD. Doors will be provided at both ends of the building to allow drive thru truck access.

3.2.1.7. Ash Conveyor Enclosure

The ash conveyor enclosure will extend from the Boiler Building to the Ash Management Building. The enclosure will shelter the ash conveying system from the weather. Provisions will be provided to collect any wash down water. Protective coatings will be applied to all interior gallery structural surfaces. The enclosure will be properly ventilated in accordance with all applicable codes, with a minimum of four air changes per hour.

3.2.1.8. Turbine-Generator (T-G) Building

The size of the T-G Building will be based upon manufacturer requirements for a T-G unit that can generate between 100 MW. The Turbine-Generator Building will have a minimum finished floor elevation of 24 feet NGVD. This building will house the turbine-generator set and related auxiliary equipment including a crane for servicing the unit.

3.2.1.9. Air Cooled Condenser

An Air Cooled Condenser (ACC) will be used for the Proposed Facility. The dimensions shown on the conceptual site plans are typical for an ACC to serve a 100 MW T-G in a by-pass mode.

An ACC works like the radiator on an automobile or truck. Exhaust steam from the steam turbine circulates through finned metal cooling tubes while large updraft fans force cooling air through the tube bundles. The condensate is returned to the boiler for reuse.

3.2.1.10. Switchyard and Switch Gear Room

The Switchyard and Switch Gear Room will contain the equipment that connects the facility to the electrical transmission substation. The switchyard will consist of a gravel bed surrounded by a barbed wire fence. Transformers and oil circuit breakers will be provided with concrete containment basins to contain potential oil leaks. The Proposed Facility will utilize the existing FPL Recway Substation on the Energy Park. The existing substation infrastructure will be upgraded by FPL to meet the needs of an additional 100 MW T-G unit.

3.2.1.11. Water Treatment Area

The Water Treatment Area will be designed to house the reverse osmosis (RO) System, demineralizer system, and chemical feeding equipment. The dimensions shown are based on projected water makeup and water treatment requirements.

3.2.1.12. Chemical Storage Area

The Chemical Storage Area will include lime, carbon, and urea storage tanks as well as one redundant storage tank for each. It should be noted that urea is shown for example only, as the Proposed Facility operator could utilize ammonium hydroxide.

**Table 3-1.
Mass Burn WTE Facility Chemical Storage Assumptions**

	Lime	Carbon	Urea
Usage Rate	20 lb/ton/MSW	1 lb/ton/MSW	1 gal/ton/MSW
Days of storage	7	14	7
Density (lbs/cu ft)	65	16.2	75
Diameter (ft)	20	12	12

3.2.1.13. Maintenance Building

The Maintenance Building will have a minimum finished floor elevation of 24 feet NGVD. The facility maintenance area, at a minimum, will be equipped with a shop floor, two offices, and lunchroom. The maintenance shop will be provided with electric roll-up doors sized to allow access for front-end loader maintenance.

3.2.1.14. Outage Maintenance Shop

The outage maintenance shop, if included in the final design, will be located adjacent to the T-G Building. This structure will serve as a staging area when boiler and T-G outages occur. The Proposed Facility's outage maintenance shop will have a minimum concrete slab floor with a finished elevation of 24 feet NGVD.

3.2.1.15. Administration Building

The conceptual layout, which includes an Administration Building comprising a total area of 6,400 sf on two floors. The space will have a minimum finished floor elevation of 24 feet NGVD. One floor of the building will serve as the Visitor Center and be designed to contain a conference room/training center, kitchen, restroom facilities, storage closet, and office space for the Authority. The other floor will serve as the operator's administration area. Both stair and elevator access will be provided to the second floor space.

The Administrative Offices and Visitor Center will be designed to be certified Platinum in according with the US Green Building Council LEED rating system.

3.2.1.16. Warehouse and Storage Area

The Warehouse and Storage Area will contain an onsite inventory of spare parts for the Proposed Facility. The conceptual layout provides a minimum 150-foot long by 80 feet wide by 22 feet high building with one loading dock. The space will have a minimum finished floor elevation of 24 feet NGVD. One half of the warehouse may utilize two

stories to meet storage space requirements while the equipment storage portion of the space will be full-height. The building will have a monorail and electric hoist that can access all levels.

3.2.1.17. Fire Pump House and Fire Water Storage

The Fire Pump House will be located adjacent to a Fire Water Storage tank that will have an estimated capacity of 500,000 gallons and measure 60-foot diameter by 25 feet high.

3.2.1.18. Wastewater Tank

There will be a wastewater tank sized to provide the projected process wastewater storage requirements of approximately 200,000 gallons. Cooling tower blowdown water from the Existing Facility along with boiler makeup system wastewater and boiler blowdown from the Proposed Facility will be stored in this tank. Water will be used for scrubber water, ash quench and waste down as more fully described in Section 3.5.4.

3.2.1.19. Settling Basin

The settling basin is sized to provide the projected wastewater drainage storage and sedimentation requirements.

3.2.1.20. Fueling Station

Adjacent to the maintenance building will be an outdoor fueling station for Proposed Facility rolling stock. The fueling station will include an above ground storage tank that conforms to Chapter 62-762, F.A.C. The fueling station will consist of two fuel-pumping units. The fuel tank will meet the weekly requirements for both off- and on-road vehicles, with a minimum of 10,000 gallons of storage capacity.

3.2.1.21. Recycle and Reuse Water Storage Tank

A two million gallon tank will be constructed to store rainwater harvested from the roof drains of the Proposed Facility and a portion of the tipping building of the Existing Facility along with other process water sources from the Existing Facility. Water will be used for boiler water makeup and other process water uses as more fully described in Section 3.5.4.

3.3. Fuel

Only MSW will be used as fuel at the Proposed Facility except during start-up, shut down and upset conditions. The Proposed Facility, as with the Existing Facility, will obtain its fuel from the Authority. The Proposed Facility will not use hazardous or biomedical waste or sewage sludge as a fuel source. Natural Gas will be used as needed during start-up, shut down and upset conditions.

3.3.1. Fuel Supply

The only fuels burned in the Proposed Facility's municipal waste combustion units will be MSW and natural gas (auxiliary fuel). Other wastes will not be burned without prior approval from the FDEP. A detailed description of the proposed fuel supply is provided in Volume II Appendix 10.3.1.

Most waste will be delivered in standard municipal-type packer vehicles, open-bodied roll-off waste dump trucks, and transfer trailers. The Proposed Facility will receive solid waste deliveries six days per week, 52 weeks per year.

Design specifications for the Proposed Facility are based on an as-fired MSW with a higher heat value of 5,000 Btu per pound and 21 percent moisture content by weight. Natural gas is available from a pipeline adjacent to the Project Site in the Jog Road rights-of-way.

3.3.2. Fuel Storage

The Proposed Facility will have a totally enclosed tipping floor approximately 360 feet wide with a minimum of twelve (12) tipping bays. The Tipping Building will be equipped with both fast closing fabric and metal doors to control the escape of odors or dust. Wheel-stops will be provided at each tipping bay to prevent vehicles from backing into the solid waste storage pit. Solid waste will be stored in a completely enclosed pit with a bottom elevation 35 feet below that of the tipping floor. The pit will be sized for a minimum storage capacity of 46,700 cubic yards level to the tipping floor and with the ability to stack additional waste to the top of the pit parapet walls. This will provide at least six days storage at the Proposed Facility's capacity of 3,000 tpd. Any free liquid in the storage pit normally will be absorbed by the solid waste and processed through the combustion units. The floor of the refuse storage pit will be a minimum of 19 feet NGVD and sloped to a sump at a minimum 1.0 percent grade at the perimeter of the pit to a sump which will permit pumping of accumulated liquids with portable pumps if liquid accumulated after a pit fire or similar event. No drains or other drainage provisions will be included at the bottom of the pit. The exterior walls of the pit will have a water proof coating where exposed to soil. Where not exposed to soil, such as in the Boiler Building, the exterior pit walls will have a water proof coating a minimum of 10 feet above floor elevation.

The refuse pit will be sized to ensure adequate on-site storage for refuse over long weekends. The refuse pit capacity also will be used to store incoming refuse when the Proposed Facility or the Existing Facility is down for scheduled or unscheduled maintenance. In this manner, the need to bypass waste directly to the Landfill will be minimized. It is anticipated that in the event all three units are out of operation, the refuse pit will provide a minimum of approximately six days of storage capacity before waste must be directed to the Landfill.

3.4. Air Emissions and Controls

3.4.1. Air Emission Types and Sources

The Proposed Facility will feature three MWC units to process a total MSW throughput capacity of 3,000 tpd. Three identical 1,000 tpd mass-burn MWCs are planned for installation at the Proposed Facility. Emissions from the MWCs will be minimized through a combination of good combustion practices and air pollution control systems. The MWC units will exhaust through identical individual flues located in a common outer concrete stack.

In addition to the MWC units, supporting equipment will be installed at the Proposed Facility. This ancillary equipment will include an air-cooled condenser (dry cooling tower), lime and carbon storage silos, two diesel fire pumps and an emergency generator. Since dry cooling will be provided in the air-cooled condenser, this equipment will not generate air pollutant emissions associated with the steam plume from typical water-based cooling towers. The lime and carbon storage silos will serve to store reagent for the air pollution control systems. Low levels of particulate matter emissions may occur during the intermittent filling of these storage silos. Each silo will be equipped with a fabric filter dust collector to control particulate matter emissions. The diesel fire pumps and emergency generator will also be sources of air emissions. Emissions from these standby units will be minimal since they will be operated on a limited basis for periodic readiness testing and during emergency situations. They will comply with federal emission standards for compression ignition internal combustion engines.

Additional descriptions of the emission units, estimated emission rates, and a completed FDEP air construction permit application form are provided in the PSD Application located in Volume III of this Application.

3.4.2. Air Emission Controls

The air pollution control systems planned for the Proposed Facility are considered state-of-the-art and have been proven to be effective in reducing air pollutant emissions from MWCs and achieving compliance with applicable requirements at WTE facilities located throughout the United States. NO_x emissions will be controlled by selective non-catalytic reduction (SNCR). Emissions of acid gases, including SO₂ and hydrogen chloride (HCl), will be reduced by a spray dryer absorber (SDA) in combination with a fabric filter (FF) baghouse. Additionally, metals and other PM emissions will be controlled by the FF device. An activated carbon injection (ACI) system will be operated for control of mercury emissions. Good combustion practices (GCP) will be utilized to minimize products resulting from incomplete combustion such as CO, volatile organic compounds (VOCs) and trace organic compounds.

Emissions from the ancillary equipment planned for installation at the Proposed Facility will also be minimized. Fabric filters will be used for control of PM emissions from the lime and carbon storage silos. The diesel fire pumps and emergency generator will comply with applicable emission standards for compression ignition internal combustion engines and emissions will be minimized through the use of ultra low sulfur diesel fuel.

3.4.3. Best Available Control Technology

For the affected emission units, a Best Available Control Technology (BACT) analysis was performed with respect to each pollutant subject to PSD review. Each BACT analysis was performed in accordance with the “top-down” approach recommended by USEPA as presented in Volume III of this Application. A summary of the proposed emission limits and control technologies for the MWC units to be installed at the Proposed Facility is provided in Table 3-2.

**Table 3-2.
MWC Emission Limits and BACT Summary**

Pollutant	Emission Limit (at 7% oxygen, dry basis)	Control Technology	Basis
Nitrogen Oxides (NO _x)	100 ppm _v (24-hr); 85 ppm _v (12-month)	Selective Non-Catalytic Reduction	BACT
Sulfur Dioxide (SO ₂)	24 ppm _v (24-hr) or 80% reduction	Spray Dryer Absorber (with Fabric Filter)	
Hydrogen Chloride (HCl)	20 ppm _v or 95% reduction		
Fluorides (as HF)	3.5 ppm _v		
Sulfuric Acid Mist (SAM)	5 ppm _v		
Particulate Matter (PM)	12 mg/dscm	Fabric Filter	
Particulate Matter (PM ₁₀ ,PM _{2.5})	12 mg/dscm		
Lead (Pb)	140 µg/dscm		BACT, NSPS
Cadmium (Cd)	10 µg/dscm		NSPS
Carbon Monoxide (CO)	100 ppmv (4-hr); 80 ppmv (30-day)	Good Combustion Practices	BACT, NSPS
Volatile Organic Compounds (VOCs as propane)	7 ppm _v		BACT
MWC Organics (as Dioxins/Furans)	13 ng/dscm		BACT, NSPS
Mercury ⁽¹⁾	25 µg/dscm or 85% reduction (quarterly test); 15 µg/dscm (12-month)	Activated Carbon Injection (with Fabric Filter)	BACT ⁽¹⁾

⁽¹⁾ Although mercury is not a regulated pollutant under the PSD program, a BACT analysis was performed for mercury in recognition of the importance of minimizing mercury emissions.

BACT analyses were also performed for the affected ancillary equipment; see Table 3-3 BACT Summary for Ancillary Equipment. Fabric filter dust collection systems were selected as BACT to control PM emissions from the storage silos. For the diesel fire pump engines and the emergency generator, BACT was concluded to be good combustion practices and engine design and the use of ultra low sulfur diesel fuel to meet applicable USEPA emission standards for compression ignition stationary internal combustion engines.

