4.0 THE PLANT AND DIRECTLY ASSOCIATED FACILITIES

4.1 Background

This chapter provides a description of the Project, a layout, key components and their operation, and proposed controls for air emissions and water discharges. Fuel specifications are provided for natural gas and ULSD oil. Estimates of the expected character, quality, and quantity of discharges and emissions from the PEEC are provided.

The existing Port Everglades Plant consists of two nominal 200 MW and two nominal 400 MW fossil fuel fired steam generating units and 12 simple cycle natural gas turbines. Units 1 and 2 began operation in 1960 and 1961, respectively. The commercial in service dates for Units 3 and 4 were 1964 and 1965, respectively. All four units have remained in service since these dates. Units 1 through 4 are authorized pursuant to FDEP Final Title V Permit 0110036-009-AV to operate on natural gas, No. 6 fuel oil, No. 2 fuel oil, propane, and on specification used oil from FPL operations. Units 1 and 2 have a permitted maximum heat input of 2,300 million British thermal units per hour (MMBtu/hr) on oil and 2,400 MMBtu/hr on natural gas. Units 3 and 4 have a permitted maximum heat input of 4,000 MMBtu/hr on oil and 4,180 MMBtu/hr on natural gas. The air emissions from each unit are exhausted through four separate approximately 343 ft stacks. The 12 simple cycle natural gas turbines (GT1-GT12) have a combined nominal capacity of 500 MW with a heat input of 8,424 MMBtu/hr and are capable of firing natural gas and/or No. 2 fuel oil.

Condenser cooling for PEEC will be accomplished using the existing infrastructure of the Unit 3 and 4 once-through cooling system intake and discharge structures, which withdraw from Port Slip No. 3 and discharge through a canal connected to the ICW, currently authorized to operate under FDEP IWW Permit No. FL0001538 and Broward County Permit IW-2010-0150. Utilizing existing infrastructure (including a previously developed site, existing access roads, existing access to the FPL transmission system, and existing cooling-water intake and discharge structures) and combined cycle technology, PEEC will maximize the redevelopment of the Site while minimizing environmental, land use, and cost impacts.

The PEEC Project consists of modernization of the existing Units 1 through 4, the 1960s vintage heavy oil and natural gas-fired fossil steam boilers, steam turbine/electric generators, and selected appurtenances. After dismantlement of these existing units, FPL will construct a nominal 1,250 MW (net) "3-on-1" combined cycle unit. The "3-on-1" unit will consist of three nominal 250 MW advanced CTs and three HRSGs, which will utilize the waste heat from the CTs to produce steam to be utilized in a single nominal 500 MW steam turbine generator.

The Mitsubishi Power Systems (MPS) "J" CTs or equivalent, and the Siemens Power Generation, Inc. "H" CTs or equivalents were used to evaluate the environmental impacts of the Project. The MPS "J" CT has a gross capacity of approximately 290 MW at an inlet temperature of 75°F and the Siemens "H" CT has a gross capacity of approximately 260 MW at an inlet temperature of 75°F. The HRSGs associated with either the MPS "J" CT or Siemens "H" CT for the Project will not have duct firing.

The MPS "J" CTs and the Siemens "H" CTs were used to evaluate the air emissions and impacts of the Project. The CT vendor has not yet been selected but will be based on competitive bidding. However, FPL desires to obtain guarantees of CT performance that will achieve the gross generation of the MPS J CT while achieving emissions within the range of the emissions provided for the MPS J and Siemens H CTs. FPL has requested in the air permit application permitted capacity and emission limits that encompass the CTs being considered.

Each CT will utilize inlet air cooling that may consist of evaporative cooling or an alternate system. Evaporative cooling systems achieve adiabatic cooling using water evaporated from a treated media. The evaporated water extracts the latent heat of vaporization from the inlet air stream when the water droplet is converted to water vapor. The result is a cooler, denser air stream. This allows additional power to be produced.

The CTs will use natural gas as the primary fuel with ULSD oil used as the backup fuel. Natural gas for PEEC will be transported to the Site via a natural gas pipeline. New onsite natural gas compressors may be installed by FPL if required to raise the pressure to the appropriate level for the CTs. The Project may also involve installation of a new onsite natural gas yard and onsite natural gas pipeline. ULSD oil will be delivered to the Site by truck or via waterborne deliveries to PEEC, and will be stored in a new fuel oil tank. When firing natural gas, emissions of nitrogen oxides (NO_x) will be controlled using dry low NO_x (DLN) combustion technology and selective catalytic reduction (SCR). When firing ULSD oil, emissions of NO_x will be controlled using water injection and SCR.

Primary water uses at PEEC will be for cooling water and process water. Cooling water is required for condenser cooling and auxiliary equipment cooling. Condenser cooling for the steam cycle portion of the 3-on-1 unit will be accomplished using the existing once-through cooling water system intake and discharge infrastructure, but with approximately half the heat rejection rate and water flow rate of the existing Units 1 through 4 once-through system. Process water is required for CT inlet air evaporative cooling, NO_x injection water, steam cycle makeup, service water, and fire protection. Other minor uses will include intake screen wash water, potable water for employee use, and water for landscape irrigation.

The Site stormwater management system design will handle a 25-year 72-hour storm event. Contact stormwater runoff from the Power Block and equipment areas will be treated through an oil/water separator and routed to the onsite stormwater detention ponds. Non-contact stormwater from outside the Power Block will also be collected and routed to the stormwater ponds. The Site stormwater management system is designed to meet all federal, state, regional, and local requirements (see Subsection 4.8.3). The construction support area and construction parking and laydown areas will meet stormwater management requirements through Best Management Practices (BMPs) (see Subsection 4.8.2). Stormwater runoff that is collected in the detention ponds will be managed by a combination of detention, percolation, and evaporation.

PEEC will connect to the FPL transmission network through the existing 138 kilovolt (kV) and 230 kV switchyards. No new transmission lines are required to connect PEEC to the existing transmission network.

4.2 Site Layout

The Power Block will be located in the central portion of the Site (Figure 4.2.0-1). Typical profiles of a CT/HRSG train are shown in Figures 4.2.0-2 (north-south) and 4.2.0-3 (east-west). New onsite natural gas compressors may be installed by FPL to raise the natural gas pressure to the appropriate level for the CTs.

4.3 Fuel

The primary fuel used by the CTs will be natural gas, delivered to the Site via a natural gas pipeline. Typical properties of natural gas are shown in Table 4.3.0-1. The heat content is typically approximately 20,940 British thermal units per pound (Btu/lb) [low heating value (LHV); approximately 23,300 Btu/lb higher heating value (HHV)] with a maximum sulfur content of 2 grains per 100 standard cubic feet (gr/100 scf) of natural gas.

ULSD oil will be used as a backup fuel for an equivalent of 1,000 hours per year (hr/yr) per CT at baseload conditions. Typical properties of ULSD oil are shown in Table 4.3.0-2. The heat content is typically approximately 18,400 Btu/lb [(LHV); approximately 19,500 Btu/lb (HHV)] with a maximum sulfur content of 0.0015 percent by weight.

No onsite storage will be provided for natural gas. ULSD oil will be delivered to the Site by truck or by pipeline from Port Everglades and will be stored in a new approximately 7 million gallon (MG) fuel oil storage tank (165,000 barrels) with integral secondary containment. All fuel oil tanks within the Certified Site will be permanently decommissioned and removed/dismantled according to applicable regulations.

The generating capacity of a combined cycle plant is affected by ambient temperature, with increased temperature resulting in less efficient electric production. Greater overall fuel consumption will occur at lower ambient temperatures. For the purpose of calculating maximum hourly fuel use quantities representative of the nominal 1,250 MW (net) combined cycle unit, the following specific operating conditions for the CTs were used (see SCA Appendix 10.2.5, Air Construction Permit):

- 35°F dry bulb turbine inlet temperature;
- 60 percent relative humidity;
- Approximately 20,940 Btu/lb and 920 British thermal units per standard cubic foot (Btu/scf), LHV, of natural gas (approximately 23,300 Btu/lb and 1,020 Btu/scf, HHV); and
- Approximately 18,400 Btu/lb and 129,900 Btu/ gallon, LHV, for ULSD oil (approximately 19,500 Btu/lb and 137,700 Btu/gallon, HHV).

The maximum heat input for each of the CTs being considered for PEEC ranges from 2,733 MMBtu/hr (LHV) (3,034 MMBtu/hr, HHV) to 2,503 MMBtu/hr (LHV) (2,774 MMBtu/hr, HHV) when firing natural gas (100 percent capacity, 35°F). The corresponding maximum fuel usage ranges from approximately 3.0 million cubic feet per hour (MMcf/hr) to 2.7 MMcf/hr of natural gas for each CT. Maximum potential fuel usage at 75°F turbine inlet temperature ranges from approximately 6.6 $\times 10^{10}$ cubic feet per year (cf/yr) to 7.3 $\times 10^{10}$ cf/yr of natural gas for PEEC.

ULSD oil use will be based on the equivalent of 1,000 hr/yr per CT at full load. The maximum fuel use is approximately 19,400 gallons per hour per CT at 35°F turbine inlet with a maximum annual usage rate of 58 MG for 3 CTs each operating for 1,000 hours.

4.4 Air Emissions and Controls

4.4.1 Air Emissions Units

Air pollutants will be emitted from the CT/HRSGs when firing natural gas and ULSD oil. Air emissions result from either the combustion process or impurities in the fuel. Tables 4.4.1-1A through 4.4.1-2B present the performance and maximum estimated emission rates of regulated pollutants for each CT/HRSG being evaluated for PEEC. Information for the MPS "J" CTs or equivalent is presented in Tables 4.4.1-1A and 4.4.1-2A, and information for the Siemens "H" CTs or equivalent is presented in Tables 4.4.1-1B and 4.4.1-2B.

The maximum estimated emission rates when firing natural gas and ULSD oil were determined using the manufacturer's information for the equipment proposed for PEEC. The design parameters are provided in Tables 4.4.1-1A through 4.4.1-2B for the range of operating loads and turbine inlet temperatures. Appendix 10.2.5, the Air Construction Permit Application, presents the basis for the emission rates and maximum annual emissions of regulated and non-regulated pollutants.