**Table 3-3.
BACT Summary for Ancillary Equipment**

Ancillary Equipment	Pollutant(s)	Proposed Control Technology
Storage Silos	PM	Fabric Filter
Diesel Fire Pumps	NO _x , PM, SO ₂ , CO, VOC	Good Combustion Practices & Design and Use of Ultra Low Sulfur Fuel
Emergency Generator	NO _x , PM, SO ₂ , CO, VOC	Good Combustion Practices & Design and Use of Ultra Low Sulfur Fuel

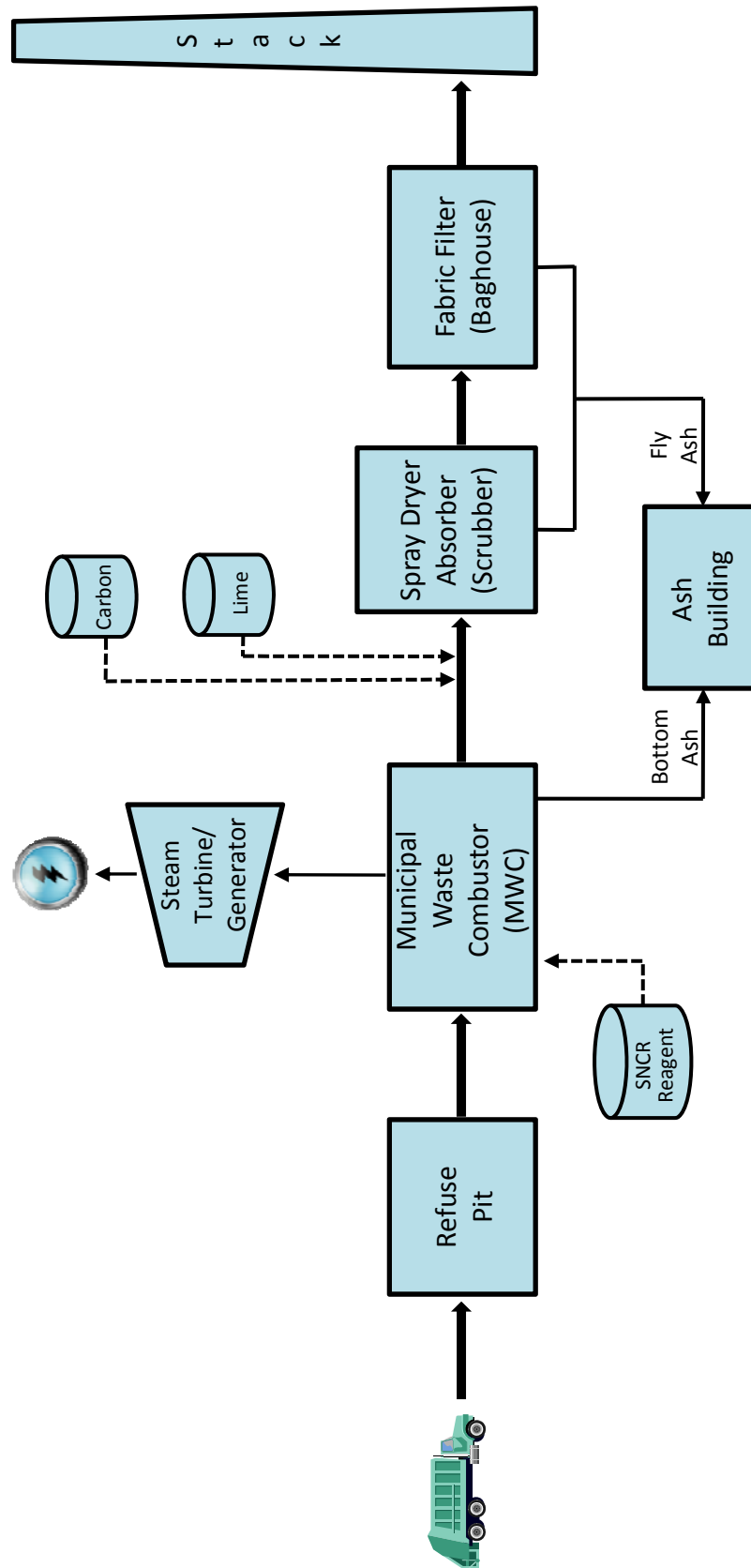
3.4.4. Design Data for Control Equipment

A simplified process flow diagram illustrating the proposed air pollution control equipment is presented as Figure 3-2. A single MWC and associated air pollution control equipment train is depicted in this figure. As indicated above, the Proposed Facility will include three identical 1,000 tpd MWCs and each MWC will have dedicated air pollution control systems. Final design data is currently not available for the proposed control equipment as vendor selection has not yet occurred.

3.4.5. Design Philosophy

The design philosophy for the proposed MWC air pollution control equipment to be installed at the Proposed Facility consists of the following:

- Selective non-catalytic reduction (SNCR) for control of NO_x emissions.
- A spray dryer absorber (SDA) in combination with a fabric filter for reducing emissions of acid gases, including sulfur dioxide (SO₂), hydrogen chloride (HCl), fluorides, and sulfuric acid mist (SAM).
- Control of MWC metals and particulate matter (PM, PM₁₀, PM_{2.5}) emissions by a fabric filter system.
- Adherence to good combustion practices (GCP) to minimize products resulting from incomplete combustion including carbon monoxide (CO), volatile organic compounds (VOCs) and MWC organics (dioxins/furans).



Note: multiple, identical MWC units and associated air pollution control systems will be installed with individual exhaust flues co-located in a common stack.

- An activated carbon injection (ACI) system with fabric filter for reducing mercury emissions.

These air pollution control systems will be designed to meet stringent emission limits and achieve compliance with applicable air quality regulations and BACT requirements.

3.5. Plant Water Use

One goal of the Authority in planning for the Proposed Facility was to minimize the use of potable and industrial process water. Realization of this goal will allow the Proposed Facility to both conserve water resources and to reduce the need for disposal of wastewater. As discussed in section 3.2.1.9, the Proposed Facility will be utilizing an Air Cooled Condenser (ACC) significantly reducing the need for water resources traditionally associated with the generation of electricity. Figure 3-3 provides a Site Water Budget and Area Users conceptual water balance. The Proposed Facility will operate as a base load plant so the average and peak water use of the plant are approximately the same. The water balance diagram provides estimated quantities of water flow for the plant potable water, process water, and wastewater systems.

The Proposed Facility will utilize wastewater from the Existing Facility and a rainwater harvest system for most process water uses to offset the need for new water resources. As indicated in Figure 3-3, potable water resources will serve only as a backup source of supply except for sanitary purposes. Potable water will be used in employee washrooms, locker rooms and break rooms. Sanitary wastewater will be discharged to the sanitary system of the City of West Palm Beach. It is anticipated that the only need for process wastewater disposal by deep well injection will come from wash down through a system of area drains except during up set conditions.

3.5.1. Heat Dissipation System

3.5.1.1. System Design

The Proposed Facility will be utilizing an ACC, therefore, eliminating the need for a water-based heat dissipation system.

3.5.1.2. Source of Cooling Water

Not Applicable.

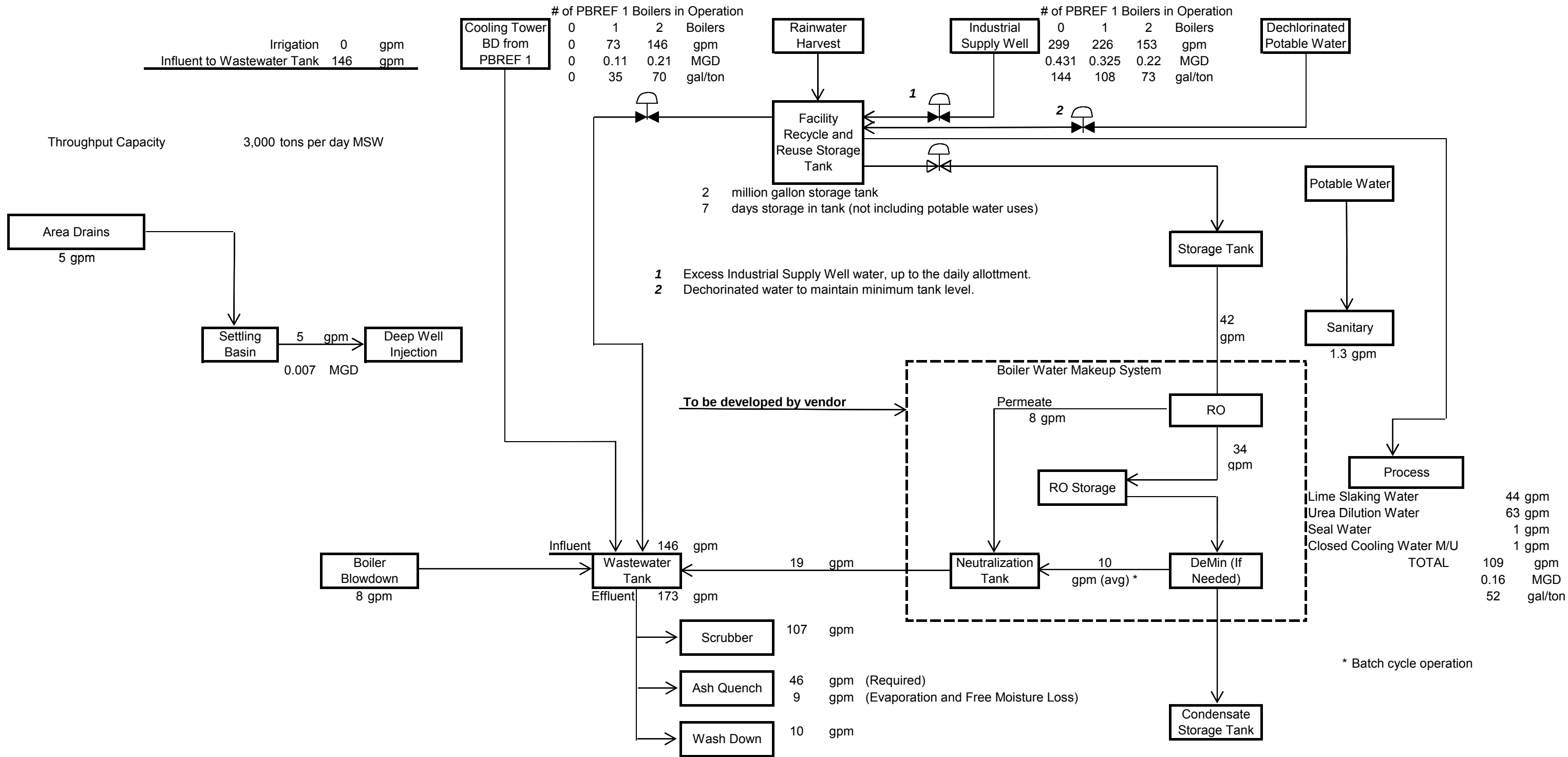
3.5.1.3. Dilution System

Not Applicable.

3.5.1.4. Blowdown

Not Applicable.

Figure 3-3
Solid Waste Authority of Palm Beach County
Site Water Budget and Area Users
(Conceptual Water Balance)



Notes:

(a) Industrial supply well water with two (2) PBREF boilers in operation (153 gpm) is assumed on an average of 220,000 gallons per day available, based on the maximization of withdrawal from the wells for consumption up to 1.65 MGD.

(b) If there is no water available from the industrial supply wells for any reason (i.e., no increase in consumption from injection well allowed; pumps down; etc.) and if there was no water in the storage tanks and no stormwater available; then the dechlorinated potable water and/or potable water sources need to provide the water.

(c) Cooling Tower Blowdown (BD) Water is from the existing Palm Beach Renewable Energy Facility (PBREF) No. 1 operated by PBRRC. The dechlorinated potable water is from SWA Utilities. The Rainwater Harvest is from the building roof areas on Figure 3-A. The 2M Gallon Storage Tank is to be provided by the New WTE Facility Contractor.

(d) This Conceptual Water Balance is based on a 3,000 tpd mass-burn renewable energy facility that uses an air-cooled condenser and the cooling tower blowdown from PBREF No. 1.

3.5.1.5. Injection Wells

The Energy Park's existing on-site injection wells will be used for disposal of non-sanitary process wastewater from the Proposed Facility. Figure 3-4 provides the estimated water flow of 7,200 GPD to the injection wells. Additional process wastewater will only be sent to the deep wells during up set conditions when the reuse storage tank is at capacity.

The injection wells that serve the Existing Facility were installed during the initial construction under the Energy Park's Conditions of Certification. These wells have operated for more than 20 years with no evidence of negative impact to the groundwater. These wells now operate below their permitted capacity and can serve the Proposed Facility's minimal disposal requirements within the current permitted capacity. Further, additional capacity will be made available since much of the existing cooling tower blowdown flow from the Existing Facility will be reused at the Proposed Facility. Information on the injection wells contained in the original application for and a copy of the current Class I Industrial Injection Well Permit, Permit No. 78189-003-UO, is provided in Volume II, Appendix 10.9.7.

3.5.2. Domestic/Sanitary Wastewater

Sanitary wastewater will be generated within the Proposed Facility in the personnel service areas, (i.e. washrooms, locker rooms, break rooms etc.). The personnel service areas will tie into the sanitary system of the City of West Palm Beach.

The Proposed Facility will employ about 75 people during the course of normal operation. From time to time, contractors and other specialty maintenance and testing staff will be retained for work in on a task specific basis. Visitors are also expected at the plant. Sanitary wastewater systems will be built to handle the resulting additional wastewater. Sanitary wastewater produced by personnel within the facility is estimated at less than 2,000 gallons per day.

3.5.3. Potable Water Systems

Potable water will be required by the Proposed Facility to provide for sanitary water uses, fire protection and backup process water supply when there is an insufficient quantity of reuse cooling tower blowdown from the Existing Facility, harvested rainwater and industrial supply well water. The current potable water supply system to the Authority is sized sufficiently to meet the needs of the Proposed Facility without any requirements for additional taps from the City of West Palm Beach system, except for sanitary uses and fire protection. Sanitary water usage is estimated at 1.3 gpm or 1,872 gpd. Disposal will be through the City of West Palm Beach.

3.5.4. Process Water Systems

3.5.4.1. Process Water Requirements

Process water will be required to operate many of the Proposed Facility's systems, including the boilers and APC systems. Estimated process water requirements for the Proposed Facility of approximately 450,000 gallons per day are provided in Figure 3-3, Site Water Budget and Area Uses, and are summarized below in Table 3-4, Process Water Requirements.

**Table 3-4.
Process Water Requirements**

Equipment/Systems	Process Water Quantity Estimates	
	(gpm)	(gpd)
Boiler Makeup Water	42	60,480
Lime Slaking Water	44	63,360
Urea or Ammonia Dilution Water	63	90,720
Seal water	1	1,440
Closed Cooling Water	1	1,440
Scrubber	107	154,080
Ash Quench	46	66,240
Wash Down	10	14,400
Total	314	452,160

3.5.4.2. Process Water Sources

There will be no increase needed in the Energy Park's allowed surficial aquifer withdrawal or potable water supply from the City of West Palm Beach to accommodate the Proposed Facility during normal operations. This will be possible because the Proposed Facility will use an ACC in place of a water based cooling system and because the Proposed Facility will satisfy its process water needs through 1) harvesting of rain water from the roofs of new and existing buildings; 2) reuse of wastewater from the Existing Facility which is currently being disposed of through injection wells; and 3) using well water authorized by the existing surficial aquifer withdrawal limit. The Authority's currently has authorization to withdraw 1.625 mgd from thirteen (13) surficial aquifer industrial supply wells on the east side of the Landfill, west of the Florida Turnpike.

Sources of the Proposed Facility process water are shown above on Table 3-4, Site Water Budget and Area Uses and summarized below in Table 3-5, Process Water Sources and Uses. Since the Proposed Facility will be using harvested rain water and sharing water resources with other facilities at the Energy Park, including the Existing Facility, the source of Process Water will vary over time based on the amount of rain fall and operating status of the Existing Facility.

A two million gallon tank will be used to store make-up process water collected with the rainwater harvesting system and existing industrial supply wells. Water from the Energy Park's existing dechlorinated potable water plant, which is supplied potable water from the City of West Palm Beach, will be used only to maintain minimum tank level. This tank is identified on Figures 3-1A and 3-1B as "Facility Recycle and Reuse Storage Tank" with a Legend ID of "f". Water from this tank will be used for boiler makeup, lime slaking, urea or ammonia dilution, seal water, and closed cooling system water in the quantities listed in Table 3-4, Process Water Requirements.

Cooling tower blow down from the Existing Facility will be stored in a separate wastewater tank. This tank will also be supplied with wastewater from the Proposed Facility boiler water makeup system as well as boiler blowdown from its three boilers. Water from this tank will be used in the SDAs (Scrubbers) as well as for the ash quenching and facility wash down.

**Table 3-5.
Process Water Sources and Uses (Gallons per Minute – gpm)**

Water Source	Rain-water	Industrial Supply Wells			Existing Facility Cooling Tower Blowdown			Proposed Facility		Process Water Uses
Operating Status	Rain-ing	Existing Facility Boilers in Operation			Existing Facility Boilers in Operation			Boiler Blow-down	Boiler Makeup Waste-water	
		0	1	2	0	1	2			
Recycle & Reuse Tank	3,016 ¹	299	226	153						Lime Slaking Urea Dilution Seal Water Closed Cooling
Wastewater Tank					0	73	146	8	19	Scrubber Ash Quench Wash down

¹ Rainwater quantity is based upon harvesting of rain at a rate of half an inch per hour.

3.5.4.3. Process Wastewater Disposal

Almost all of the process wastewater will be reused. Wash down water and other water collected in area drains will go to a settling basin and then will be disposed of through existing Authority injection wells as shown on Figure 3-3, Site Water Budget and Area

Uses. It is estimated that this will be 5 gpm or 7,200 gpd of wastewater requiring disposal. No treatment of this wastewater is planned prior to disposal. All process wastewater will meet quality standards specified in the injection well permit. A copy of the injection well permit is included in Volume II, Appendix 10.9.7.

3.5.4.4. Boiler Makeup Water Treatment

The boiler makeup water treatment systems will be designed to meet the boiler and turbine manufacturer's requirements. This will include a Reverse Osmosis (RO) system. It may also, if required, include a demineralizer. A condensate storage tank, with a capacity of two boilers, will hold the boiler makeup water from the RO/demineralizer system. Permeate from the RO system will go to a neutralization tank, if required, and then to the wastewater tank where it will be stored for reuse.

3.5.4.5. Boiler Water Chemical Feed System

The boiler water chemical feed system will consist of one skid-mounted chemical feed system to inject chemical solutions as specified by boiler and turbine manufacturers into the boiler water system for protection of the boiler and turbine.

The system will also include chemical solution makeup and feed tanks along with positive displacement pumps. The chemical feeders will be designed to operate unattended, with minimal operator intervention, except for periodic inspection, manual change of feed rates, replenishment of required bulk chemicals and solution makeup.

The boiler water chemical feed system will be suitable for feeding diluted chemicals on a continuous basis under flow proportioned control for oxygen scavenging, pH and hardness control.

3.5.4.6. Auxiliary Cooling Water Chemical Addition System

An auxiliary cooling water chemical addition system will be provided for periodic manual addition of chemicals to the auxiliary cooling water system if utilized in the final design of the Proposed Facility.

3.5.4.7. Sampling System

A centralized sampling station will be included in order to provide information on chemical conditions in the feed, condensate, and steam system. The system will be designed for continuous sampling from the points defined below, including automatic analysis, and sample coolers will be provided for hot streams.

Chemical conditions that are out of the acceptable range will be communicated via an annunciator in the control room. .

The sample analysis location will, at a minimum, be as follows:

- Point 1 – Condensate pump discharge. Parameters: pH, total dissolved solids, oxygen concentration.
- Point 2 – Feed pump discharge. Parameters: pH, total dissolved solids.
- Point 3 – (1 per boiler) Boiler drum steam. Parameters: silica, sodium.
- Point 4 – (1 per boiler) Blowdown. Parameters: pH, total dissolved solids, phosphate concentration.

Grab samples provisions will also be available for the auxiliary cooling water system.

3.6. Chemical and Biocide Waste

Chemicals will be added to several of the process streams. Corrosion inhibitors and oxygen scavengers will be added to the boiler make-up water. Chemicals will be used in the on-site RO system and demineralizer prior to storage. Since the Proposed Facility will be using an ACC system, it will eliminate the need for corrosion inhibitors, biocides, and chlorine that are typically added to the cooling tower make-up water. The boiler make-up water (usually 1-2% of the boiler steam flow rate) replaces water that is removed from the boiler to reduce the solids content of the boiler water. The boiler blowdown water is relatively pure and will be reused as discussed in Section 3.5.4.2. There will be no discharges from chemical processing, spent process water treatment, or waste piles as a result of plant operation that would enter the local environment.

3.7. Solid and Hazardous Waste

Non-combustible material and ash residue will be generated at the Proposed Facility. Appropriate recycling or disposal practices will be implemented to handle each of these waste streams at the Landfill or other Energy Park facility.

3.7.1. Solid Waste

All construction and demolition debris generated during construction of the Proposed Facility will either be recycled or disposed of at the Landfill. Residue from solid waste combustion consists primarily of noncombustible materials, fly ash, bottom ash, and spent lime and carbon residue by-products of the air quality control system. Conveyers will transport ash and other residue from the boilers, dry scrubbers, and bag house to the ash management building, where ferrous and non-ferrous materials will be removed for additional processing at the Energy Park or other metals processing facility prior to being recycled. The remaining material will be loaded into dump trucks and transported to Landfill.

The residue will contain no more than three percent combustible material by dry weight content after recovery of metals for recycling.

All municipal solid waste generated by personnel at the Proposed Facility will be combusted in the same manner as Authority-delivered waste. All generated ash will be disposed of in compliance with Section 62-701.300(2), F.A.C.

3.7.1.1. Ash Management Plan

Ash will fall from the end of each combustion grate unit directly into a water-filled quench tank. The quench tank will be fully enclosed to prevent ash from becoming airborne. The quenched ash will then be allowed to drain free of water while being mechanically discharged onto a conveyor system which will transport the ash to the enclosed ash management building. A back-up conveyor for ash transport to the ash management building will be provided. Mechanical transport equipment consisting of front-end loaders will be available at the Proposed Facility to transport ash in the event of a breakdown of the dual conveyor system.

Fly ash will be discharged from the bottom of the SDA's and bag houses onto conveyors. The conveyors will be fully enclosed to prevent the release of fine particulate matter. The fly ash will be conveyed to the ash management building where it will be combined with the bottom ash after removal of metals.

The ash management building will have a watertight, sealed concrete floor. Any free liquid will drain to a sump for reuse or disposal. The ash conveyors and ash management building will be covered and enclosed to prevent rain water from coming in contact with the ash or windblown emissions.

The ash will be transferred from the ash management building in covered, leak resistant vehicles for disposal at the Landfill. All loading and preparation for ash transport occurs within the fully-enclosed ash management building. Because the ash is moist, dust will not be generated during transportation and disposal. The consistency and appearance of the wetted ash material will be similar to that of wet aggregate.

As part of the ash handling system, a metal removal system will be installed to recover ferrous material and nonferrous material such as aluminum. A complete description of the Authority's materials separation and recycling program, as well as quantities and types of solid waste handled are provided as a separate attachment to this application. (Volume II, Appendix 10.3.1).

3.7.2. Hazardous Waste

No hazardous waste will be generated on-site or accepted for processing. There will be no hazardous waste disposal at the Proposed Facility. Section 5.4.2 describes the procedures that are to be followed if any apparent hazardous material or waste is delivered to the Proposed Facility.

3.8. On-Site Drainage System

3.8.1. Existing Stormwater Management System - Entire Energy Park

The stormwater management system for the Energy Park, except for the areas south of 45th Street, handles the stormwater for the Existing Facility, Landfill, vegetation processing facility, ferrous processing facility, compost facility, household hazardous waste facility, administrative offices and Jog Road is modeled and permitted as a single system. See Figure 3-4. The recovered materials processing facility (RMPF) and biosolids pelletizer facility (BPF) located south of 45th Street have their own individual systems that are independent from the rest of the Energy Park.

There are three main culvert systems that are located at the northern, central, and southern areas of the Energy Park as illustrated in Figure 3-4. These culvert systems convey stormwater in an east to west flow under Jog Road. The northern and southern box culvert systems convey stormwater from the landfill portion of the Energy Park into the on-site conservation area. The existing central culvert system consists of two box culverts and two 24-inch RCP culverts. The two box culverts convey runoff from portions of the central landfill area into the Jog Road right-of-way on the east side of Jog Road. The two 24-inch RCP culverts convey stormwater across Jog Road (east to west). Stormwater from the Jog Road west side right-of-way flows into a partially wooded dry retention area via six 30-inch RCP culverts. The dry retention area, the site of the Proposed Facility, is located north of the Existing Facility. Stormwater from the dry retention area is discharged into the conservation area via twelve 30-inch RCP culverts. Discharges from the conservation area are controlled by an outfall control structure located south of the southern box culvert system at the northwest corner of 45th Street and Jog Road. Discharged water flows to the EPB-10 canal east of the Turnpike which is part of the Northern Palm Beach Water Control District (NPBWCD) system and ultimately into the C-17 canal of the South Florida Water Management District (SFWMD). For more details on the Energy Park stormwater management system, see Volume II, Appendix 10.7.3 and 10.13.3.