During combustion, two primary types of NO_x are formed: fuel NO_x and thermal NO_x. Fuel NO_x emissions are formed through the oxidation of a portion of the nitrogen contained in the fuel. Thermal NO_x emissions are generated through the oxidation of a portion of the nitrogen contained in the combustion air. NO_x formation can be limited by lowering combustion temperatures (through water or steam injection) and/or staging combustion (a reducing atmosphere followed by an oxidizing atmosphere, known as DLN control). The proposed NO_x stack emissions rates for PEEC (concentrations) are 2 parts per million by volume dry (ppmvd), corrected to 15 percent oxygen (O_2) or less when firing natural gas, and 8 ppmvd corrected to 15 percent O_2 or less when firing ULSD oil.

Carbon monoxide (CO) is formed by incomplete combustion of fuel. High combustion temperatures, adequate excess air, and good fuel/air mixing during combustion will minimize CO formation. CO formation is limited by ensuring complete efficient combustion of the fuel in the turbines. Recent improvements in CT combustor technology allow for both reduced NO_x emissions and low CO emissions.

The expected CO stack emission rates for the MPS "J" CTs or equivalent when firing natural gas are 9 ppmvd corrected to 15 percent O_2 at baseload operation and 35 ppmvd corrected to 15 percent O_2 with ULSD oil firing. For the Siemens "H" CTs or equivalent, the expected CO emission rates when firing natural gas are 5 ppmvd corrected to 15 percent O_2 at baseload operation, and 10 ppmvd corrected to 15 percent O_2 with ULSD oil firing.

Similarly, volatile organic compound (VOC) emissions are formed by incomplete combustion of fuel. High combustion temperatures, adequate excess air, and good fuel/air mixing during combustion will minimize VOC formation. VOC formation is limited by ensuring complete efficient combustion of the fuel in the CTs. Recent improvements in CT combustor technology allow for both reduced NO_x emissions and low VOC emissions.

The expected VOC stack emission rates for the MPS "J" CTs or equivalent at baseload operation when firing natural gas are 1 ppmvd corrected to 15 percent O_2 at baseload operation and 10 ppmvd corrected to 15 percent O_2 for ULSD oil firing. For the Siemens "H" CTs or equivalent at baseload operation, the expected CO emission rates when firing natural gas are 1 ppmvd corrected to 15 percent O_2 at baseload operation and 10 ppmvd corrected to 15 percent O_2 for ULSD oil firing.

Maximum sulfur dioxide (SO_2) emission rates are controlled and minimized by the very low sulfur content in the fuels, which will be no greater than 2 gr/100 scf of sulfur for natural gas and no greater than 0.0015 percent sulfur by weight for ULSD oil.

PEEC will be equipped with two, 2,250 kilowatt (kW) emergency generators. These emergency generators will be used when electric power is not available. This would primarily occur during catastrophic events such as hurricanes. In addition to the larger emergency generators, there are small 25 kW propane fired emergency generators associated with the PEEC hurricane shelter. SCA Appendix 10.2.5, Air Construction Permit Application, contains emissions and manufacturer's information for the emergency generators proposed for PEEC. Normally, these emergency generators would be operated 1 to 2 hours per month for maintenance and reliability testing.

The 3-on-1 unit may also include one natural gas-fired fuel heater and a spare. These heaters will have a heat input of 10 MMBtu/hr (HHV) or less and will be used as necessary to heat natural gas above the dew point. Only one fuel heater may be necessary for the operation of PEEC. SCA Appendix 10.2.5 contains performance and emissions information for the fuel heater.

The auxiliary boiler will be used as necessary for startup. The limited use auxiliary boiler will have a maximum heat input of 99.8 MMBtu/hr (HHV) firing natural gas. SCA Appendix 10.2.5 contains performance and emissions information for the auxiliary boiler. For construction, temporary boilers will be required for steam blows and cleaning. These boilers are described in Appendix 10.2.5.

PEEC may include a new natural gas compressor station to increase natural gas pressure from the existing FGT pipeline to the CTs. The natural gas compressor station, if installed onsite, may consist of three Solar Centaur 50 compressor set natural gas compressors or equivalent. These natural gas compressors typically consist of a natural gas turbine and natural gas compressor. During normal operation only two of the three compressor sets would be operating. SCA Appendix 10.2.5 contains performance and emissions information for the natural gas compressors.

A new approximately 7 MG fuel oil storage tank will be used to store the ULSD oil at the Site. Appendix 10.2.5 contains VOC emissions information for the fuel oil tank.

Finally, PEEC will be equipped with a 300 horsepower (hp) fire pump engine. This engine will be used when necessary during catastrophic events such as fires. SCA Appendix 10.2.5 contains emissions and manufacturer’s information for the engine proposed for PEEC. Normally, this fire pump engine would be operated only 1 to 2 hours per month for maintenance and reliability testing.

The total annual emissions from PEEC include air emissions from the CTs, fuel heater, emergency generators, auxiliary boiler, fire pump engine, compressor station, and fuel oil tank. Tables 4.4.1-3A and 4.4.1-3B present the annual potential emissions for PEEC for the MPS “J” or equivalent, and Siemens “H” CTs, respectively. Annual emissions were based on maximum emissions for baseload operation and ambient temperatures of 75°F. The maximum CT emissions are based on 7,760 hr/yr firing natural gas and 1,000 hr/yr firing oil. The potential emissions are based on the 75°F turbine inlet temperature at 100 percent load condition. This turbine inlet temperature is conservative, since the annual average temperatures are slightly higher than 75°F.

Tables 4.4.1-3A and 4.4.1-3B present the net emission changes resulting from the modernization of the existing Port Everglades Plant to the PEEC, reflecting the maximum projected PEEC emissions and the resulting changes compared to the existing Plant, and the Prevention of Significant Deterioration (PSD) significant emission rates, which are thresholds for PSD review for modifications to major sources. PSD review is required for emissions of a pollutant greater than the listed PSD significant emission rate. Figure 4.4.1-1 presents the net emissions reductions for sulfur dioxide (SO_2), NO_x, and particulate matter (PM) greater than or equal to 10 micrometers (PM_{10}) resulting from the modernization of the existing Plant to the PEEC. As shown in these tables and this figure, the net emission changes for PEEC are less than the PSD significant emission rates for these regulated air pollutants.

On June 3, 2010, the U.S. Environmental Protection Agency (EPA) promulgated regulations related to PSD and Title V Greenhouse Gas (GHG) Tailoring Rule (75 Federal Register 31514-31608). In EPA's promulgation, GHGs are defined to include an aggregate group of six classes of compounds that have been determined to have GHG properties: CO_2, methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride. Each of these GHGs has a specific Global Warming Potential (GWP) that is calculated as "CO_2 equivalent emissions" or CO_2e that is equivalent to the GHG properties of one ton of CO_2.

For the PEEC, the GHGs emitted are CO_2, CH_4, and N_2O, with one ton of CH_4 equivalent to 21 tons of CO_2e and one ton of N_2O equivalent to 310 tons of CO_2e. Tables 4.4.1-3A and 4.4.1-3B present the net emission changes resulting from the modernization of the existing Units 1 through4 to the PEEC, reflecting the maximum projected PEEC emissions and the resulting changes compared to the existing Units 1 through 4, and the PSD significant emission rates, which are thresholds for PSD review for modifications to major sources.

The CO_2 emission rates shown in the tables for Units 1 through 4 were obtained from EPA's Acid Rain database. Since emissions of N_2O and CH_4 were not reported before 2010, these GHGs were calculated based on the actual annual heat input and emission factors from Title 40, Part 98 of the Code of Federal Regulations (40 CFR 98), Subpart C. These GHG emissions show the CO_2e rates for these pollutants. PSD review is required for GHG emissions greater than the listed PSD significant emission rate of 75,000 tons per year (TPY) CO_2e. As shown in Tables 4.4.1-3A and 4.4.1-3B, the maximum potential annual CO_2e emissions of the Project will exceed the historical emissions of Units 1 through 4, primarily due to greater operation.

EPA regulations require a comparison of the maximum CO_2e potential emissions of PEEC to the baseline actual CO_2e emissions of the existing Port Everglades Units 1 through 4. If the maximum potential emissions exceed the baseline actual emissions by more than the PSD threshold, than PSD review is required. EPA rules require the maximum potential CO_2e emissions for PEEC be based on its operation at 100 percent capacity for every hour of the year (8,760) including the maximum use of ULSD oil (1,000 hours of the 8,760 hours per year). EPA rules define baseline actual emissions as the actual annual emissions during the last 5 years using the highest average over 24 consecutive months. The baseline actual CO_2e emissions for the existing Port Everglades Units 1 through 4 were about 2.6 million tons/year of CO_2e with a capacity factor of less than 30 percent. However, as shown in Figure 4.4.2-1, the PEEC CO_2e emission rate is less than one-half that of the existing Plant. Indeed, the maximum potential CO_2e emissions currently authorized of Port Everglades Units 1 through 4 is about 9.6 million tons tons/year of CO_2e. As a result, the EPA PSD threshold is exceeded due to the low capacity factor of the existing units over the last 5 years.

The PSD/Air Construction Permit Application (see SCA Appendix 10.2.5) is being filed for the purpose of establishing federally enforceable emission limitations that ensure the Project will not result in a significant net increase in emissions of any regulated air pollutant for non-GHG, in accordance with the FDEP's federally approved minor source air construction permit program under Florida's federally required State Implementation Plan. For GHG, a BACT analysis has been performed and is included in the PSD/Air Permit Application. As discussed in Subsection 4.4.3, the air emission controls are representative of BACT emission limits under PSD regulations for non-GHG pollutant and BACT analysis has been proposed for GHGs.

4.4.2 Air Emission Controls

The use of clean fuels (natural gas and ULSD), combustion controls, and air pollution control equipment will minimize air emissions and ensure compliance with applicable emission limiting standards. Using clean fuels will minimize emissions of SO_2, PM/PM_{10}, and other fuel bound contaminants. Combustion controls will minimize the formation of NO_x and the formation of CO and VOCs by combustor design. Further NO_x reduction will be achieved by SCR. The combination of these techniques has been determined to represent BACT on previous combined cycle projects based on an evaluation of economic, energy, and environmental impacts. The following subsection presents a summary of the air pollution control technology proposed for PEEC, which is presented in detail in the PSD/Air Construction Permit Application (Appendix 10.2.5).

PEEC, among other measures, will continue FPL's major efforts to reduce CO_2 emissions in FPL's system. The maximum CO_2 emission rate after the modernization of the Port Everglades Units 1 through 4 will be approximately one half the maximum CO_2 emission rate for the existing Units 1 through 4. This reduction in CO_2 emission rate is a result of the efficiency of advanced combined cycle technology and the primary use of natural gas. PEEC will be among the most efficient natural gas-fired generating units in FPL's system and will displace generation that would otherwise be produced by less efficient units in FPL's system, thereby reducing system CO_2 emissions. The increased efficiency can be shown by the CO_2 emission rate in pounds of CO_2 emitted per megawatt of energy produced per hour (lb/MW-hr). Figure 4.4.2-1 shows the lb/MW-hr emission rates before and after the modernization of the Port Everglades Units 1 through 4 to combined cycle technology. As shown in this figure, the CO_2 emission rate for PEEC will be 795 lb/MW-hr, while the CO_2 emission rate for the existing Port Everglades Plant is 1,738 lb CO_2/MW-hr as reported by EPA (EPA, 2010). Moreover, PEEC will reduce FPL's system emissions of CO_2 by 22 million tons from 2016 through 2047, which will be a significant reduction in CO_2 emissions in FPL's system as a direct result of the Project (see SCA Appendix 10.8).

4.4.3 Control Technology Description

FDEP has adopted PSD rules in FDEP Rule 62-212.400, F.A.C. BACT review is part of the evaluation of control technology under the Florida PSD rules, and is required only for those pollutants that trigger PSD review. BACT is applicable to all pollutants for which PSD review is required and is pollutant specific. BACT is an emission limitation that is based on the maximum degree of reduction for each regulated pollutant, which is determined to be appropriate after taking into account the energy, environmental, and economic impacts and other costs. The emission limits proposed for PEEC are reflective of BACT, even though PSD review is not required for FDEP-regulated pollutants.

The EPA updated the New Source Performance Standards (NSPS) for stationary CTs that will commence construction after February 18, 2005. Subpart KKKK applies to units with a gross capacity greater than 1 MW. The Subpart KKKK requirements applicable to CTs greater than 30 MW apply to the CT/HRSG trains associated with PEEC. The NO_x emissions are limited to 15 parts per million (ppm) corrected to 15 percent O_2 or 0.43 lb/MW-hr for natural gas firing and 42 ppm corrected to 15 percent O_2 or 1.3 lb/MW-hr for ULSD firing. For SO_2 emissions, Subpart KKKK requirements limit emissions to 0.9 lb/MW-hr or a potential total sulfur content equivalent to 0.06 lb/MMBtu (HHV) if multiple fuels are fired.

NSPS are also applicable to the auxiliary boiler, fuel heaters, natural gas compressors, fire pump engine, and emergency generators. Subpart KKKK is also applicable to the turbines associated with the natural gas compressors. These turbines will fire only natural gas with heat input greater than 50

MMBtu/hr but less than 850 MMBtu/hr and the Subpart KKKK NO_x emissions limit is 25 ppmvd corrected to 15 percent O_2. For PEEC, the proposed NO_x emissions rate of 15 ppmvd corrected to 15 percent O_2 is well below the Subpart KKKK limit. The EPA NSPS Subpart Dc, Standards of Performance for Small Industrial-Commercial-Institutional Steam Generating Units, applies to the auxiliary boilers and fuel heaters. For the emergency generators, natural gas compressors, and fire pump engine, NSPS Subpart IIII, Standards of Performance for Stationary Compression Ignition Internal Combustion Engines, is applicable.

EPA has promulgated maximum achievable control technology (MACT) standards under the National Emissions Standards for Hazardous Air Pollutants (NESHAP) regulations. As presented in SCA Appendix 10.2.5, the Port Everglades Plant will continue to be a major source of hazardous air pollutant (HAP) emissions due to the combined potential emissions from PEEC and the 12 gas turbines units associated with the Gas Turbine Power Park–Port Everglades. Therefore, MACT standards under the NESHAP regulations would apply. The NESHAP Subpart YYYY applies to PEEC if the aggregate use of oil by existing and new turbines exceeds 1,000 hours during any calendar year. However, information available from the equipment vendors indicate that PEEC will meet the proposed MACT of 91 parts per billion by volume dry (ppbvd) corrected to 15 percent O_2 for formaldehyde. The NESHAP Subpart ZZZZ addressing reciprocating internal combustion engines (RICE) applies to the diesel engines associated with the Project. Under this rule, if the facility is not a major source of HAPs, it would still be categorized as an area source and be subject to the rule. However, the method of compliance under this provision would be to demonstrate compliance with 40 CFR 60, Subpart IIII.

Appendix 10.2.5 of the SCA contains the PSD/Air Construction Permit Application for PEEC. The application describes the air pollution control technology proposed for PEEC and addresses air quality impacts for compliance with Ambient Air Quality Standards (AAQS). The remainder of this section briefly describes those control technologies that are proposed for PEEC.

4.4.3.1 Nitrogen Oxides

The Project will result in a net emissions decrease of approximately 3,900 TPY for NO_x emissions (i.e., more than 85 percent reduction from historical emissions). PSD review, including a BACT determination, is not applicable. However, the NO_x control technology and emission limits proposed for PEEC are consistent with emission limits established as BACT in Florida and EPA Region IV for similarly designed projects. The use of DLN combustors and SCR for PEEC with NO_x emission levels of 2 ppmvd corrected to 15 percent O_2 when firing natural gas and 8 ppmvd corrected to 15 percent O_2 when firing ULSD is consistent with recently established BACT emission limits for other combined cycle units. Similarly, the NO_x emission rates proposed for the auxiliary boiler, natural gas heaters, emergency generators, and natural gas compressors have been established as BACT in previous PSD permits.

When firing natural gas, NO_x emissions will be controlled using DLN combustors. DLN combustor technology has been offered and installed by CT manufacturers to reduce NO_x emissions by inhibiting thermal NO_x formation through premixing fuel and air prior to combustion and providing pre-mix combustion to reduce flame temperatures. The DLN combustors have premixed fuel zones plus a standard diffusion flame pilot burner for startup. Low NO_x levels are achieved by introducing fuel primarily to the pre-mix zones and reducing the amount of fuel being combusted from the pilot nozzle.

NO_x emissions will be further controlled by SCR systems when firing either natural gas or ULSD oil. SCR is a post-combustion process where NO_x in the gas stream has reacted with ammonia in the presence of a catalyst to form nitrogen and water vapor. The reaction occurs typically between approximately 320 and 400 degrees Celsius (°C) (600 and 750°F). These temperatures occur within the HRSG where the SCR catalyst and ammonia injection grid is installed. Aqueous ammonia will be stored onsite in one or more tanks. Flue gas NO_x emissions when firing natural gas will be reduced to 2 ppmvd, corrected to 15 percent O_2. When firing ULSD, SCR can reduce NO_x emissions by 80 percent or more to 8 ppmvd corrected to 15 percent O_2 or less.

The NO_x emissions from the auxiliary boiler, fuel heater, emergency generators, pump-fire engine, and natural gas compressors will be limited using combustion techniques. The auxiliary boiler will be equipped with low NO_x burners to reduce NO_x emissions to 0.05 lb/MMBtu (HHV). The fuel heater will use combustion controls to reduce NO_x emissions to 0.095 lb/MMBtu (HHV). The emergency generators will meet the NSPS Subpart IIII NO_x emission requirements of 6.5 grams per brake horsepower-hour (g/bhp-hr). The natural gas compressors evaluation is based on natural gas turbines using Solar Turbines dry low emissions (DLE) technology with a maximum NO_x emission rate of 15 ppmvd corrected to 15 percent O_2.

4.4.3.2 Carbon Monoxide

The Project will result in net annual CO emissions less than the PSD significant emission rate of 100 TPY. Therefore, PSD review, including a BACT determination, is not applicable. However, the use of combustion controls to reduce CO emissions in the range proposed for natural gas and ULSD firing has been the technology used to achieve low CO emission rates in CTs.

The emission rates are based upon the CTs being considered for PEEC. The CTs will utilize advanced combustion technology. The expected CO emission rates for the MPS "J" CTs or equivalent when firing natural gas are 9 ppmvd corrected to 15 percent O_2 at baseload operation. When firing ULSD oil, the CO emissions from the MPS "J" CTs or equivalent are based on 35 ppmvd corrected to 15 percent O_2. The Siemens "H" CTs or equivalent CO emissions are based on 5 ppmvd corrected to 15 percent O_2 when firing natural gas at baseload operation. For the Siemens "H" CTs when firing ULSD oil, the CO emissions are based on 10 ppmvd corrected to 15 percent O_2.

Combustion techniques will be used to reduce the CO emissions from the auxiliary boiler, fuel heaters, fire pump engine, and emergency generators. The auxiliary boiler will be equipped with low NO_x burners designed to reduce CO emissions to 0.08 lb/MMBtu (HHV). The fuel heaters will use combustion controls to reduce CO emissions to 0.08 lb/MMBtu (HHV). The emergency generators will meet the NSPS Subpart IIII CO emission requirements of 8.5 g/bhp-hr. Each natural gas compressor will be equipped with combustion technology to reduce CO emissions to 25 ppmvd corrected to 15 percent O_2.

The CO emission rates proposed for the auxiliary boiler, fuel heater, emergency generators, and natural gas compressors have also been established as BACT in previous PSD permits.

4.4.3.3 Sulfur Oxides (SO_2 and H_2SO_4 Mist)

The Project will result in net emissions decreases of more than 9,000 TPY for SO_2 emissions and approximately 380 TPY for sulfuric acid (H_2SO_4) mist (i.e., reductions of more than 95 percent for SO_2 and 90 percent for H_2SO_4 from historical emissions). PSD review, including a BACT determination, is not applicable. The only feasible control for the combined cycle unit, auxiliary boilers, fuel heaters, emergency generators, fire pump engine, and natural gas compressors is combustion of clean fuels. Natural gas and ULSD oil are the cleanest fuels available with maximum sulfur contents of 2 gr/100 scf for natural gas and 0.0015 percent sulfur for ULSD oil proposed for PEEC. H_2SO_4 emissions will also be minimized by the use of low sulfur fuels. SO_2 and H_2SO_4 mist emission limits based on use of natural gas and ULSD oil have been established as BACT in previous PSD permits.

4.4.3.4 Particulate Matter and Other Regulated Pollutants

The Project will result in a net emissions decrease of more than 350 TPY for PM/PM_{10} (i.e., more than 50 percent reduction from historical emissions). PSD review, including a BACT determination, is not applicable. The use of clean fuels, characterized by low PM and trace contaminant contents, and advanced combustion techniques, result in negligible PM and PM_{10} emissions from the combined cycle unit, auxiliary boiler, fuel heaters, emergency generators, fire pump engine, and natural gas compressors. Emission limits based on the use of clean fuels (i.e., natural gas and ULSD oil) have been established as BACT for PM/PM_{10} emissions in previous PSD permits.