3.8.2. Data Reviewed

The following documents and permits were utilized in the development of Section 3.8:

- Solid Waste Resource Recovery Facility, Application for Power Plant Site Certification, Volumes 1-4, April 1985;
- Modified Conditions of Certification (PA 84-20H), August 27, 2007;
- USACE Dredge and Fill Permit, No. 85IPB-21054, issued on October 20, 1986;
- USACE modified Permit, No. 198521054 (IP-TM), April 1999;
- Site Mitigation Plan for Site 7 approved by the FDEP on December 23, 1987 (Plan prepared by Joyce Environmental Consultants);



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**MALCOLM
PIRNIE**



Solid Waste Authority
of Palm Beach County

**EXISTING SITE
DRAINAGE**
1:24,000

MALCOLM PIRNIE, INC.

July 2010
FIGURE 3-4

- North County Regional Resource Recovery Facility, On-Site Mitigation Status Report, October 9, 1989;
- Solid Waste Authority, Site 7 Stormwater Model prepared by CDM, June 1996;
- North County Resource Recovery Facility Evaluation of the Sitewide Stormwater System, memorandum dated August 21, 2008, issued by CDM.

3.8.3. Proposed Stormwater Management System

The Proposed Facility will be constructed over the existing stormwater basin No. 2 and the central culvert system pathway, including the wooded dry retention area, six 30-inch RCP culverts and twelve 30-inch RCP culverts that serve the Existing Facility. Modifications to the existing stormwater management system (SWMS) will include replacing the existing wooded dry retention area and dry retention area with a new dry retention swale and rerouting swales and culverts to maintain drainage from Existing Facility, scale house and Jog Road. The Environmental Resource Permit application for the proposed SWMS can be found in Volume II, Appendix 10.7.3.

The SWMS for the Proposed Facility has been designed in accordance with applicable FDEP and SFWMD regulations, including Basis of Review (BOR) criteria. The proposed SWMS will include a dry retention system capable of providing the required quality treatment for direct runoff resulting from the 25-year, 72-hour storm event (design storm) from the Proposed Facility and portions of the Existing Facility that drain north into the existing dry retention area. This system will also maintain the capability to route stormwater overflow from the Jog Road drainage system (central culvert system) through the site to the conservation area on the west. In addition, the proposed SWMS will include specialized roof drainage systems, two duplex pump stations, a 2 million gallon tank and ancillary piping systems and appurtenances designed to capture and store rainwater from designated roof areas for process water uses.

3.8.3.1. Gravity Collection System

The non-roof areas will be drained by a conventional gravity system consisting of inlets, pipes, and swale areas that discharge into the new dry retention swale. All swales will be graded and sodded. All drainage structures will meet FDOT requirements. A concrete weir will provide for the overflow of water from the Jog Road drainage system into the new dry retention swale.

3.8.3.2. Stormwater Harvesting System

Roof areas designated for stormwater harvesting include the multi-purpose building(s), tipping building, refuse storage building, boiler building, air pollution control building, ash management building, and the tipping building of the Existing Facility. At a minimum, the stormwater pump stations will be designed to pump the first two inches of rainfall to the stormwater harvesting tank, at rainfall rates of up to one-half inch an hour.

Pump stations will be equipped with an overflow pipe drain to the gravity stormwater system. Each pump in the duplex stations will be sized to provide 100% of the required station capacity, and the pumps will alternate to balance wear and run time.

The stormwater harvesting tank will be a prestressed concrete ground storage tank (minimum 2.0 MG capacity), equipped with a dome roof with raised parapet walls, that routes the roof runoff into the tank. The tank will be combined use for storage of non-reclaim water sources (stormwater, industrial supply wells, and dechlorinated potable water) and will be equipped with a control system that will monitor the water level in the harvesting tank. If a low level is detected, non-reclaim water from the Authority's existing utility system facility will be added to bring the tank to a minimum level. If a high level is detected, then the stormwater pump stations will be automatically shut down. In the event the water surface elevation in the tank reaches the high water mark, the tank overflow will flow through the internal overflow pipe that will be routed to the new dry retention swale. The outlet pipe from the tank will be connected to a pump station that can route tank water to the Proposed Facility's (i) reverse osmosis water treatment system for use as boiler water makeup; (ii) use in processes such as lime slaking where high-quality water is needed; or (iii) to processes such as ash quench where low-quality water can be used. See also Figure 3-3 Site Water Budget and Area Uses.

3.8.3.3. Control Structure and Outfall

The design of the proposed SWMS will allow excess (i.e. greater than design storm) runoff entering the new dry retention area to be discharged through a control structure to the conservation area on the west at the existing outfall location, which will maintain the current discharge point, hydro period, and drainage patterns in accordance with the FDEP guidance.

3.9. Materials Handling

Heavy construction equipment, plant components and other building materials will be delivered to the Project Site by truck and rail. The Energy Park is accessible by modern roadways including Florida's Turnpike and Bee Line Highway, State Road 710. A CSX rail siding is available at the northern boundary of the Energy Park adjacent to State Road 710. Laydown areas will be available as needed adjacent to the Project Site on both the east and west sides of Jog Road. Drainage of these laydown areas will be managed consistent with requirements of the Energy Park approved stormwater management plan.

4. Effects of Site Preparation, and Plant and Associated Facilities Construction

As a preface to the discussion of the effects of site preparation and construction, the following is an overview of anticipated construction activities associated with the Proposed Facility. It is anticipated that construction of the Proposed Facility will be approximately 36 months. Additional personnel training, equipment testing and calibration will be conducted when construction is substantially complete. The entire design, construction, and start-up period will extend for approximately 54 months, from notice to proceed to full plant operation. The different construction phases will include site preparation (site clearing and preparation, and excavation), construction (foundations, building and process equipment erection, electrical and mechanical systems installation, instrumentation), and finalization (road construction and paving, final grading, painting, landscaping, and clean-up). Completion of final construction activities may extend into the start-up period.

4.1. Land Impact

4.1.1. General Construction Impacts

4.1.1.1. Staging, Material Laydown, and Work Force Parking Areas

The staging, materials laydown, storage, and work force parking areas will be on the Energy Park adjacent to the Project Site on the east and west sides of Jog Road. These areas will be prepared to minimize dust and potential run-off (e.g., silt screens, hay bales, gravel or mulch parking, etc.). Drainage of these laydown areas will be managed consistent with requirements of the Energy Park approved stormwater management plan.

4.1.1.2. General Construction Impacts

It is planned that the construction of the Proposed Facility will affect the Project Site of approximately 24 acres in size plus an additional 10 acres for staging, materials laydown and work force parking areas. This land has been previously been used previously in association with other approved improvements to the Energy Park. No new roads, rail lines or sidings or utility lines will be required. Construction debris and other solid wastes will either be recycled or disposed of at other Energy Park facilities. Chemical waste, if any, will be appropriately handled and disposed of off-site at permitted facilities. The disturbances to the existing terrain will be the addition of fill for ramps, roadways and building pads and the construction of the Proposed Facility buildings.

These terrain altering activities are typical for a construction project of this nature and are unavoidable. No explosives will be utilized during any phase of this project.

4.1.2. Roads

There will be no new public roads needed or constructed as a part of the development of the Proposed Facility. Interior roadways at the Proposed Facility will be private roadways that do not handle public traffic. These roadways will consist of two lanes, each twelve feet wide, with eight-foot wide shoulders on each side of the roadway. All roadways and ramps will be designed and built to applicable FDOT standards.

4.1.2.1. Work Force

The total construction work force for the Proposed Facility is expected to average 325 persons for the 36 months of the construction period. The minimum anticipated work force of 50 personnel will be in place during the closeout phase of construction. Peak work force levels are expected to be 850 to 950 during critical stages of construction. It is estimated that up to 2,500 individual construction trades workers will be employed during the construction period. The estimated work force throughout the duration of the Proposed Facility construction is indicated on Figure 4-1.

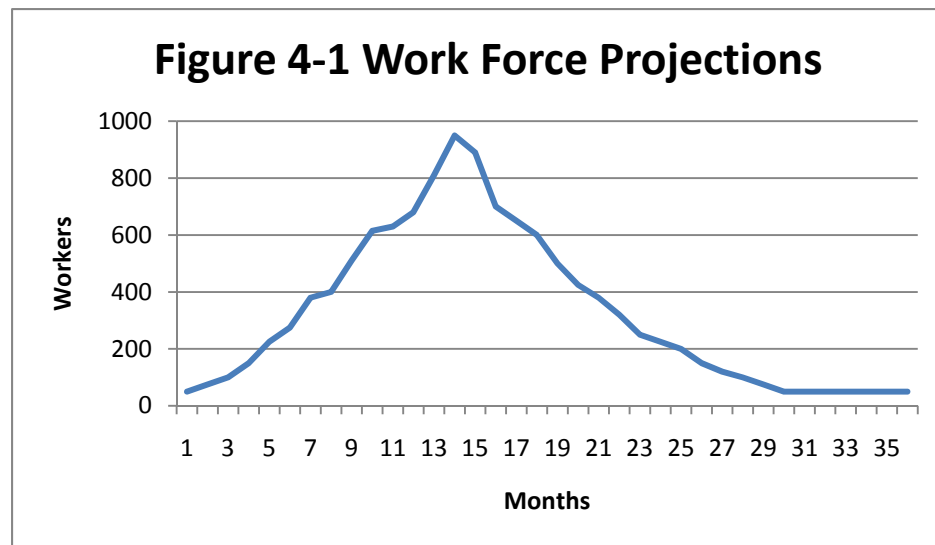


Table 4-1 provides an estimation of the anticipated average daily number of construction workers, facility employees, and their required one way trips associated with the construction of the Proposed Facility.

**Table 4-1.
Daily Totals**

Type of Worker	Number of Trips per Worker/Daily	Total Trips
Construction Worker Average daily amount (325)	2	650
Facility Employee (75)	2	150
Totals	2	800

4.1.2.2. Workshifts

The majority of activities required for the construction of the Proposed Facility will likely be scheduled for two 10 hour shifts, six days a week. Continuous placement of concrete may be required on a 24-hour basis for short periods based on final design and the method of construction being utilized.

4.1.2.3. Traffic Associated with Construction

The traffic impact of construction is associated with the number of vehicles that will enter and exit the Project Site per day over the duration of construction. The four general categories of traffic that will enter and exit the Project Site include vehicles associated with the general work force, delivery of construction equipment, construction materials, and equipment for installation. The traffic anticipated on the peak days during construction is not anticipated to exceed 2,000 trips per day. This temporary increase will result in a less than significant traffic impact.

4.1.3 Flood Zones

The Project Site does not lie within the 100-year flood zone, as determined by the Federal Emergency Management Agency (FEMA) and indicated on the Federal Insurance Rate Map prepared by FEMA and shown in Figure 2-3. The Project Site lies within FEMA “Zone B”, which typically is comprised of areas that are between the limits of the 100-year flood and the 500-year flood. Palm Beach County also determined the Project Site does not lie within the 100-year flood plain, as indicated in the Palm Beach County Flood Map as illustrated in Figure 2-3.

4.1.4 Topography and Soils

As construction progresses, a portion of the Project Site will be covered with impervious surfaces such as fill, roadways and pavement, foundations, and buildings. When construction is complete, the Project Site will have approximately 16-acres of impervious surface. The stormwater retention ponds, swales, and buffer areas will make up approximately two acres, 10% of the Project Site.

The contractor will be required to use the following measures to control soil erosion and air pollutants during construction:

- On-site traffic will be limited to the main access road and/or feeder roads as much as possible;
- Water truck will be utilized regularly to keep dust to a minimum;
- Use of siltation barriers (i.e., hay bales, sedimentation fencing earth berms) will be employed during any filling activities and around parking and lay-down areas; and
- Designated lay-down area and construction worker parking areas will be used.

The existing Project Site buffer zone will be maintained along the border to minimize visual impacts during construction.

4.2 Impact on Surface Water Bodies and Uses

4.2.1 Impact Assessment

With the exception of the filling of the South Borrow Lake, which will be completed prior to construction of the Proposed Facility in compliance with the Initial Proffered Permit (Joint ERP Dredge and Fill Permit, see Volume II, Appendix 10.9.17), there will be no impacts to surface water bodies and uses. There are no proposed intake or discharge structures for cooling or other process water, therefore an NPDES discharge permit is not anticipated to be required for the Proposed Facility. A Notice of Intent to Use Multi-Sector Generic Permit For Stormwater Discharge Associate With Industrial Activity, DEP Form 62-621.300(5)(b), will be filed prior to the beginning of onsite construction. It is anticipated that minimal dewatering, if any, will be needed for the construction of the Proposed Facility. However, if dewatering becomes necessary during construction, the required approvals and permits will be obtained prior to implementing of any dewatering activities as required by Conditions of Certification PA84-12, Section XIII.A.13.

Certain Project Site preparation and construction activities may result in temporary impacts. For example, if dewatering of the uppermost aquifer becomes necessary, water from the dewatering effort will be discharged to a temporary retention basin created specifically for the temporary dewatering. Surface water may be discharged from the stormwater retention and/or detention pond(s) and the temporary dewatering retention pond, to on-site wetlands or drainage ditches after the suspended solids have settled from the dewatering discharge.

Specific techniques will be implemented to prevent erosion of cover material and siltation of drainage ditches and other surface water management facilities. Temporary measures will be used for completed areas to control erosion and for limiting siltation from un-

vegetated areas. These measures include placement of hay bales in major ditches and periodic maintenance of the drainage system according to applicable standards established by the USDA Soil Conservation Service.

4.2.2 Measuring and Monitoring Program

During the Proposed Facility construction activities that involve dewatering, if needed, surface water may be released from the existing retention and/or detention pond(s) to the on-site wetlands or existing drainage ditches. If applicable, periodic water quality sampling will be conducted at the discharge points from the retention and/or detention basins. The parameters for analysis will include field pH, field specific conductivity, metals, total dissolved solids, and suspended solids. Stormwater runoff from the construction areas will not directly discharge to wetlands within the Project Site.

Stormwater runoff from the Project Site will be directed to a temporary detention basin. This will allow for siltation and filtration of stormwater before it reaches the retention swale. The discharge structure from the retention swale includes a baffle to provide additional protection against the discharge of floatables and sediments. The time of year when construction activities occur will affect the measuring and monitoring programs since Palm Beach County experiences a rainy season during the spring and summer months.

4.3 Groundwater Impacts

Construction of the Proposed Facility will have little effect on the groundwater levels and availability. Modifications to groundwater resources during site preparation are discussed below:

4.3.1 Impact Assessment

No dewatering is anticipated during construction of the Proposed Facility so minimal groundwater impacts are anticipated. However, if dewatering becomes necessary during construction, the required approvals and permits will be obtained prior to implementing of any dewatering activities as required by Conditions of Certification PA84-12, Section XIII.A.13.

4.3.2 Measuring and Monitoring Program

In the event that significant dewatering is necessary, a groundwater-monitoring program will be established to monitor water table aquifer elevations during dewatering. Temporary monitoring wells or piezometers will be installed before the initiation of dewatering to facilitate water table aquifer elevation measurements prior to, during and after dewatering activities. An existing groundwater quality monitoring program is ongoing for the Energy Park. It will be closely observed throughout Proposed Facility construction.

4.4 Ecological Impacts

4.4.1 Impact Assessment

The construction of the Proposed Facility will have a limited ecological impact on the Project Site. The Project Site is comprised of habitat that has been previously affected through the construction of the Energy Park. Therefore, species diversity and composition is not anticipated to undergo short or long term alternations. The filling of the South Borrow Lake prior to the construction of the Proposed Facility will have a minimal ecological impact and will be performed in accordance with the South Borrow Lake Filling Project or Initial Proffered Permit (Joint ERP Dredge & Fill Permit, see Volume II, Appendix 10.9.17).

The Project Site is not an area of unique habitat and, as previously stated, has been vegetationally and hydrologically altered by drainage and construction activities since the construction of the Energy Park beginning in 1986. Habitats and species diversity and composition at the Project Site are not expected to undergo any major alterations as a result of the proposed construction. The area encompassed by the Project Site (approximately 24 acres), will be significantly altered. However, this area has been previously disturbed through the original dredging of the South Borrow Lake and construction of the Existing Facility.

4.4.2 Measuring and Monitoring Program

There are no new wildlife monitoring programs proposed because impacts will be minimal during the construction phase of the Proposed Facility. Evaluation of the general ecological conditions of the Project Site will be made coincidentally with ongoing Energy Park monitoring programs.

4.5 Air Impact

4.5.1 Emission Rates

Facility construction activities may cause localized, short-term, adverse air quality impacts. Potential impacts include:

- Fugitive dust emissions from site preparation activities and temporary travel on unpaved surfaces; and
- Emissions from fuel combustion by construction equipment at the construction site.

It is anticipated that Proposed Facility construction will take at total of approximately 36 months.

Although the emissions indicated above will continue throughout all phases of construction, the greatest potential impacts from fugitive dust emissions will occur during

the site preparation phase when the largest number of acres of the Project Site will be exposed.

Internal combustion engines, primarily diesel-fuel, are associated with the dozers, backhoes, tractors, graders, trucks, concrete mixers, cranes, generators, compressors, and some smaller equipment that will be used. This equipment will emit, in decreasing order by total mass, nitrogen oxides, carbon monoxide, sulfur dioxide, hydrocarbons, and particulates. These emissions will not be significant enough to cause local exceedances of ambient air quality standards. The highest potential impact from the mobile sources will occur during the Proposed Facility site preparation phase when the amount of equipment on the Project Site is the greatest.

4.5.1.1 Mitigating Measures for Fugitive Particulate Emissions

The Project Site is located in an air quality attainment area. The fugitive particulate emissions that may occur during construction are expected to have only short term impacts that are typical of those found with other construction activities.

Good site maintenance will be practiced and contractors will be required to employ proper dust control techniques to minimize fugitive emissions. The following are typical air quality mitigation measures associated with construction activities:

- Spraying exposed soil with water to reduce fugitive particulate emissions.
- Wetting materials in trucks, or providing adequate freeboard (space from the top of the material to the top of the truck) as needed to reduce fugitive particulate emission during transportation.
- Removing mud deposited on paved, public roads to reduce particulate matter in the area.
- Requiring appropriate emission-control devices on all construction equipment powered by gasoline or diesel fuel to reduce CO and NOx emissions. Using well maintained equipment to reduce CO and NOx emissions.

4.6 Impact on Human Populations

The construction of the Proposed Facility may create both positive and negative impacts on the local and regional populations. Positive impacts will include the creation of construction jobs, the secondary influx of monies into the local economy from the construction work force, and revenues from the purchase of construction materials and services for the Proposed Facility. Negative impacts are anticipated to be minimal but could include possible short-term visual and noise impacts and traffic increases due to construction worker arrivals and deliveries of equipment and supplies.

Sensitive receptors are defined as individuals or organizations/institutions which are located close enough to the project site to have the potential to be affected by the

construction process. A comprehensive description of the land use and demographic features of the area surrounding the Project Site is presented in Section 2.2.3.

As indicated in Section 2.2, major land uses adjacent to the Project Site include wetlands, residential, light industrial and the existing Landfill across Jog Road. Only the residential areas and the City of West Palm Beach WCA are considered sensitive receptors for the purpose of this analysis.

No effects on sensitive receptors are anticipated due to Proposed Facility construction. The distance from the Proposed Facility site to the residential areas and the presence of buffer areas support this determination.

4.7 Impact on Landmarks and Sensitive Areas

There are no landmarks or sensitive areas within the limits of the Project Site. None of the areas identified in Section 2.2.5 (Regional Scenic, Cultural and Natural Landmarks) will be impacted by site preparation or facility and associated facilities construction.

4.8 Impact on Archaeological and Historic Sites

There were no archaeological or historic sites identified in the DAHRM survey of the Project Site and vicinity (Section 2.2.6 Archaeological and Historic Sites). Therefore, no impact to archaeological or historic sites will result from site preparation or construction.

In the unlikely event that a previously undocumented archaeological or historic material is found, DAHRM will be notified and necessary measures taken to assure conservation of the area until an assessment of its nature can be made.

4.9 Special Features

This section discusses the special features associated with Project Site preparation, and the Proposed Facility and associated facilities construction that may influence the environment and ecological systems of the Project Site and adjacent areas as a result of the Proposed Facility construction.

During construction associated with the Proposed Facility, solid and liquid wastes may be generated. This waste may consist of discarded packaging materials, refuse produced by construction workers, earth spoils, sanitary wastes, or used oils and other wastes associated with this type of construction activity. These materials will be disposed and/or recycled periodically using a licensed hauler to transport the materials to properly permitted disposal/recycling facilities, some of which are operated by the Authority at the Energy Park. Earth spoils will be transferred to the Authority's Landfill or other suitable disposal site. Sanitary wastes and used oils will be handled by the appropriate licensed haulers/disposers.

4.10 Benefits from Construction

Benefits from construction associated with the expansion of the Proposed Facility include:

- The employment of construction laborers throughout the course of construction, during which more than 2,000 workers will be employed.
- Additional income to the area generated by the construction work force, including retail and service orientated businesses, which will benefit from increased sales to the construction laborers.
- The sale of goods and services relating to construction operations will increase employment for construction related companies providing goods and services to the construction site.

4.11 Variances

The construction of the Proposed Facility will comply with all of the applicable nonprocedural requirements of the local, regional, and state agencies with jurisdiction over the Proposed Facility. No variances from any applicable state, regional and local standards are needed for the construction of the Proposed Facility.

5. Effects of Plant Operation

The section addresses the effects of the operation of the Proposed Facility on the environment and the Authority's procedures for monitoring any potential environmental impacts resulting from these operations. Environmental effects that are considered unavoidable and are short-term are distinguished from those that are considered unavoidable and irreversible. In addition, mitigation alternatives for each potential environmental impact are discussed.

5.1. Effects of the Operation of the Heat Dissipation System

As described in Section 3.5.1, an air cooled condenser (ACC) will be used to condense the steam at the Proposed Facility. There will be no thermal discharges to surface water bodies. Therefore, Section 316 demonstrations for thermal discharges are not applicable.

5.1.1. Temperature Effect on Receiving Body of Water

Not applicable.

5.1.2. Effects on Aquatic Life

Not applicable.

5.1.3. Biological Effects of Modified Circulation

Not applicable.

5.1.4. Effects of Offstream Cooling

Not applicable.

5.1.5. Measurement Program

Not applicable.

5.2. Effects of Chemical and Biocide Discharges

5.2.1. Industrial Wastewater Discharges

There will be no off-site industrial wastewater discharges to sanitary sewer or surface waters from the operation of the Proposed Facility. Effluents will be disposed by deep well injection. The existing injection wells have sufficient capacity to dispose of the wastewater generated by the Proposed Facility. The onsite wastewater collection and treatment system will be designed to meet the wastewater discharge quality limit for the existing injection wells in accordance with the approved permit requirements Volume II Appendix 10.9.7. In addition, the discharged wastewater will not exceed 120°F in temperature with solids no larger than 1/8 inch and will be within a pH range of 6.0 – 8.0.

The Proposed Facility will utilize wastewater treatment technologies to allow for reuse of most wastewater and to minimize the quantity of wastewater that requires ultimate disposal in the injection wells.

5.2.2. Cooling Tower Blowdown

The Proposed Facility will utilize an air cooled condenser, resulting in no cooling tower blowdown.

5.2.3 Measurement Programs

There will be periodic monitoring of the Proposed Facility's treatment operations and wastewater discharge to the injection wells, as required by the injection well permits.

5.3. Impacts on Water Supplies

5.3.1. Surface Water

There will be no adverse impacts to surface water associated with the operation of the Proposed Facility because there will be no direct withdrawal from or discharge to a surface water body.

Sanitary wastewater will be discharged into the sanitary system of the City of West Palm Beach. Process wastewater will be discharged to the Energy Park's existing injection wells. Stormwater will be managed through a new retention swale with overflow through the existing structure before discharge to the Energy Park conservation area.

5.3.2. Groundwater

There will be no adverse impacts to groundwater from the Proposed Facility's operation. All solid waste and ash will be handled and stored in enclosed buildings to prevent contact with stormwater and surface water. The storage structures for the solid waste and ash will be constructed of concrete and waterproofed to eliminate the potential for releases to groundwater or surface waters. Any moisture or liquids inherent to MSW will be absorbed by the waste materials and combusted. Typically, there will be no free leachate (accumulated liquids) in the refuse bunker. Any wash down water and free liquids in the ash handling building will be captured in floor drains and conveyed to a sump for reuse or disposal by injection well.

5.3.3. Drinking Water

Potable water service for the Proposed Facility will be supplied by using the City of West Palm Beach potable water system. There will be no impact by withdrawal or discharge to the surrounding area because potable water will be provided by the existing pipelines and infrastructure. The anticipated quantity of required potable water is only 2.5 gpm or 3,600 gpd, and thus the Proposed Facility is not a large user. Additional potable water will only

be required as a backup for process needs. Water conservation measures are more fully discussed in Section 3.5.3, Potable Water Systems.

5.3.4. Leachate and Runoff

Stormwater runoff from vegetated areas, paved surfaces, and rooftops will be collected and handled by the stormwater management system or used as process water by the Proposed Facility. All refuse or residue storage areas will be enclosed and designed so that there is no runoff from these areas. Unprocessed waste and ash residue will not come in contact with surface or ground water as described in Sections 5.3.1 and 5.3.2. The Existing Facility Oil Pollution Prevention Plan and Stormwater Pollution Prevention Plan table of contents are provided in Volume II, Appendix 10.14. These plans will be revised, as needed, to include the Proposed Facility.

The Landfill will be used to dispose of the noncombustible MSW delivered to the Proposed Facility, as well as ash residue.

5.3.5. Measurement Programs

There is a current and ongoing groundwater monitoring program for the Existing Facility and Landfill. The monitoring wells used to monitor the Existing Facility will be monitored for the Proposed Facility. The Groundwater and Surface Water Monitoring Plan table of contents for the Existing Facility is provided in Volume II, Appendix 10.14.2.