4.4.3.5 Volatile Organic Compounds

The Project will result in a net emissions increase of less than 40 TPY for VOC. Therefore, PSD review, including a BACT determination, is not applicable. Combustion techniques will be used to reduce the VOC emissions from the combined cycle unit, auxiliary boiler, fuel heater, emergency generators, fire pump engine, and natural gas compressors.

The CTs will utilize advanced combustion technology, and the proposed emission rates are consistent with those established as BACT for these turbines. The expected VOC emission rate for the MPS “J” CTs or equivalent when firing natural gas is 1 ppmvd corrected to 15 percent O_2 at baseload operation. When firing USLD oil, the VOC emissions from the MPS “J” CTs or equivalent are based on 10 ppmvd corrected to 15 percent O_2. VOC emissions for the Siemens “H” CTs are based on 1 ppmvd (corrected to 15 percent O_2) when firing natural gas at baseload operation. For the Siemens “H” CTs when firing ULSD oil, the VOC emissions will be are based on to 10 ppmvd corrected to 15 percent O_2.

The auxiliary boiler is designed with proper combustion techniques to reduce VOC emissions to 0.005 lb/MMBtu (HHV). The fuel heater will use combustion controls to reduce VOC emissions to 0.005 lb/MMBtu (HHV). The emergency generators will meet the NSPS Subpart IIII VOC emission requirements of 1 g/bhp-hr as total hydrocarbons. Each natural gas compressor will be equipped with combustion technology to reduce VOC emissions to 12.5 ppmvd corrected to 15 percent O_2.

4.4.3.6 Greenhouse Gases

FPL is committed to reducing GHG emissions that is discussed in more detail in Appendix 10.8 NextEra Energy, Inc.'s and Florida Power & Light Company's Greenhouse Gas Strategy – Port Everglades Next Generation Clean Energy Center. FPL operates one of the cleanest generating fleets in the nation. Consistent with FPL's trend of leading the industry in clean energy investments for customers, this modernization would cut the current plant's CO_2 emissions rate in half and slash its air emissions rate by approximately 90 percent. Use of natural gas as the primary fuel at PEEC, along with the most efficient combined cycle technology, will result in one of the lowest CO_2 emission rates on a pound-per-megawatt-hour (lb/MW-hr) basis of any fossil fuel-fired units in the country. Moreover, PEEC will be among the most efficient natural gas-fired generating units in FPL's system. As a result, the electricity generated by PEEC will displace generation produced by less efficient units in FPL's system and concomitantly reduce the amount of CO_2 emissions by 22 million tons.

Although there will be an increase in GHG emissions at the location of the existing Port Everglades Plant as a result of the Project, there will be a decrease of GHGs in FPL's system. The Project's net emission increase of GHGs above the PSD threshold requires a BACT analysis. In November 2010, EPA issued guidance on the determination of BACT for GHGs ("*PSD and Title V Permitting Guidance for Greenhouse Gases*", November 2010). EPA believes that it is important in BACT reviews for permitting authorities to consider options that improve the overall energy efficiency of the source or modification – through technologies, processes, and practices at the emitting unit. In general, a more energy efficient technology burns less fuel than a less energy efficient technology on a per unit of output basis. Considering the most energy efficient technologies in the BACT analysis helps reduce the products of combustion, which includes not only GHGs but other regulated New Source Review (NSR) pollutants (e.g., NO_x, SO_2, $PM/PM_{10}/PM_{2.5}$, CO, etc.), EPA emphasizes that energy efficiency should be considered in BACT determinations for all regulated NSR pollutants (not just GHGs).

The efficiency of the generation technology in producing electricity and the type of fuel utilized are the most important aspects in GHG emissions from electric generation projects. Together, efficiency and fuel type dictate the amount of GHG emissions per unit of generation.

An important measure of the efficiency for an electrical generating facility is the units' heat rate. Heat rate is a measurement of how efficiently a unit uses heat energy. It is expressed as the number of Btus of heat required to produce a kilowatt-hour of energy (Btu/kWh)[1]. A heat rate of 3,413 Btu/kWh reflects a conversion efficiency of 100 percent from thermal energy to electrical energy.

The proposed combined cycle units' heat rate and energy efficiency were compared to data obtained from the U.S. Energy Information Administration (EIA). Based on data provided in the Annual Energy Review 2010, the approximate heat rate for electricity for fossil fueled power plants in the U.S. in 2010 was 9,760 Btu/kWh (35.0 percent efficiency) (http://www.eia.gov/totalenergy/data/annual/index.cfm).

Based on US EIA's 2010 annual review of the electrical power industry, the reported average heat rate for natural gas firing was 8,185 Btu/kWh (41.7 percent efficiency) including all types of generation (http://www.eia.gov/electricity/annual/pdf/table5.3.pdf). Of the generation types, the average heat rates when firing natural gas are:

- Steam turbine generator – 10,249 Btu/kWh (33.3 percent efficiency),
- Natural gas turbine – 11,590 Btu/kWh (29.5 percent efficiency),
- Internal combustion – 9,917 Btu/kWh (34.4 percent efficiency), and
- Combined cycle – 7,619 Btu/kWh (44.8 percent efficiency).

(http://www.eia.gov/electricity/annual/pdf/table5.4.pdf)

Using heat balance predictive data to estimate the power output of the steam turbine generator and the heat rate and efficiency of PEEC when using natural gas and ULSD oil are as follows for new and clean conditions:

- Natural gas firing – 6,357 to 6,488 Btu/kWh (53.7 to 52.6 percent efficiency) (Baseload at 75°F)
- Oil firing – 6.745 to 7,171 Btu/kWh (50.6 to 47.6 percent efficiency) (Baseload at 75°F)

The overall new and clean heat rate of PEEC, using the heat rates for each fuel and an operating scenario of 1,000 hr/yr of CT on oil firing, and 7,760 hr/yr of CT on natural gas firing, is estimated to range from 6,449 to 6,518 Btu/kWh (52.9 to 52.4 percent efficiency) for PEEC. These estimated heat rates are well below the approximate heat rate for all fossil-fueled power plants in the U.S. in 2010, and the proposed unit is 33 percent more efficient than all U.S. fossil fueled power plants. When compared to all types of generation using natural gas, the proposed Power Block will be 20 percent more efficient than all generation using natural gas.

[1] All BTU/kWh are calculated on a HHV basis.

PEEC will be more efficient than other existing combined cycle plants. This is a result of utilizing the latest CT technology that results in greater efficiency in the CT generated power and increased exhaust energy through the HRSG to produce more steam electric generation. Together this significantly improves the efficiency over earlier generation combined cycle plants. PEEC will have a heat rate over 10 percent lower than average existing combined cycle plants as indicated from EIA 2009 data. The proposed Project will be designed to produce the maximum efficiency for the size of the Project (approximately 1,250 MW) including the use of inlet air cooling that improves efficiency. For example, at an inlet temperature of 95°F, the use of evaporative cooling will decrease the heat rate by 1 percent or more and translate to a proportional decrease in GHG emissions.

As part of EPA's clean energy initiatives, EPA developed the Emissions & Generation Resource Integrated Database (eGRID) as a resource tool in assessing GHG emissions. eGrid is a comprehensive source of data on the environmental characteristics of almost all electric power generated in the United States with data available based on a variety of geographic regions and locations. Data is also available on a plant-specific basis. Based on the latest available eGrid data, the following are the emissions of CO_2 on a generation basis for generation facilities located in the same subregion as the project:

- Florida Reliability Coordination Council – 1,225.7 lb CO_2/MWh for all generation (including nuclear); 1,417.3 lb CO_2/MWh for total combustion generation.
- FPL – 881.6 lb CO_2/MWh for all generation (including nuclear); 1,121.3 lb CO_2/MWh for total combustion generation.

For PEEC, the net CO_2 emission rate on a generation basis will range from approximately 740 to 760 lb CO_2/MWh over the range of operating temperatures when firing the primary fuel, natural gas. When compared to the existing generation facilities in the region and FPL's system, it can be seen that PEEC's GHG emission rates are lower. Therefore, the GHG on a generation basis are much lower than the existing generation and when operated displaces less efficient generation resulting in overall GHG reduction. FPL's analysis indicates that PEEC will reduce FPL's system emissions of CO_2 by 22 million tons from 2016 through 2047.

4.4.4 Design Data for Control Equipment

Design data for the air pollution control equipment are presented in SCA Appendix 10.2.5 (Air Construction Permit Application).

4.4.5 Design Philosophy

The PEEC Project will modernize existing 1960s vintage oil and natural gas-fired steam-electric units to an advanced, natural gas-fired combined cycle plant that minimizes air pollutant emissions by using the most fuel-efficient and pollution-preventing technology. This concept has been incorporated with the selection of a combined cycle process utilizing advanced CTs. Advanced combined cycle plants can be expected to achieve fuel conversion rates of less than 6,800 Btu/kWh (50 percent efficiency at 75°F, baseload). The PEEC emission rates will be reduced by approximately 90 percent compared with the existing Port Everglades Plant Units 1 through 4, resulting in significant annual emissions reductions and air quality benefits. By maximizing the megawatt output per unit of fuel consumed, the air pollutant emissions per MW output are minimized. In addition, the efficiency of PEEC and the use of natural gas minimizes the emissions of CO_2 (see Subsection 4.4.2 and Appendix 10.8).

Pollution prevention is incorporated in the design by the use of clean fuels and advanced combustion technology. Natural gas and ULSD oil will be used. Moreover, advanced DLN combustion technology will be used to minimize NO_x emissions while ensuring that CO and VOC emissions are within accepted limits. SCR will be installed to further reduce NO_x emissions. Taken together, the design of PEEC will incorporate features that will make PEEC one of the most efficient and lowest polluting fossil fuel-fired units in Florida.

4.5 Plant Water Use

Primary water uses for PEEC, like the existing Units 1 through 4, will include cooling water and process water. Cooling water is required for condenser cooling, auxiliary cooling, and cooling pump seal water. Process water is required for CT inlet air cooling, NO_x injection water when firing ULSD, steam cycle makeup, service water, and fire protection. Other uses will include intake screen wash water and aquatic organism return system water, potable water for employee use, and water for landscape irrigation. Condenser cooling for the steam cycle portion of PEEC and auxiliary cooling will be accomplished using the existing infrastructure of the once-through cooling system intake and discharge structures. Water for screen wash and the aquatic organism return system will come from downstream of the traveling screens from the cooling-water intake system as shown in Figure 4.5.0-1. Process and potable water for PEEC will continue to come from the existing potable water supply from the City of Fort Lauderdale.

The stormwater management system for PEEC will be designed to meet local, regional, state, and federal permit requirements, which include the rules of the SFWMD, Broward County, City of Hollywood, FDEP, and EPA. SCA Section 4.8 discusses the stormwater for construction and operation of PEEC and SCA Appendix 10.11 Stormwater Management Plan provides detailed stormwater calculations.

The Water Supply Alternatives and Water Conservation Plan in SCA Appendix 10.10 discusses water supply alternatives for PEEC and water conservation technology, methods, and procedures that will be used at PEEC. The use of reclaimed water in cooling towers at PEEC is not an economically feasible option when compared to once-through cooling. Furthermore, the energy penalty at PEEC for operating cooling towers instead of a once-through cooling system is estimated to be approximately 15.6 MW. This energy loss would increase air pollutant and greenhouse gas emissions per unit of electricity generated. Therefore, PEEC will continue to use the existing infrastructure of Port Everglades Plant Units 3 and 4 once-through cooling-water intake and discharge structures for condenser and auxiliary cooling, withdrawing seawater from the Port Slip No. 3, and discharging through the existing system. The salinity of surface and groundwater sources at the Site is too high to be used economically for potable or process and irrigation water supply. Reclaimed water is not currently available for PEEC from Broward County, the City of Hollywood, or other municipalities. If a reliable source of reclaimed water for process and irrigation can be delivered to the Site that meets the facility's quantity and quality requirements, FPL will evaluate the environmental, economic and technical feasibility of using the reclaimed source. Should FPL determine that use of a reclaimed water source is acceptable and feasible for process and irrigation in the future, FPL will provide a plan to the appropriate regulatory agencies for implementation.

Stormwater reuse also is not practicable at the Site. The size of the Site does not allow for efficient reuse of stormwater. First, only a small percentage of the process and irrigation water demand can be supplied by this source. Second, a significant onsite storage capacity would be required, approximately 0.5 MG. Third, this supply would require additional treatment. The limited benefit does not justify the additional cost. (See Subsection 3.2.2 in SCA Appendix 10.10, Water Alternatives Study and Water Conservation Plan.) Therefore, the only feasible source for process and potable water is the existing potable supply from the City of Fort Lauderdale. See SCA Appendix 10.10 for a letter from the City of Fort Lauderdale confirming water availability for PEEC.

The PEEC water balance is presented schematically in Figure 4.5.0-1. Process, potable, irrigation, and fire protection water will be obtained from the existing potable water connection. The existing marine surface water connections to Port Slip No. 3 will be used as the source of cooling water. Information on water quality has been derived from information described in Subsection 3.3.4. Subsections 4.5.1 through 4.5.4 provide detailed descriptions of PEEC water uses.

4.5.1 Heat Dissipation System

PEEC will continue to use the existing once-through cooling-water intake structure for condenser and auxiliary cooling, withdrawing marine water from Port Slip No. 3 and discharging through the existing canal. The point of withdrawal at Port Slip No. 3 is through four, 12 ft diameter, 244 ft long reinforced concrete pipes with the pipes' centerline 7 ft below mean low water. The intake pipes are connected to a 2,100 ft canal to the existing intake structures. The discharge is to a 4,850 ft canal that is connected to the ICW. (See also Subsection 3.3.4.) The PEEC cooling system, including auxiliary cooling flows, will have a total design intake flow capacity of approximately 635 MGD. Water from the intake canal that is used for the intake screen wash (estimated flow of 1,600 gpm) and aquatic organism return system will be released back to a water body connected to the ICW.

Operation of PEEC during periods of startup and shutdown, steam turbine shutdowns, or other atypical/emergency operating conditions where steam is being produced in the HRSGs and discharged directly into the condenser before passing through the steam turbine, is defined as steam turbine bypass or "Bypass Operation". During the majority of the operating scenarios while in Bypass Operation, the thermal energy discharged to the condenser falls within the design full load thermal discharge.

Because the design intake flow for PEEC will be approximately one-half the existing Plant's intake flow, the existing intake infrastructure can be used for PEEC with lower cooling water requirements. The average flow for PEEC will be 635 MGD while the flow for the existing units is authorized for 1,296 MGD. The existing Units 3 and 4 have a design intake flow of 817 MGD. Therefore, the point of intake velocity and the design through screen velocity will be lower at a 635 MGD flow rate.

4.5.2 Domestic/Sanitary Wastewater

Sanitary wastewater from the PEEC will continue to be routed to the sewer system. Restroom facilities will be constructed to accommodate the employees of PEEC using the same connection. Sanitary wastewater flows are expected to average approximately 1 gpm, approximately the same as the existing Plant. See SCA Appendix 10.10 for a letter from the City of Fort Lauderdale confirming sanitary sewer service for PEEC.

4.5.3 Potable Water Systems

Potable water for human consumption at PEEC will continue to be obtained from the City of Fort Lauderdale that serves Port Everglades area. Potable water demand for human consumption is expected to average 1 gpm, approximately the same as for the existing Plant. See SCA Appendix 10.10 for a letter from the City of Fort Lauderdale confirming water availability for PEEC.

4.5.4 Process Water Systems

Potable water from the City of Fort Lauderdale will continue to be used as process water treatment system influent and may be used as service water for PEEC. Process and service water demand will be approximately 243,360 gallons per day (GPD), in contrast to the existing water use of approximately 420,000 GPD for the existing units. This is over a 40 percent reduction in potable water that is required as process water. See SCA Appendix 10.10 Water Alternatives Study and Water Conservation Plan for a letter from the City of Fort Lauderdale confirming water availability for PEEC.

4.5.4.1 Demineralized Water

PEEC will require the use of demineralized water [i.e., conductivity < 0.1 microsiemen per centimeter (μS/cm)]. Demineralized water is required for:

- Makeup water to replace HRSG and evaporative cooler water use to maintain water quality;
- Makeup water to replace miscellaneous steam losses in the steam cycle; and
- Water injection into the CTs for NO_x control when firing ULSD.

FPL will continue to use a reverse osmosis/mixed bed (RO/MB) demineralizer technology for PEEC process water treatment using potable water. The demineralized water will be pumped into a new onsite storage tank. RO reject water (average flow of approximately 54 gpm) will be mixed with the cooling water flow used for condenser cooling. The HRSG and evaporative cooler blowdown (average flow of approximately 48 gpm) will be reused to the greatest extent practicable for process water uses or mixed with the cooling water flow before discharge.

4.5.4.2 General Service Water

General service water uses, including cleaning and flushing water and fire protection water, will be provided by the process/service water system.

4.6 Chemical and Biocide Waste

The wastewaters generated by PEEC will include cooling water, HRSG and evaporative cooler blowdown, process water treatment system wastewater, wash water, and equipment area stormwater. HRSG and evaporative cooler blowdown will be reused to the greatest extent practicable or routed to the cooling water discharge. Contact stormwater will be treated in an oil/water separator and then routed to the stormwater ponds. Water treatment wastewaters and non-hazardous, low volume wastewaters (e.g., wash water and equipment drains) will be treated if necessary and routed to the cooling system outfalls.

The principal uses of chemicals and biocides will be for steam cycle water quality control and chemical cleaning of the HRSGs and pre-HRSG piping systems.

Table 4.6.0-1 presents a list of the waste streams associated with PEEC, their characterization, and proposed method of disposal. The following sections provide further information on the characteristics of these waste streams (see also Section 4.7).

4.6.1 Cooling System Water Chemical Treatment

Intermittent chlorination, as authorized under FDEP IWW Permit No. FL0001538 will continue to be used for PEEC to prevent biofouling of the heat rejection system.

4.6.2 Steam Cycle Water Treatment

The steam/condensate feedwater will be chemically treated to prevent corrosion or scaling of the equipment. The steam cycle water will be treated with ammonia or an amine for pH control. Other chemicals such as oxygen scavengers will be utilized to maintain water quality. Sodium phosphate will be fed to the HRSGs for control of pH and hardness. Residual phosphate in the HRSG will react with hardness to form a non-adherent precipitate that will be permanently removed through HRSG boiler blowdown.

4.6.3 Sanitary Wastewater Treatment

The sanitary system for PEEC will utilize the existing sanitary system connection to a lift station in the City of Hollywood. No pretreatment will be provided for PEEC.

4.6.4 Makeup Water Demineralization

As discussed in Subsection 4.5.4.1, the makeup water to the steam cycle will be demineralized using portable RO/MB type demineralizer trains. The resulting RO reject will be routed to the condenser cooling system. Regeneration of the MB ion exchange units will be performed offsite.

4.6.5 Chemical Cleaning

The HRSG and feedwater piping will be chemically cleaned initially during commissioning and also periodically during the life of PEEC. The chemicals used will not be permanently stored onsite but will be delivered to the Site by a licensed contractor at the time of the scheduled periodic cleanings. The chemical cleaning solutions to be used for acid and alkaline cleaning of the HRSG must be consistent with the HRSG manufacturer's recommendations. Chemicals typically used in HRSG and feedwater pipe cleaning may include the following:

- Inhibited citric acid;
- Aqueous ammonia;
- Organic chelates, such as ethylene diamine tetra-acetic acid (EDTA);
- Disodium phosphate;
- Trisodium phosphate;
- Nonfoaming wetting agents; and
- Foam inhibitors.

Wastewaters will consist of the cleaning solutions and material removed during the cleaning process. Chemical cleaning is an infrequent maintenance operation; it does not contribute to the liquid wastes produced by the normal operation of PEEC.

Chemical cleaning wastes will be maintained onsite and tested and, if meeting the requirements authorized under FDEP IWW Permit No. FL0001538 will be routed to the condenser cooling system outfall. Chemical cleaning wastes not meeting the IWW permit requirements will be managed according to applicable local, state, and federal rules and regulations.

4.6.6 Miscellaneous Drains

Wastewater can result from draining a storage tank or from cleaning and maintenance operations such as washdown of storage areas. Wastewater from these processes that meets the requirements authorized under FDEP IWW Permit No. FL0001538 may be routed to the condenser cooling system outfall. Flows from the miscellaneous PEEC drains will be intermittent and will not normally contribute to the wastewater flows. Periodic offline washes of the CTs, using water or a detergent-water solution, will also produce wastewaters. CT offline wash wastewater will be managed by draining these wastewaters into a tank and transferring by a portable pump to tank trucks and managed according to applicable local, state, and federal rules and regulations.