5.4. Solid / Hazardous Waste Disposal Impacts

5.4.1. Solid Waste

There will be no disposal of solid waste on the site of the Proposed Facility. The Proposed Facility will combust MSW, reducing the volume of waste requiring disposal at the Landfill by approximately 90 percent. Ferrous and non-ferrous metals will be recovered from the ash residue and recycled. The Authority's recycling system is fully described in the Materials Separation Plan provided in Volume II, Appendix 10.3.

5.4.2. Hazardous Waste

Hazardous waste will not be disposed of at the Proposed Facility. The Proposed Facility will accept only MSW, which includes non-hazardous residential, commercial, and industrial wastes. Public and private users of the Proposed Facility will be informed of these limitations because signs are posted at the scale house to indicate the types of wastes that are accepted at the Proposed Facility. A radioactive waste detector will also continue to be utilized at the scale house. Routine visual inspections by personnel will monitor the types of wastes received upon arrival at the gates and random inspections of waste loads will be conducted per Section 62-701.500, FAC. The crane operator will be trained to visually inspect waste in the solid waste storage pit inside the Proposed Facility. If hazardous materials are discovered to have inadvertently entered the Proposed

Facility, the materials will be isolated and temporarily stored. A licensed hazardous materials contractor will be contacted to collect and transport these materials to a proper treatment or disposal facility.

A description of the programs implemented by the Authority for the proper management of hazardous and household hazardous wastes, including devices containing mercury, is provided in the Material Separation Plan provided in Volume II, Appendix 10.3.

A chemical and toxicity analysis of the combined ash residue (including both bottom ash after recovery of recyclable metals and fly ash) will be conducted during acceptance testing. This testing will be used to verify that the ash is not a hazardous waste under state and federal regulation. Test methods used will be in conformance with Chapter 62-702, FAC, Solid Waste Combustor Ash Management. Based on the Authority's experience with ash from the Existing Facility, the ash residue is anticipated to be non-hazardous. Therefore, this waste material is expected to be suitable for disposal in the Landfill. Experience at other similar facilities has shown that the bottom and fly ash can pass the EPA toxicity test and is non-hazardous material.

5.5. Sanitary and Other Waste Discharges

Solid waste generated by the operations (employee and visitor refuse, packing material, etc.) of the Proposed Facility will be collected from receptacles located throughout the Project Site and deposited into the solid waste storage pit inside the Proposed Facility. Materials not processible by the Proposed such as oversize items will be separated for disposal at the Landfill or other appropriate facility. All sanitary wastewater will be collected and discharged to the sanitary system of the City of West Palm Beach.

5.6. Air Quality Impacts

Based upon the estimated emissions from the Proposed Facility, it is anticipated that New Source Review (NSR) requirements under the Clean Air Act Amendments (CAAA), including Prevention of Significant Deterioration (PSD) regulations, will apply. Preliminary emission estimates for the Proposed Facility are shown in Table 5-1 and compared to the PSD Significant Emission Rates/Thresholds. The preliminary emission estimates are based on the anticipated allowable concentration of each pollutant in the exhaust gas by using the concentrations allowed under the applicable regulatory requirements or recently approved air permits for MWC units¹. The estimated volume of exhaust gas was calculated based upon the conceptual design of the new MWC units.

¹ Mercury is not included in Table 5-1. Although mercury is not a federal PSD pollutant, the State of Florida had listed mercury as a PSD pollutant in the past. According to a recent ruling on Florida's PSD State Implementation Plan (SIP) by the United States Environmental Protection Agency (USEPA) (Federal Register, June 27, 2008), one condition of final approval of the SIP is that the mercury SER be removed from the Florida PSD regulations by June 2009. The estimated mercury emission rate for the Proposed Facility is 0.14 tons/year.

Under the PSD program (40 CFR 52.21(k) and Section 62-212.400, FAC), it must be demonstrated through the use of dispersion modeling that the proposed project will not cause or contribute to a violation of an national ambient air quality standard (NAAQS), or applicable PSD increment for those pollutants emitted in significant amounts. The Proposed Facility will also be subject to applicable state air quality standards and regulations.

**Table 5-1.
Preliminary Emission Rates¹**

Pollutant	Significant Emission Rate Threshold ² (tons/year)	Proposed Facility Estimated Emissions (tons/year)	Subject to PSD? (Yes/No)
Carbon Monoxide (CO)	100	435.0	Yes
Nitrogen Oxides (NOX)	40	759.4	Yes
Sulfur Dioxide (SO2)	40	298.7	Yes
Particulate Matter (PM)	25	56.1	Yes
Particulate Matter (PM10)	15	56.1	Yes
Particulate Matter (PM2.5)	10	56.1	Yes
Volatile Organic Compounds (VOCs)	40	59.8	Yes
Lead (Pb)	0.6	0.65	Yes
Fluorides	3	13.6	Yes
Hydrogen Sulfide (H2S)	10	Negligible	No
Total Reduced Sulfur	10	Negligible	No
Reduced Sulfur Compounds	10	Negligible	No
Sulfuric Acid Mist (H2SO4)	7	95.2	Yes
MWC Organics (as TCDD/TCDF)	3.5E-06	6.1E-05	Yes
MWC Metals (as PM)	15	56.1	Yes
MWC Acid Gases (as SO2 & HCl)	40	440.4	Yes

² 40 CFR 52.21(b)(23).

Class I areas are areas of special national or regional value from a scenic, recreational, or historic perspective. Sources or modifications subject to PSD review may not adversely impact a Class I area. These adverse impacts are evaluated in terms of Class I area PSD increments (air quality degradation) and air quality related values (AQRVs), which are special attributes of a particular Class I area, such as visibility, special flora and fauna, water quality, etc. If a proposed major source or major modification near a Class I area, the area's Federal Land Manager (FLM) must be notified. The FLMs have jurisdiction over the Class I areas and determine if a Class I air quality analysis is required. Based on draft screening criteria that uses the potential emissions of a facility for determining

which Class I areas of are interest, the National Park Service (NPS), the FLM for Everglades National Park, requested that a Class I analysis be performed for this area. Everglades National Park is approximately 118 kilometers from the Project Site. In addition, NPS requested that an air quality analysis also be performed for Biscayne National Park, a Class II area park under their jurisdiction.

5.6.1. Impact Assessment

As part of the regulatory permitting process for the project, air dispersion modeling was performed to demonstrate that the air quality impacts of the proposed project will comply with all applicable standards and criteria, including NAAQS, Florida Ambient Air Quality Standards (FAAQS), and PSD increments.

5.6.1.1. Modeling Methodology

The analysis was performed using the USEPA and FDEP-approved AERMOD modeling system. The AERMOD modeling system has multi-layer meteorology, includes handling of convective (unstable) conditions, terrain depiction, and refined characterization of surface conditions. The analysis used the latest version of AERMOD (currently version 07026), and followed the latest USEPA guidance for using AERMOD (USEPA, 2009a). Five years of AERMOD-ready data provided by FDEP was used for the analysis. The data from 2001 through 2005 are based on hourly surface data from Palm Beach International Airport and upper air data from Florida International University, Miami. Palm Beach International Airport, the nearest National Weather Service (NWS) station is approximately 6.9 miles southeast of the site. A five-year average wind rose (wind blowing to) is presented in Figure 2-20.

For the Class I area analysis for Everglades and Biscayne National Parks, the CALPUFF modeling system was used. Three years of meteorological data (2001 through 2003) provided by the NPS were used for the analyses for these two areas

The primary source of emissions at the Proposed Facility will be the municipal waste combustion (MWC) units. The MWC emissions will be exhausted from a tall stack, which contains identical flues (one for each identical MWC unit). Emissions from the other project-related ancillary equipment (i.e., the lime and carbon silo baghouse vents, the baghouse vent for the ash handling facility, emergency generator, and emergency fire pumps) are considered negligible.

The dispersion modeling for the PSD Class II analysis was performed in accordance with the *Guideline on Air Quality Models* (USEPA, 2008a), the *New Source Review Workshop Manual* (USEPA, 1990), and guidance provided by FDEP. The analysis was performed to determine potential ambient air quality impacts for each pollutant that has the potential to be emitted in significant amounts. Based upon a preliminary estimate of the emissions

shown in Table 5-1, modeling was performed for CO, NO₂, SO₂, lead (Pb), and particulate matter (PM₁₀ and PM_{2.5}).

A tiered receptor grid was used for the analysis in order to capture the maximum impact. A fine 100 meter (m)-spaced grid was placed out to three kilometers (km). A 500-m spaced grid was placed from 3-km to 10-km, followed by a 1,000-m spaced grid from 10 km out to 30 km. Terrain elevation at each receptor location was based on electronic terrain data from FDEP Land Boundary Information System (LABINS). The analysis also included the effects of building downwash.

The maximum annual concentration for all receptors and years of meteorological data modeled was selected for comparison to ambient air quality standards and PSD increments for long-term averaging times (annual periods). The highest value of the second-highest concentration at each receptor for each year of meteorological data modeled (i.e., “highest second high,” and abbreviated H2H) was selected for comparison to ambient air quality standards and PSD increments for short-term averaging times (24 hours or less) for all pollutants except PM10. In the case of PM10, the highest value of the sixth-highest concentration (H6H) over the five-year meteorological database was used for comparison to the 24-hour ambient air quality standard. These tables appear in the PSD Air Permit Application (Volume III).

An initial analysis was conducted to determine the operating load (s) (i.e., worst-case operating condition(s) based on MSW heating value and throughput) for the MWC units that resulted in the highest offsite impacts for each pollutant and averaging time. The operating load(s) that resulted in the highest impacts were then used to predict the maximum potential impacts in the refined analysis. The worst-case load analysis used the refined AERMOD modeling system with five years of hourly surface meteorological data (2001 to 2005) from West Palm Beach Airport and upper air data from Florida International University, which was provided by FDEP.

Refined modeling was conducted using the design and worst-case operating conditions from the load analysis to identify maximum ground-level impacts for pollutants emitted from the Proposed Facility. The refined modeling was also performed using the AERMOD modeling system and five years (2001 to 2005) of hourly surface meteorological data from West Palm Beach Airport and upper air data from Florida International University, provided by FDEP. The results of this analysis were used for a comparison of impacts from the project with applicable air quality standards and criteria. A detailed discussion of the air impacts analysis is contained in PSD Air Permit Application (Volume III).

5.6.1.2. Significant Impact Analysis

Following regulatory guidance, a preliminary analysis was performed to determine if predicted ambient air impacts from the Proposed Facility have the potential to exceed an

ambient air quality standard or increment. This is determined by comparing the modeled impacts to the significant impact levels (SILs) for each criteria pollutant subject to PSD review. The SILs are ambient concentrations set at extremely low levels such that if the maximum-modeled impacts from a proposed facility do not exceed a SIL, the emissions from the facility for that pollutant are considered not to cause or contribute to an exceedance of a standard or increment. Unless a SIL is exceeded, a full multisource analysis is not required. For conservatism, comparison to the SILs uses the maximum annual and maximum short-term impacts for all pollutants and all averaging times. As shown in Table 5-2, the maximum impacts from all applicable pollutants from the proposed facility are well below the respective SILs, indicating that the proposed project will not cause or lead to an exceedance of an ambient air quality standard or PSD increment. Therefore, cumulative modeling of the project with other nearby sources is not required.

**Table 5-2.
Class II Significant Impact Analysis**

Pollutant	Averaging Time	Significant Impact Level ($\mu\text{g}/\text{m}^3$)	Maximum Modeled Impact ($\mu\text{g}/\text{m}^3$)	Below SIL? (Yes/No)
Sulfur Dioxide (SO_2)	3-hour	25	7.2	Yes
	24-hour	5	3.6	Yes
	Annual	1	0.35	Yes
Particulate Matter < 10 μm (PM_{10})	24-hour	5	0.67	Yes
	Annual	1	0.06	Yes
Nitrogen Dioxide (NO_2)	Annual	1	0.87	Yes
Carbon Monoxide (CO)	1-hour	1200	14.8	Yes
	8-hour	800	12.0	Yes

5.6.1.3. Ambient Air Quality Standards

Both the USEPA and FDEP have ambient air quality standards (AAQS). Tables 5-3 and 5-4 present a comparison of the modeled impacts to these standards. In both tables, the modeled impacts from the Proposed Facility were added to conservative background concentrations based on monitoring data collected by the FDEP in the vicinity of the Project Site for comparison to the AAQS.

**Table 5-3.
Comparison to the Florida Ambient Air Quality Standards (FAAQS)**

Pollutant	Averaging Period	FAAQS (µg/m ³)	Predicted Facility Impact (µg/m ³)	% of FAAQS	Background Value (µg/m ³)	Total Impact (µg/m ³)	Meets Standard? (Yes/No)
SO ₂	3-hour	1,300	6.8	0.5%	10	16.8	Yes
	24-hour	260	3.1	1.2%	10	13.1	Yes
	Annual	60	0.35	0.6%	4	4.3	Yes
PM ₁₀	24-hour	150	0.45	0.3%	49	49.5	Yes
	Annual	50	0.06	0.1%	25.9	26.0	Yes
PM _{2.5}	24-hour	---	---	---	---	---	---
	Annual	---	---	---	---	---	---
NO ₂	Annual	100	0.87	0.9%	18	18.9	Yes
CO	1-hour	40,000	14.3	0.0%	3,206	3,220	Yes
	8-hour	10,000	9.2	0.1%	2,061	2,070	Yes
Lead	3-mo. rolling	---	---	---	---	---	---
	Quarterly	1.5	0.009	0.6%	0.01	0.019	Yes

Source: F. A. C. Chapter 62-204.240

**Table 5-4.
Comparison to the National Ambient Air Quality Standards (NAAQS)**

Pollutant	Averaging Period	NAAQS ($\mu\text{g}/\text{m}^3$)	Predicted Facility Impact ($\mu\text{g}/\text{m}^3$)	% of NAAQS	Background Value ($\mu\text{g}/\text{m}^3$)	Total Impact ($\mu\text{g}/\text{m}^3$)	Meets Standard?
							(Yes/No)
SO ₂	3-hour	1,300	6.8	0.5%	10	16.8	Yes
	24-hour	365	3.1	0.9%	10	13.1	Yes
	Annual	80	0.35	0.4%	4	4.3	Yes
PM ₁₀	24-hour ³	150	0.45	0.3%	49	49.5	Yes
	Annual ²	---	---	---	---	---	---
PM _{2.5}	24-hour ⁴	35	0.43	1.2%	20.9	21.3	Yes
	Annual ⁵	15	0.06	0.4%	7.29	7.4	Yes
NO ₂	Annual	100	0.87	0.9%	18	18.9	Yes
CO	1-hour	40,000	14.3	0.0%	3,206	3,220	Yes
	8-hour	10,000	9.2	0.1%	2,061	2,070	Yes
Lead	3-mo. Rolling	0.15	0.009	6.0%	0.01	0.019	Yes
	Quarterly	1.5	0.009	0.6%	0.01	0.019	Yes

Sources: F.A.C. Chapter 62-204.240 and 40 CFR Part 50.

¹ Short-term averaging period standards are not to be exceeded more than once per calendar year.

² Due to a lack of evidence linking health problems to long-term exposure to coarse particle pollution, the USEPA revoked the annual PM₁₀ standard in 2006 (effective December 17, 2006).

³ The 24-hour PM₁₀ standard is not to be exceeded more than once per year on average over 3 years.

⁴ To attain the annual PM_{2.5} standard, the 3-year average of the weighted annual mean concentrations must be less than or equal to the standard.

⁵ The Federal 24-hour PM_{2.5} standard was changed from 65 $\mu\text{g}/\text{m}^3$ to 35 $\mu\text{g}/\text{m}^3$ on December 17, 2006. The 24-hour PM_{2.5} standard is met when the 3-year average of the 98th percentile is less than or equal to the standard.

The impacts from the Proposed Facility, including the modeled background concentrations, are all well below both the Florida and National Ambient Air Quality Standards.

5.6.1.4. PSD Increments

In Table 5-5, the impacts for the Proposed Facility are compared to the PSD Class II increments. As illustrated, the maximum impacts for the Proposed Facility are all well below their respective PSD Class II increments.

**Table 5-5.
Comparison to PSD Class II Increments**

Pollutant	Averaging Period	PSD Increment ($\mu\text{g}/\text{m}^3$)	Predicted Facility Impact ($\mu\text{g}/\text{m}^3$)	% of Class II Increment
SO ₂	3-hour	512	6.8	1.3%
	24-hour	91	3.1	3.4%
	Annual	20	0.34	1.7%
NO ₂	Annual	25	0.87	3.5%
PM ₁₀	24-hour	30	0.58	1.9%
	Annual	17	0.06	0.4%

Source: 40 CFR 52.21

Notes: Long-term (annual) increments are not to be exceeded. Short-term (3-hour and 24-hour) increments are not to be exceeded more than once per year.

5.6.1.5. Impacts to Everglades and Biscayne National Parks

The Class I analysis modeled concentrations of regulated pollutants for comparison to proposed PSD Class I significant impact levels and increments, the potential lead impacts in comparison to the ambient air quality standard, the effects of the Proposed Facility's plume on visibility, and the potential for ecological impacts due to deposition at the nearest Class I area, Everglades National Park. In addition, an analysis was performed for Biscayne National Park, a national park in a Class II area along the Atlantic coast south of the Proposed Facility. The analysis for Biscayne National Park modeled concentrations of regulated pollutants for comparison to proposed PSD Class II significant impact levels and increments, the potential lead impacts in comparison to the ambient air quality standard, the effects of the Proposed Facility's plume on visibility, and the potential for ecological impacts due to deposition.

Tables 5-6 and 5-7 present comparisons to the SILs and PSD increments for Everglades and Biscayne National Parks, respectively. The maximum impacts at both national parks are well below the SILs, indicating that impacts at the parks from the Proposed Facility will not cause or contribute to an exceedance of an ambient air quality standard or PSD increment, and that a cumulative impact analysis is not required.

**Table 5-6.
Everglades National Park: Comparison to Class I SILs and PSD Increments**

Pollutant	Averaging Period	Maximum Modeled Concentration ($\mu\text{g}/\text{m}^3$)	Proposed Class I Significant Impact ($\mu\text{g}/\text{m}^3$)	Exceeds SIL? (Yes/No)	Class I Increment ($\mu\text{g}/\text{m}^3$)	% of Class I Increment Consumed
NO ₂	Annual	0.0079	0.1	No	2.5	0.3%
SO ₂	3-hour	0.191	1.0	No	25	0.8%
	24-hour	0.066	0.2	No	5	1.3%
	Annual	0.0031	0.1	No	2	0.2%
PM ₁₀	24-hour	0.013	0.3	No	10	0.1%
	Annual	0.0007	0.2	No	5	0.001%

**Table 5-7.
Biscayne National Park: Comparison to Class II SILs and PSD Increments**

Pollutant	Averaging Period	Maximum Modeled Concentration ($\mu\text{g}/\text{m}^3$)	Class II Significant Impact ($\mu\text{g}/\text{m}^3$)	Exceeds SIL? (Yes/No)	Class II Increment ($\mu\text{g}/\text{m}^3$)	% of Class II Increment Consumed
NO ₂	Annual	0.0047	0.1	No	25	0.02%
SO ₂	3-hour	0.183	1.0	No	512	0.004%
	24-hour	0.070	0.2	No	91	0.008%
	Annual	0.0024	0.1	No	20	0.0008%
PM ₁₀	24-hour	0.015	0.3	No	30	0.005%
	Annual	0.0005	0.2	No	17	0.003%

Visibility impacts are below the thresholds at both parks, as are the nitrogen and sulfate deposition impacts. Lead impacts at Everglades and Biscayne National Parks were compared to the NAAQS for lead. For conservatism, the maximum 24-hour lead impact

using CALPUFF was used for comparison to the 3-month rolling average NAAQS for lead. Table 5-8 presents this comparison for Everglades and for Biscayne National Parks.

**Table 5-8.
Everglades and Biscayne National Parks: Comparison to Lead NAAQS**

Parameter	Everglades NP	Biscayne NP
Lead (Pb) Impact ¹ (maximum 24-hr. avg.)	0.000219 µg/m ³	0.000184 µg/m ³
NAAQS (3-month rolling avg.)	0.15 µg/m ³	
Facility impact % of NAAQS	0.15%	0.12%
Background concentration ²	0.01 µg/m ³	
Total predicted impact	0.0102 µg/m ³	0.0102 µg/m ³
Below NAAQS?	Yes	Yes

Notes:

1. For conservatism, the maximum 24-hour average concentration (H1H) was used to compare with the rolling 3-month average.
2. Monitored background concentration.

The modeled results demonstrate that the conservative 24-hour impacts are well below the standard, and with the estimated lead background (from FDEP monitoring data), the total impact is also well below the standard.

5.6.1.6. Additional Impacts

5.6.1.6.1 Growth

The Proposed Facility will employ approximately 75 personnel. While there will be economic benefits associated with the operation of the project, no measurable growth in population or air quality impacts will be associated with operation of the Proposed Facility due to this growth.

5.6.1.6.2 Soils and Vegetation

The secondary national ambient air quality standards (NAAQS) were used to evaluate whether soils and vegetation will experience any adverse effects from air pollution. The secondary NAAQS were developed to prevent unacceptable effects on the public welfare, including damage to crops and vegetation. The maximum predicted impacts (including

the existing background concentration) were demonstrated to be well below the secondary NAAQS for all applicable pollutants and averaging times. Therefore, the Proposed Facility will not have an adverse impact on soil and vegetation.

5.6.2. Monitoring

A continuous emissions monitoring program will be operated for opacity, oxygen, and a number of pollutants, including sulfur dioxide (SO₂), carbon monoxide (CO), carbon dioxide (CO₂), and nitrogen oxide (NO_x) concentrations from the MWC unit exhaust stacks. The Continuous Emission Monitoring (CEM) equipment will be installed, calibrated, and maintained in accordance with applicable USEPA and FDEP regulations. Periodic compliance testing will also be conducted for pollutants with permit emission limits in accordance with applicable USEPA and FDEP regulations. A detailed operational monitoring program will be submitted to FDEP in accordance with applicable permit requirements.

5.7. Noise

All of the major equipment, with the exception of the air-cooled condenser, will be enclosed, in part to minimize potential noise emitted from the operations of the Proposed Facility. Consequently, the Proposed Facility is expected to generate sound levels less than or equal to the Existing Facility. Taking into consideration that sound levels are expressed on a logarithmic decibel scale, the combined sound level from the Existing Facility and the Proposed Facility should be no more than 3.3 dBA greater than existing conditions. Generally, a change of 3 dBA is considered barely discernable by the human ear. Given the nature of sound propagation from the Project Site, sound levels would be comparable to presently existing noise levels in the vicinity of the Proposed Facility.

Sound levels on-site and at the facility perimeter were characterized in February 2010. The sound level survey was completed to document existing conditions and provides information for testing during initial operations of the Proposed Facility. The sound survey is presented in Volume II, Appendix 10.11.2. The results indicated that existing sound levels were acceptable and in compliance with all applicable standards. Given that the assumed operational characteristics of the Proposed Facility will not perceptibly increase the sound levels, there is no predicted impact at any sensitive receptor (human or ecological.)

5.8. Changes in Non-Aquatic Species Population

5.8.1. Impacts

The construction of the Proposed Facility will occur within the existing boundaries of the Energy Park in an area that has already been heavily disturbed by prior development. It is anticipated that the Proposed Facility will have minimal, if any, effects on existing species populations and long-term species diversity.

Part of the Project Site is in an area of the South Borrow Lake that will be filled prior to construction of the Proposed Facility in compliance with a Initial Proffered Permit (Joint Dredge and Fill Permit, see Volume II, Appendix 10.9.17).

The proposed stormwater management system will include retention swales, culverts and outfall structure that will discharge into the Energy Park conservation area through the existing outfall structure. The retention swales will be designed to treat and retain runoff generated by a design storm from the Proposed Facility. Stormwater flow from east of Jog Road through the existing culvert system will be rerouted to flow around the Proposed Facility via a separate retention swale. Groundwater seepage and detention area overflow to the conservation area should not be changed significantly. Conservation area wetland hydroperiods, likewise, will not be changed significantly by development of the Proposed Facility.

5.8.2. Monitoring Program

Minimal impacts on species population are anticipated; therefore, no long-term wildlife monitoring is necessary.

5.9. Other Plant Operation Effects

The construction of the Proposed Facility is not anticipated to have any adverse traffic impacts. All of the trucks making deliveries of MSW to the Proposed Facility are currently utilizing the Energy Park Landfill. No change in traffic patterns, and no new roadways or modification to existing roadways, will be needed. The additional traffic associated with new workers or delivery of supplies or shipment of ash or metals will be negligible, less than 250 tips per day. A Traffic Concurrency letter to the PBC Traffic Division is provided in Volume II Appendix 10.11.4.

5.10. Archaeological Sites

No archaeological sites will be impacted by the operation of the Proposed Facility. The original Energy Park certification indicated there are no archaeological or historic sites in on the Energy Park including the Project Site (See Volume II, Appendix 10.8.1). As such no post construction monitoring will be required.

5.11. Resources Committed

The commitment of resources in this case is typical for major capital-intensive projects. Natural and human resources will be consumed, converted, or made unavailable for future use if the Proposed Facility is implemented.

The resources used in construction will be committed to this project. Some building materials will be irretrievably used in the construction of the Proposed Facility or irreversibly committed to the Proposed Facility. Certain lumber products and concrete

structures will be committed, as well as metal, glass, ceramics, paint, insulation, and paving materials. In addition to the materials consumed during construction, the energy and human labor expended cannot be retrieved.

Financial commitments include dedication of bond issue funds or other sources of construction funds. As with the commitment of labor and materials, the financial requirements for a major capital project are very typical.

5.12. Variances

The operation of the Proposed Facility will comply with all of the applicable nonprocedural requirements of the local, regional, and state agencies with jurisdiction over the Proposed Facility. No variances from any applicable state, regional and local standards are needed for the operation of the Proposed Facility.