4.7 Solid and Hazardous Wastes

All non-hazardous and hazardous wastes associated with the operation of PEEC will be managed according to federal, state, and local regulations and FPL's "Waste Guidelines" (see Table 4.7.0-1). PEEC may periodically generate hazardous waste [typically less than 100 kilograms (kg) per month], including spent solvents, boiler chemical cleaning wastes, and other wastes. Wastes generated during dismantlement are discussed in Subsection 5.1. Potentially hazardous wastes will be collected and managed as hazardous waste until tested to determine their characteristics.

Solvent rags will be separated and either laundered or disposed of appropriately. If aerosol cans are punctured prior to disposal, the residual will be collected and managed as hazardous waste. Paint waste, polyvinyl chloride (PVC) cleaner, and PVC cement wastes will be minimized.

4.7.1 Solid Wastes

Solid wastes will be generated by the operation of PEEC, but generally in small quantities. Such solid wastes will be limited to MSW, infrequent replacement of inlet air filters, operations and maintenance wastes, and solids from the water pretreatment process. An approved solid waste disposal contractor will dispose of all solid wastes. There will be no facilities requiring a permit under FDEP Rule 62-701.300(2), F.A.C. for PEEC. As a result, information required by this FDEP rule pertaining to waste containment design, leachate control, surface water control, geotechnical investigations, water quality monitoring plan, closure plan and long-term care, and financial assurance are not applicable to PEEC.

4.7.2 Hazardous Wastes

FPL will operate PEEC to minimize, if not eliminate, the generation of hazardous waste. Any hazardous waste associated with the PEEC will typically be less than 100 kg per month and may include spent solvents, HRSG chemical cleaning wastes, and other wastes. Hazardous wastes, if any, will be collected onsite and disposed of by a licensed hazardous waste contractor. Hazardous waste will be managed according to applicable rules and regulations.

4.8 Onsite Drainage System

4.8.1 Design Criteria and Applicable Regulations

The surface water management system for PEEC will be designed to meet the requirements of applicable local, regional, State, and federal requirements, which include the rules of the SFWMD, Broward County, the City of Hollywood, FDEP, and EPA. The required design rainfall event, based on a 25-year 72-hour storm, is approximately 14.3 inches. The basic design philosophy is that the required water quality treatment volume of runoff from PEEC will be treated by onsite dry detention.

The Project drainage system of catch basins, pipes, channels, swales, and culverts will convey runoff to stormwater detention ponds. Preliminary surface water and stormwater management calculations that include PEEC are presented in SCA Appendix 10.11 Stormwater Management Plan.

4.8.2 Construction Site Drainage

Prior to commencement of dismantlement of the existing plant, FPL will seek coverage for the construction of PEEC under FDEP's Generic Permit for Stormwater Discharge from Large and Small Construction Activities. Since May 1, 2003, construction sites in Florida that will result in a disturbance of 1 acre or more are required to seek coverage under the Generic Permit for Stormwater Discharge from Large and Small Construction Activities [FDEP Rule 62-621.300(4)(a), F.A.C.]. The Notice of Intent (NOI) will be submitted to FDEP at least 2 days prior to commencement of construction.

Prior to submitting the NOI for the construction permit, FPL will prepare a comprehensive Storm Water Pollution Prevention Plan (SWPPP), as required under the Generic Permit, addressing both the dismantlement of the existing plant and the construction of PEEC.

During the dismantlement, stormwater will be managed using either the existing stormwater management system infrastructure, implementing the construction stormwater management system before dismantlement begins, or some combination of the two. In all cases, stormwater discharges will be controlled to meet the requirements of the Generic Permit for Construction, and appropriate pollution prevention techniques will be implemented to minimize erosion and sedimentation and properly manage stormwater. Separate NOIs will be submitted and FPL will prepare a SWPPP for each phase.

The conceptual construction drainage plan for the Site is presented in Figures 4.8.2-1a and 4.8.2-1b.

Prior to dismantlement of Units 1 through 4 and construction activities associated with the combined cycle unit, silt fences or equivalent will be installed in accordance with the SWPPP along the perimeter of areas designated for dismantlement, those areas to be used for new construction support, and where offsite runoff may occur. Stormwater detention ponds will be installed and will serve as sedimentation ponds during dismantlement of Units 1 through 4 and the construction of PEEC. A phased approach may be used to accommodate activities associated with dismantlement of Units 1 through 4 and construction of the combined cycle unit.

During construction, the extent of earth disturbances will be minimized as much as is practical in accordance with the SWPPP. Areas outside of cut and fill operations will be protected against unnecessary equipment traffic. Aggregate surfaced areas may be provided for roads, while limerock surfacing may be provided for the construction support areas.

Construction runoff ponds (Dry Detention Areas on Figures 4.8.2-1a and 4.8.2-1b) will be installed to intercept and store runoff from earth disturbing activities. Temporary erosion and sedimentation control measures will be designed to prevent sediment from being displaced. Construction personnel and equipment will enter the Site over paved roads. Temporary construction entrances will be provided and maintained as required to minimize migration of sediment from construction areas onto public roads. Within the construction support areas, temporary swales, ditches, silt fences, and hay bales will be provided as necessary to divert runoff to detention areas and/or temporary sedimentation ponds. If necessary, driveways leading to public roads that may be impacted by construction activities will be swept periodically to remove excess sediment tracked from the Site. Sediment collected in the sedimentation ponds during construction will be removed as required, and properly disposed to maintain proper functioning of these measures. All temporary sediment and erosion control measures will be removed at the end of construction or when areas have been stabilized or incorporated into the permanent facilities.

4.8.3 Operational Site Drainage

At the completion of construction, the disturbed areas of the Site not used for PEEC will be seeded and their runoff will be routed to non-contact stormwater detention ponds (see Figures 4.8.3-1a and 4.8.3-1b). A detailed description of the pre-construction and post-construction site drainage features and associated modeling of design stormwater runoff is presented in Appendix 10.11 Stormwater Management Plan.

Operational Site runoff that is unaffected by industrial activity will be handled by the new stormwater management system. This stormwater management system will provide the required water quality and quantity treatment in dry detention areas located on the Site (see Figures 4.8.3-1a and 4.8.3-1b). The treated stormwater will be released to either the intake or discharge canals.

Runoff from the PEEC Power Block and equipment and containment areas (containment areas for transformers, oil tanks, and other oil containing or handling equipment) will be routed through an oil/water separator and then routed to the stormwater management system.

4.9 Heavy Equipment and Materials

4.9.1 Construction Materials and Equipment

Construction materials and equipment will be delivered to the Site, including the construction parking and laydown areas, by existing roadways. I-595/Eller Drive, SE 14th Avenue, and SE 19th Avenue/Eisenhower Boulevard will be used during construction of the Project.

The construction activities for the Project will occur within the existing Site construction parking and laydown areas located on the eastern portion of the area to be certified, which is south of Eisenhower Boulevard and north of the discharge canal. Additional laydown and staging may occur in the area north of the existing westernmost administration building and parking area (see Figure 3.1.1-3.) As necessary, additional clean fill materials suitable for the construction of the Project will be placed within the appropriate areas. Limestone and aggregate will be used as necessary for stabilization of the construction parking and laydown areas associated with the Project.

Equipment and component parts of the combined cycle unit will be unloaded and moved around the Site using portable cranes and trucks. Some of the heaviest items, such as the new CTs, steam turbine, electric generators, HRSGs, and transformers, may require special transport. Pollution control measures for the laydown areas will include runoff collection as discussed above in Section 4.8. As necessary, additional temporary access required for the construction support areas and the construction parking and laydown areas may be surfaced with aggregate/limerock with reasonable precautions taken to control fugitive dust (see Subsection 5.5.2).

4.9.2 Roads

Trucks and equipment associated with the construction of the Project will travel to the Site, and the construction parking and laydown areas, by using I-595, Eller Drive and SE 14th Avenue as well as SE 19th Avenue and Eisenhower Boulevard. Existing Plant gates provide access from SE 14th Avenue and Eisenhower Boulevard and will be used as access to the Site. Analysis of construction traffic impacts is presented in greater detail in Subsection 5.7.2 and SCA Appendix 10.7.4, Traffic Information. Eller Drive and SE 14th Avenue will continue to be used for trucks and equipment necessary to support the operation of PEEC. Operational traffic is discussed in greater detail in Subsection 6.9.1.

4.9.3 Rail/Ship

Equipment that cannot be transported to the area by highway may be transported by rail or ship. Heavy components such as turbine sections, transformers, and generators may be delivered to the Site through the Port, or the rail spur located just south of the Site adjacent to Eller Drive.

4.10 Associated Linear Facilities

Associated linear facilities for the Project include ULSD fuel infrastructure and an aquatic organism return system as described in Subsection 3.2.4. Subsection 3.3.6.2 provides an ecological description of the associated linear facilities corridors. As described in this subsection, the corridors proposed for the USLD oil infrastructure and aquatic organism return system are occupied by existing industrial facilities. As a result, there will be no adverse environmental impacts due to the construction and operation of the PEEC associated linear facilities.

PEEC will not require any other new associated linear facilities. PEEC will connect to the FPL transmission network through the existing 230 kV and 138 kV system switchyard.

4.11 Emergency Disaster Preparedness Plans

FPL has comprehensive emergency disaster preparedness plans for both operational emergencies and natural disasters that can occur in Florida (e.g., hurricanes). FPL has been an industry leader in the preparation for hurricanes and in the recovery after a storm. FPL will continue with these efforts in the future, and enhance emergency preparedness plans for new projects like PEEC. The existing Port Everglades Plant currently has an Emergency Action Plan. This Emergency Action Plan will be updated based on the design and operation of PEEC.

For PEEC, a hurricane shelter and emergency generators will be located in the Power Block area. The PEEC Emergency Action Plan will include descriptions of the hurricane shelter and emergency generators.

TABLE 4.3.0-1
TYPICAL NATURAL GAS COMPOSITION

Composition	Mole %
Nitrogen (N_2)	0.27 - 0.45
Helium (He)	0.01
Carbon Dioxide (CO_2)	0.44 - 0.88
Methane (CH_4)	96 - 97.0
Ethane (C_2H_6)	1.8 - 2.6
Propane (C_3H_8)	0.16 - 0.29
Butane (C_4H_{10})	0.011 - 0.017
Pentanes (C_5H_{12})	0.007 - 0.03
Hexanes (C_6H_{14})	0.03
Heptanes (C_7H_{16})	0.01
Octanes (C_8H_{18})	0.0
Argon, Oxygen (Ar, O_2)	0.0
Sulfur (S)	2 grains per 100 scf
Water Vapor (H_2O)	0.6 lb/MMscf

Low Heating Value (LHV) = 21,000 Btu/lb; 920 Btu/scf (approximate).
High Heating Value (HHV) = 23,300 Btu/lb; 1,020 Btu/scf (approximate).

Note: scf = standard cubic feet.
MM = million.

TABLE 4.3.0-2
TYPICAL ULTRA LOW SULFUR LIGHT OIL COMPOSITION

Elements	Maximum
Carbon Residue	0.35 % on 10% Bottoms
Water and Sediment	0.05 %
Ash	0.01 %
Vanadium	0.5 ppm
Sodium and potassium	0.5 ppm
Lead	1 ppm
Calcium	2 ppm
Sulfur	0.0015 wt. %

Low Heating Value (LHV) = 18,400 Btu/lb; 129,900 Btu/gallon (approximate).
High Heating Value (HHV) = 19,500 Btu/lb; 137,700 Btu/gallon (approximate).

Note: ppm = parts per million.

TABLE 4.4.1-1A
STACK, OPERATING, AND EMISSION DATA FOR
THE COMBUSTION TURBINES/HRSGS FOR PEEC OPERATION—
NATURAL GAS COMBUSTION, MPS 501J CT

		Operating and Emission Data[a] for Ambient Temperature			
		Combustion Turbine/ HRSG			
Parameter	**Units**	**35 °F**	**59 °F**	**75 °F**	**95 °F**
CT/HRSG Stack Data					
Height	ft	149	149	149	149
Diameter	ft	22.0	22.0	22.0	22.0
100 Percent Load					
Temperature	°F	196	195	195	195
Velocity	ft/sec	61.1	58.9	57.3	55.3
Maximum Hourly Emissions per Unit					
SO_2	lb/hr	17.0	16.3	15.8	15.2
$PM/PM_{10}/PM_{2.5}$	lb/hr	8.4	8.1	7.8	7.5
NO_x	lb/hr	21.4	20.5	19.8	19.0
CO	lb/hr	58.5	56.2	54.3	52.1
VOC (as methane)	lb/hr	3.7	3.6	3.5	3.3
Sulfuric Acid Mist	lb/hr	3.3	3.2	3.1	3.0
75 Percent Load					
Temperature	°F	184	185	186	187
Velocity	ft/sec	49.2	47.2	45.8	44.2
Maximum Hourly Emissions per Unit					
SO_2	lb/hr	13.7	13.0	12.6	12.0
$PM/PM_{10}/PM_{2.5}$	lb/hr	6.8	6.5	6.3	6.0
NO_x	lb/hr	17.0	16.1	15.5	14.8
CO	lb/hr	46.6	44.2	42.4	40.6
VOC (as methane)	lb/hr	3.0	2.8	2.7	2.6
Sulfuric Acid Mist	lb/hr	2.67	2.53	2.44	2.34
50 Percent Load					
Temperature	°F	184	185	186	187
Velocity	ft/sec	38.7	38.0	37.4	36.7
Maximum Hourly Emissions per Unit					
SO_2	lb/hr	10.4	9.9	9.6	9.2
$PM/PM_{10}/PM_{2.5}$	lb/hr	5.3	5.1	4.9	4.8
NO_x	lb/hr	13.0	12.3	11.8	11.4
CO	lb/hr	35.5	33.7	32.4	31.1
VOC (as methane)	lb/hr	2.3	2.1	2.1	2.0
Sulfuric Acid Mist	lb/hr	2.03	1.93	1.87	1.79

[a] Refer to Appendix 10.2.5, Subappendix A for detailed information on basis of pollutant emission rates and operating data

Source: MPS, 2011 - CT Performance Data; Golder Associates, 2011.

TABLE 4.4.1-1B
STACK, OPERATING, AND EMISSION DATA FOR
THE COMBUSTION TURBINES/HRSGS FOR PEEC OPERATION—
NATURAL GAS COMBUSTION, SIEMENS H CT

		Operating and Emission Data[a] for Ambient Temperature			
		Combustion Turbine/ HRSG			
Parameter	**Units**	**35 °F**	**59 °F**	**75 °F**	**95 °F**
CT/HRSG Stack Data					
Height	ft	149	149	149	149
Diameter	ft	22.0	22.0	22.0	22.0
100 Percent Load					
Temperature	°F	196	195	195	195
Velocity	ft/sec	63.1	60.4	58.2	55.9
Maximum Hourly Emissions per Unit					
SO_2	lb/hr	15.6	14.9	14.3	13.7
$PM/PM_{10}/PM_{2.5}$	lb/hr	15.1	13.9	13.7	12.6
NO_x	lb/hr	21.2	20.2	19.4	18.6
CO	lb/hr	32.2	31.0	30.0	28.0
VOC (as methane)	lb/hr	3.7	3.5	3.4	3.2
Sulfuric Acid Mist	lb/hr	3.0	2.9	2.8	2.7
80 Percent Load					
Temperature	°F	184	185	186	187
Velocity	ft/sec	51.1	48.6	47.8	46.2
Maximum Hourly Emissions per Unit					
SO_2	lb/hr	12.9	12.0	11.6	10.9
$PM/PM_{10}/PM_{2.5}$	lb/hr	12.4	11.2	11.0	10.9
NO_x	lb/hr	17.6	16.4	15.8	14.9
CO	lb/hr	54.0	50.0	48.0	45.0
VOC (as methane)	lb/hr	3.1	2.9	2.8	2.6
Sulfuric Acid Mist	lb/hr	2.5	2.34	2.26	2.13
60 Percent Load					
Temperature	°F	184	185	186	187
Velocity	ft/sec	43.2	41.6	41.1	40.0
Maximum Hourly Emissions per Unit					
SO_2	lb/hr	10.5	9.9	9.5	9.0
$PM/PM_{10}/PM_{2.5}$	lb/hr	10.7	10.6	10.5	10.4
NO_x	lb/hr	14.4	13.5	13.0	12.2
CO	lb/hr	44.0	41.1	40.0	37.2
VOC (as methane)	lb/hr	2.5	2.4	2.3	2.1
Sulfuric Acid Mist	lb/hr	2.03	1.92	1.85	1.75

[a] Refer to Appendix 10.2.5, Subappendix B for detailed information on basis of pollutant emission rates and operating data

Source: Siemens, 2011 - CT Performance Data; Golder Associates, 2011.

TABLE 4.4.1-2A
STACK, OPERATING, AND EMISSION DATA FOR
THE COMBUSTION TURBINES/HRSGS FOR FOR PEEC OPERATION—
ULTRA LOW SULFUR DISTILLATE OIL COMBUSTION, MPS 501J CT

		Operating and Emission Data[a] for Ambient Temperature Combustion Turbine/ HRSG			
Parameter	**Units**	**35 °F**	**59 °F**	**75 °F**	**95 °F**
CT/HRSG Stack Data					
Height	ft	149	149	149	149
Diameter	ft	22	22	22	22
100 Percent Load					
Temperature	°F	359	357	355	354
Velocity	ft/sec	77.1	73.3	70.9	68.0
Maximum Hourly Emissions per Unit					
SO_2	lb/hr	4.0	3.7	3.6	3.4
$PM/PM_{10}/PM_{2.5}$	lb/hr	20.8	19.8	19.2	18.4
NO_x	lb/hr	78.2	73.3	70.6	66.8
CO	lb/hr	208.3	195.3	187.9	177.9
VOC (as methane)	lb/hr	34.0	31.9	30.7	29.0
Sulfuric Acid Mist	lb/hr	0.77	0.73	0.70	0.67
Lead	lb/hr	0.036	0.034	0.033	0.031
75 Percent Load					
Temperature	°F	359	357	355	354
Velocity	ft/sec	62.9	60.0	58.1	55.5
Maximum Hourly Emissions per Unit					
SO_2	lb/hr	3.2	3.1	2.9	2.8
$PM/PM_{10}/PM_{2.5}$	lb/hr	17.0	16.3	15.7	15.1
NO_x	lb/hr	63.4	60.0	57.7	54.8
CO	lb/hr	168.9	159.7	153.7	145.9
VOC (as methane)	lb/hr	27.6	26.1	25.1	23.8
Sulfuric Acid Mist	lb/hr	0.63	0.60	0.57	0.55
Lead	lb/hr	0.029	0.028	0.027	0.026
50 Percent Load					
Temperature	°F	359	357	355	354
Velocity	ft/sec	53.7	51.5	49.9	47.8
Maximum Hourly Emissions per Unit					
SO_2	lb/hr	2.8	2.7	2.6	2.5
$PM/PM_{10}/PM_{2.5}$	lb/hr	14.5	13.9	13.5	13.0
NO_x	lb/hr	55.0	52.1	50.3	47.9
CO	lb/hr	146.4	138.8	134.0	127.5
VOC (as methane)	lb/hr	23.9	22.7	21.9	20.8
Sulfuric Acid Mist	lb/hr	0.55	0.52	0.50	0.48
Lead	lb/hr	0.026	0.024	0.023	0.022

[a] Refer to Appendix 10.2.5, Subappendix A for detailed information on basis of pollutant emission rates and operating data.

Source: MPS, 2011 - CT Performance Data; Golder Associates, 2011.

TABLE 4.4.1-2B
STACK, OPERATING, AND EMISSION DATA FOR
THE COMBUSTION TURBINES/HRSGS FOR FOR PEEC OPERATION—
ULTRA LOW SULFUR DISTILLATE OIL COMBUSTION, SIEMENS H CT

		Operating and Emission Data[a] for Ambient Temperature Combustion Turbine/ HRSG			
Parameter	**Units**	**35 °F**	**59 °F**	**75 °F**	**95 °F**
CT/HRSG Stack Data					
Height	ft	149	149	149	149
Diameter	ft	22	22	22	22
100 Percent Load					
Temperature	°F	359	357	355	354
Velocity	ft/sec	79.4	75.8	72.8	68.3
Maximum Hourly Emissions per Unit					
SO_2	lb/hr	4.1	3.9	3.8	3.6
$PM/PM_{10}/PM_{2.5}$	lb/hr	60.1	57.0	55.0	51.9
NO_x	lb/hr	88.8	84.6	81.0	77.3
CO	lb/hr	68.0	64.0	62.0	59.0
VOC (as methane)	lb/hr	39.0	37.0	35.0	34.0
Sulfuric Acid Mist	lb/hr	0.80	0.76	0.73	0.70
Lead	lb/hr	0.038	0.036	0.034	0.033
80 Percent Load					
Temperature	°F	359	357	355	354
Velocity	ft/sec	64.1	61.6	59.6	57.3
Maximum Hourly Emissions per Unit					
SO_2	lb/hr	3.4	3.2	3.1	2.9
$PM/PM_{10}/PM_{2.5}$	lb/hr	48.9	46.8	44.8	42.8
NO_x	lb/hr	73.9	69.5	66.3	62.3
CO	lb/hr	56.0	53.0	50.0	47.0
VOC (as methane)	lb/hr	32.0	30.0	29.0	27.0
Sulfuric Acid Mist	lb/hr	0.67	0.63	0.60	0.56
Lead	lb/hr	0.031	0.030	0.028	0.027
70 Percent Load					
Temperature	°F	359	357	355	354
Velocity	ft/sec	57.9	56.0	54.5	52.7
Maximum Hourly Emissions per Unit					
SO_2	lb/hr	3.1	2.9	2.8	2.7
$PM/PM_{10}/PM_{2.5}$	lb/hr	43.8	42.8	40.7	39.7
NO_x	lb/hr	67.6	63.6	60.6	57.1
CO	lb/hr	51.0	48.0	46.0	43.0
VOC (as methane)	lb/hr	29.0	28.0	26.0	25.0
Sulfuric Acid Mist	lb/hr	0.61	0.57	0.55	0.52
Lead	lb/hr	0.029	0.027	0.026	0.024

[a] Refer to Appendix 10.2.5, Subappendix B for detailed information on basis of pollutant emission rates and operating data.