6. Transmission Lines and Other Linear Facilities

6.1. Transmission Lines

6.1.1. Project Introduction

The Proposed Facility will utilize existing substations and transmission lines constructed for the Existing Facility. No new transmission lines will be required or constructed for the Proposed Facility. Consequently, no new transmission line corridor will be required for the construction of the Proposed Facility. The existing transmission line is 138 kV, and is sized to carry the ultimate combined output of both Existing Facility and the Proposed Facility continuously.

6.1.2. Corridor Location and Layout

The Proposed Facility will interconnect to the existing FPL Recway Substation on the Energy Park, and it will utilize the same transmission lines and corridor from the Recway Substation to the Riviera Beach Substation that is used by the Existing Facility. No new electrical transmission line corridor will be required for the Proposed Facility.

6.1.3. Transmission Line and Road Design Characteristics

The corridor and access roads for the power lines servicing the Existing Facility already exist. Therefore, no new access roads are required for the Proposed Facility.

6.1.4. Cost Projections

Not Applicable.

6.1.5. Corridor Selection

The existing infrastructure associated with Existing Facility can support the additional electrical capacity generated by the Proposed Facility. Therefore, it will not be necessary to select an additional corridor.

6.1.6. Social and Political Environment of the Corridor Area

Not Applicable.

6.1.7. Biological and Physical Environment of the Corridor Area

Not Applicable.

6.1.8. Effects of Right-of-Way Preparation and Transmission Line Construction

Not Applicable.

6.1.9. Post Construction Impacts and Effects of Maintenance

Current maintenance practices will continue to be employed along the existing transmission line right of way. No additional impacts are anticipated as a result of the operation of the Proposed Facility.

6.1.10. Other Post Construction Effects

As described in Sections 6.1.1 and 6.1.2 above, the Proposed Facility will use the existing substations, transmission lines and transmission line corridor as the Existing Facility. The existing transmission lines have sufficient capacity to transmit the additional electric load generated by the Proposed Facility and will not be modified. The existing transmission lines will not be reinsulated to operate at a higher nominal voltage or reconducted to operate at a higher maximum current rating. The additional load on the existing transmission line in the existing transmission line corridor is not expected to have any meaningful impacts on electromagnetic fields or other environmental conditions. The transmission line used by the Existing Facility is located in a transmission line corridor that is shared with other much larger capacity transmission lines servicing FP&L's Riviera Substation.

6.2. Associated Linear Facilities

No new linear facilities will be constructed in areas outside of the Energy Park. The infrastructure and utilities for the Existing Facility will be used to service the Proposed Facility. All necessary roads and utility facilities (e.g., potable water, sanitary sewer, natural gas, and telecommunications) already exist in the Energy Park adjacent to the Project Site for the Proposed Facility. The Proposed Facility will merely need to interconnect to these existing utilities and linear facilities. The locations of the actual interconnections will be determined when the final design is prepared for the Proposed Facility.

7. Economic and Social Effects of Plant Construction and Operation

The Authority has committed its resources to provide a system for the disposal of solid waste that is ecologically sound and will provide a number of benefits, socially, environmentally, and economically. Specifically, the Proposed Facility will:

- Recover usable materials (e.g., ferrous and non ferrous materials from the ash residue) that will reduce the amount of raw materials and energy required for production and generate revenue for the Authority;
- Generate clean, efficient, and renewable electrical energy from MSW that will be sold to offset operational costs and reduce the demand for fossil fuel energy sources;
- Drastically reduce the amount of land required for landfilling MSW, reducing the costs associated with landfilling, and increasing the operational life of the existing Authority Landfill;
- Conserve oil and gas by offsetting energy generation with MSW;
- Decrease the likelihood of compromising the quality of the groundwater by reducing the amount of waste requiring landfill disposal;
- Meet the intent of the state Legislature [Section 377.109(1) Florida Statutes] to encourage energy conservation, to dispose of solid refuse in a proper manner, and to use resource recovery facilities as an environmentally preferred alternative to conventional solid waste disposal;
- Provide an improved process for the disposal of solid waste that remains after recycling, while minimizing ecological impacts;
- Use reclaimed water for most of its operations, further reducing the ecological impact of the Proposed Facility;
- Provide a long-term economic method of solid waste disposal for those materials that remain after recycling;
- Reduce the carbon footprint of the Authority by replacing fossil fuel energy generation with renewable energy from waste and reducing greenhouse gases associated with landfilling;
- Provide thousands of construction jobs during construction and 80 permanent jobs in Palm Beach County, contributing to the local economy;
- Provide the public with an educational resource center;
- Stabilize or reduce future cost increases for the disposal of the County's solid waste; and

- Become an integral component of the Authority's total solid waste management program.

7.1. Economic and Social Benefits

The Proposed Facility will have a continuous nominal rated capacity of 3,000 tpd. Some noncombustible materials will be transported directly to the designated Authority Landfill. However, of the 3,000 tpd processed by the Facility, less than 10 percent by volume (containing less than 4.0 percent combustible debris) will require landfilling. This significant decrease in waste tonnage corresponds with a 90 percent reduction in waste volumes. A related 90 percent reduction in the annual space requirements for landfilling can be expected. The Proposed Facility will increase the landfill life span significantly.

Increasing the Landfill life span will result in the protection of the limited, valuable, and sensitive groundwater and surface water resources in the area. Another benefit is the generation of a minimum of an additional 854,100 megawatt-hours (MWh) of electricity per year or 14,892,000 MWh over the life of the Proposed Facility (i.e., based on an average 1,095,000 tons per year over a 20-year period, and 500 kWh/ton net output). This additional production corresponds to a decrease in the use of crude oil by 985,000 barrels per year or a minimum of 19.7 million barrels over the life of the Proposed Facility. At 2010 oil prices (~\$80 barrel), the decreased demand for crude oil translates into a reduction of about \$78.8 million per year in spending or \$ 1.58 billion over the 20-year life of the Proposed Facility. These figures do not include inflation, which will increase the savings further as the price of crude oil increases.

Local economic benefits from the Proposed Facility include the full-time employment of approximately 75 personnel. The annual payroll for the personnel is approximately \$4 million, which contributes over \$80 million into the local economy over a 20-year period. Retail sales from energy recovery personnel will contribute \$1 million or approximately twenty-five percent (25%) of their annual income to local establishments. An estimated additional \$2 million in personal income will be generated by local residents.

The Proposed Facility will also contribute to the local economy through routine costs associated with operating and maintaining the Proposed Facility's equipment. Approximately \$8 million per year is spent in procurement of spare parts, consumable goods, utilities, and outside service contractors in maintaining the Proposed Facility.

The increased revenue within Palm Beach County will provide for an increase in its tax base.

There are additional anticipated economic benefits related to the Proposed Facility. The local economy and labor market will benefit from the approximate \$700 million

construction project. Increased revenues from construction-related goods and services and secondary increased jobs from this spending will benefit the area. A significant amount of construction supplies, such as concrete, structural steel, glass, piping, fittings, and landscape material are anticipated to be purchased from local businesses. There will also be indirect benefits to retail and service sector establishments supplying the work force with goods and services throughout the course of the project (anticipated construction time frame of 2012-2015). It is estimated that there will be more than 1,000 workers employed throughout the construction process.

In addition to these benefits during construction, as stated earlier, long-term benefits associated with the construction of the Proposed Facility include:

- A safe method of solid waste processing and disposal;
- The reduction of landfilling requirements;
- Increased protection of groundwater supplies;
- The generation of electric power for resale;
- The recovery and sale of ferrous and non-ferrous metals which would otherwise be disposed in a landfill;
- The conservation of oil and gas, both non-renewable natural resources; and
- Increased employment associated with a permanent work force at the Proposed Facility.

Additionally, when comparing waste-to-energy to fossil fuel power plants, the EPA stated that waste-to-energy:

- Has the least environmental impact than almost any other source of electricity;
- Is recognized for having upgraded emission control systems that exceed the Clean Air Act standards;
- Is recognized as a clean, reliable, and renewable energy source;
- Is more favorable than landfills for greenhouse gas emissions;
- Produces 63% less CO₂, 94% less SO₂ and 10% less NO_x than a traditional coal fired power plant;
- Can actually improve air quality by replacing fossil fuel power plants; and
- Complements landfills by eliminating organic waste from landfill disposal, reducing methane generation and the odors associated with landfill disposal.

7.2. Economic and Social Costs

This section provides an overview of the costs related to the construction and operation of the Proposed Facility over a 20-year period.

7.2.1. Temporary External Costs

Temporary external costs associated with the Proposed Facility include:

- Temporary increase in construction traffic; and
- Some increase in noise during construction work hours.

These temporary external costs will be mitigated by the location of the Proposed Facility at the Authority's existing Energy Park.

7.2.2. Long-Term External Costs

The major economic cost for this project will be a commitment of approximately \$700 million for the design and engineering, procurement of a design-build-operator, and all construction and labor costs to construct the Proposed Facility.

The Proposed Facility will be constructed adjacent to the existing NCRRF No. 1. The operator of the Facility (to be determined) will receive an annual operating and maintenance fee from the Authority. The operation and maintenance costs will be fixed, but subject to escalation indices over the life of the agreement.

There are several land use, comprehensive plan, and zoning components that minimize the long-term land use impacts on the Proposed Facility's immediate area. For example, the Authority's solid waste Energy Park also houses a Landfill, two deep injection wells for industrial waste water, a materials recycling facility, ferrous processing facility, the existing renewable energy facility PBREF No. 1, several borrow lakes, and 500 acres that maintain a permanent green space buffer. The wetlands area located west of the Project Site and the forested area to the north of the site will buffer it from existing and potential residential development.

The Proposed Facility will become an extension of the industrial and utility uses that exist in the area, consistent with zoning and land use considerations. The existing industrial use along Jog Road is for other solid waste facilities. The existing utility uses include a landfill and transmission infrastructure supporting the existing PBREF No. 1. The Proposed Facility is compatible with these existing uses.

Economic comparisons have been made between the costs of operation of a resource recovery facility for disposal of refuse versus the continued landfilling of raw refuse. The present practice of landfilling has seen escalating costs. Projections have been made

for the costs associated with a resource recovery facility and these projections indicate that the tipping fee would stabilize and very possibly decrease over time.

Moreover, the Proposed Facility will be operable for many years after the bond issue has been retired and worth a high percentage of its initial cost, as is the case with the existing renewable energy facility and its approaching bond retirement.

Overall, with good operational and maintenance procedures and continued energy revenue, the long-term cost of the Proposed Facility is projected to be lower than the costs associated with traditional landfilling.

8. Site and Design Alternatives

The Proposed Facility project is not subject to the National Environmental Policy Act (NEPA). As such, this section is not applicable to the Authority's Application.

8.1. Alternative Sites

Not Applicable.

8.2. Proposed Site Design Alternatives

Not Applicable.

8.2.1. Cooling System (exclusive of intake and discharge)

Not Applicable.

8.2.2. Biological Fouling Control

Not Applicable.

8.2.3. Intake System

Not Applicable.

8.2.4. Discharge System

Not Applicable.

8.2.5. Chemical Waste Treatment

Not Applicable.

8.2.6. Sanitary Waste System

Not Applicable.

8.2.7. Solid Waste Disposal Systems

Not Applicable.

8.2.8. Multiple Uses

Not Applicable.

8.2.9. Other Systems

Not Applicable.

8.2.9.1. Alternative Water Sources

Not Applicable.

9. Coordination

9.1. Coordination

As previously discussed in Section I.2.5, Information Sources, several city, county, state, and federal agencies have been contacted to provide information and guidance in support of the completion of this Application. The specific agencies, individuals and subject matter are provided below:

Federal:

Agency	Individual(s)	Subject
U.S. Fish and Wildlife Service	Kristi Yanchis	Everglades Snail kite Review
US-ACE	Linda Knock	Project Introduction Meeting
US-EPA	Stanley Krivo (Region 4)	Class I and Class II Modeling
U.S. National Park Service	John Notar, Dee Morse	Class I Modeling

State:

Agency	Individual(s)	Subject
FDEP Southeast District	Joe Lurix	Surface Water Management Plan
FDEP Southeast District	Jennifer Smith, Irene Arpayoglou, Indarjit Jagarine	ERP Pre-Application Meeting and Wetland Impacts
FDEP Siting Office (Tallahassee)	Mike Halpin, Cindy Mulkey	Application Package overview
FDEP	Cleve Holladay, Deborah Nelson	Class I and Class II Modeling

Regional

Agency	Individual(s)	Subject
South Florida Water Management District	Jim Golden, Steven Memberg, Steve Bell, Jennifer Boakankowitz, Rick Nevolis	Project Introduction Meeting

Local

Agency	Individual(s)	Subject
City of West Palm Beach	Mayor Lois Frankel, Eduardo Balbis, Penni Redford, John Alfred	Project Introduction Meeting
City of West Palm Beach Planning Department	Eric Schneider	Project Introduction Meeting
Palm Beach County Health Department	James Stormer	Project Introduction Meeting
Palm Beach County Traffic Division	Dan Weisberg	Traffic Analysis

9.1.1. Distribution List

A distribution list of those who received this permit application package is provided in the cover letter to this application.