Source: Siemens, 2011 - CT Performance Data; Golder Associates, 2011.

TABLE 4.4.1-3A
SUMMARY OF MAXIMUM POTENTIAL ANNUAL EMISSIONS FOR PEEC OPERATION, MPS 501J CT

	PEEC Project Maximum Potential Annual Emissions (TPY)								Netting Calculations		
Pollutant	3 CTs/HRSGs [a]	1 Auxiliary Boiler [b]	2 Emergency Generators	1 Natural Gas Heater	2 Gas Compressors	1 Fire Pump Engine	Fuel Oil Storage Tank	TOTAL	Maximum 2-Year Average from Existing Units 1 to 4 [c] (TPY)	Change (TPY)	PSD Significant Emission Rate (TPY)
SO_2	208	0.56	0.003	0.24	2.60	0.00018	NA	211	9,494	-9,283	40
PM	120	0.74	0.28	0.32	2.98	0.013	NA	124	604	-479	25
PM_{10}	120	0.74	0.28	0.32	2.98	0.013	NA	124	604	-479	15
$PM_{2.5}$	120	0.74	0.28	0.32	2.98	0.013	NA	124	402	-278	10
NO_x	337	4.99	4.87	4.25	25.2	0.22	NA	376	4,260	-3,884	40
CO	914	7.98	6.00	3.57	25.6	0.086	NA	958	885	73	100
VOC (as methane)	86.2	0.54	0.71	0.23	7.3	0.033	5.82	101	77	23.8	40
Sulfuric Acid Mist	40.4	Neg.	Neg.	Neg.	Neg.	Neg.	NA	40.4	422	-382	7
Lead	0.049	Neg.	Neg.	Neg.	Neg.	Neg.	NA	0.049	0.10	-0.049	0.6
Greenhouse Gases (CO_2e)	4,410,327	11,670	687	5,072	55,313	15	NA	4,483,085	2,551,038	1,932,047	75,000

Source: Golder, 2011.

[a] Based on oil-firing for 1,000 hours (maximum).

[b] An auxiliary boiler is only required to supply steam to the MPS 501J CT during startup.

[c] Based on actual emissions from Annual Operating Reports from 2006-2010.

Note: Neg.= negligible; NA= not applicable

TABLE 4.4.1-3B
SUMMARY OF MAXIMUM POTENTIAL ANNUAL EMISSIONS FOR PEEC OPERATION, SIEMENS H CT

	PEEC Project Maximum Potential Annual Emissions (TPY)							Netting Calculations		
Pollutant	**3 CTs/HRSGs** [a]	**2 Emergency Generators**	**1 Natural Gas Heater**	**2 Gas Compressors**	**1 Fire Pump Engine**	**Fuel Oil Storage Tank**	**TOTAL**	**Maximum 2-Year Average from Existing Units 1 to 4** [b] **(TPY)**	**Change (TPY)**	**PSD Significant Emission Rate (TPY)**
SO_2	187	0.003	0.24	2.60	0.00018	NA	190	9,494	-9,304	40
PM	242	0.28	0.32	2.98	0.013	NA	246	604	-358	25
PM_{10}	242	0.28	0.32	2.98	0.013	NA	246	604	-358	15
$PM_{2.5}$	242	0.28	0.32	2.98	0.013	NA	246	402	-156	10
NO_x	348	4.87	4.25	25.2	0.22	NA	382	4,260	-3,878	40
CO	631	6.00	3.57	25.6	0.086	NA	666	885	-219	100
VOC (as methane)	92.1	0.71	0.23	7.3	0.033	5.82	106	77	29.2	40
Sulfuric Acid Mist	36.4	Neg.	Neg.	Neg.	Neg.	NA	36.4	422	-386	7
Lead	0.052	Neg.	Neg.	Neg.	Neg.	NA	0.052	0.10	-0.047	0.6
Greenhouse Gases (CO_2e)	4,058,754	687	5,072	55,313	15	NA	4,119,841	2,551,038	1,568,804	75,000

Source: Golder, 2011.

[a] Based on oil-firing for 1,000 hours (maximum).

[b] Based on actual emissions from Annual Operating Reports from 2006-2010.

Note: Neg.= negligible; NA= not applicable

TABLE 4.6.0-1
PEEC WASTE STREAMS, CHARACTERIZATION AND DISPOSAL METHOD (Page 1 of 2)

Waste Streams (Process Water Systems)	Non Hazardous Basis for Characterization	Hazardous Basis for Characterization	Disposal Management Process
Demineralized Water RO Reject	Based on analytical characterization of historical data	—	Disposed of depending upon source. Refer to Sections 4.5.4 and 4.6.4.
Heat Recovery Steam Generator Blowdown	Based on analytical characterization of historical data	—	Reused in wastewater process or disposed of as industrial wastewater into the circulating water system (cooling water discharge).
Cooling System Water (Biocide Addition Chlorine, Scale Inhibitor, Pretreatment Chemicals)	Based on analytical characterization by vendor supplying chemical	—	Disposed of as industrial wastewater into the circulating water system.
Steam Cycle Water Treatment (Hydrazine, Ammonia, Sodium Phosphate)	Based on analytical characterization by historical data	—	Chemicals breakdown in steam cycle [any residual chemicals are disposed of by HRSG blowdown into circulating water system (cooling water discharge)].
Heat Recovery and Steam Generator as Well as Pre-boiler Piping Chemical Cleaning	Based upon analytical waste stream characterization.	Based upon analytical waste stream characterization	If non-hazardous, will be disposed into circulating water system. If hazardous, then disposed of by a licensed approved contractor.
Miscellaneous Drains	Based on analytical characterization of historical data	—	Disposed of as industrial wastewater into the circulating water system.

TABLE 4.6.0-1
PEEC WASTE STREAMS, CHARACTERIZATION AND DISPOSAL METHOD (Page 2 of 2)

Waste Streams (Construction and Operations)	Non Hazardous Basis for characterization	Hazardous Basis for characterization	Disposal Management Process
Construction-Related Waste Water (e.g., ammoniated process water for hydrostatic testing and backfilling, groundwater from dewatering and steam blow quench water, etc.)	Based on historical data	—	Disposed of depending on source. Refer to Chapter 5.
Water Pretreatment Solid Waste	Based on analytical results	—	Disposed of by an approved disposal contractor.
Rags	As per EPA in 40 CFR 279	—	Recycled via laundering by FDEP-approved vendor or disposed of in landfill.
Punctured Aerosol Cans	As per EPA characterization letter	—	Disposed of by an approved scrap metal contractor.
Captured Paint Residuals from Punctured Aerosol Cans	—	Analytical data from waste characterization	As hazardous waste in accordance with 40 CFR, Part 261.
X-ray Weld Testing	—	—	Process does not generate waste chemicals onsite. Vendor is responsible for their waste generation.
Florescent Bulbs and Batteries	—	As per 40 CFR 273 EPA determination	Recycled as universal waste.
Oily Separated Waste Water	Based on analytical results	—	Separated water is routed to onsite ponds. Oil is disposed of by an approved waste disposal contractor.
Oily Solid Wastes	As per EPA in 40 CFR 279	—	Disposed of by an approved waste disposal contractor.

Note: Wastes during dismantlement of Units 1 through 4 are discussed in Section 5.1.

TABLE 4.7.0-1
FPL GENERAL WASTE HANDLING GUIDELINES (Page 1 of 2)

GENERAL WASTE HANDLING GUIDELINES

1. All effort should be taken to reduce and/or eliminate waste generation.
2. All effort should be taken to reuse and/or recycle wastes.
3. Label all containers so that contents can easily be determined and products used.
4. If waste is hazardous due to a hazardous constituent in the original product, try to substitute with a non-hazardous product, if feasible.
5. If waste is generated, see attached list for disposal options and instructions.
6. If waste is hazardous and is required to be placed into satellite accumulation drums, contact Environmental Plant Leader.
7. If waste cannot be identified, contact Environmental Plant Leader.

WASTE HANDLING INSTRUCTIONS
<u>Recycling</u>

1. Cardboard: flatten and place in designated area.
2. Pallets (poor condition) and scrap wood: place in designated area.
3. White paper and file stock: place in designated bin.
4. Aluminum cans: place in designated bin marked “Aluminum Cans”.
5. Metal scrap: place in “metal” designed dumpster.
6. Empty drums (poor condition): empty, crush and place in “metal” dumpster.
7. Fluorescent bulbs (intact): place into original box and store in Universal Waste Storage Area.
8. Lead acid batteries: place on pallet in Hazardous Waste Area.
9. Dry alkaline cell batteries: place in appropriate designated universal waste bin.
10. Ni Cad batteries (includes all communication type batteries, i.e., cell phone/pager batteries): place in appropriate bin.
11. Empty aerosol cans: puncture with can puncturing device and place can into scrap metal drum designated for this purpose. Residual materials in drum are managed as Hazardous Waste.

TABLE 4.7.0-1
FPL GENERAL WASTE HANDLING GUIDELINES (Page 2 of 2)

Recycling (continued)

12. Used oil filters: drain filters for at least 24 hours and place drained oil filters into appropriate drums. Do not put plastic bags into drum.
13. Metal shavings: place in designated scrap metal drum.
14. Mercury liquid: notify Environmental Plant Leader.

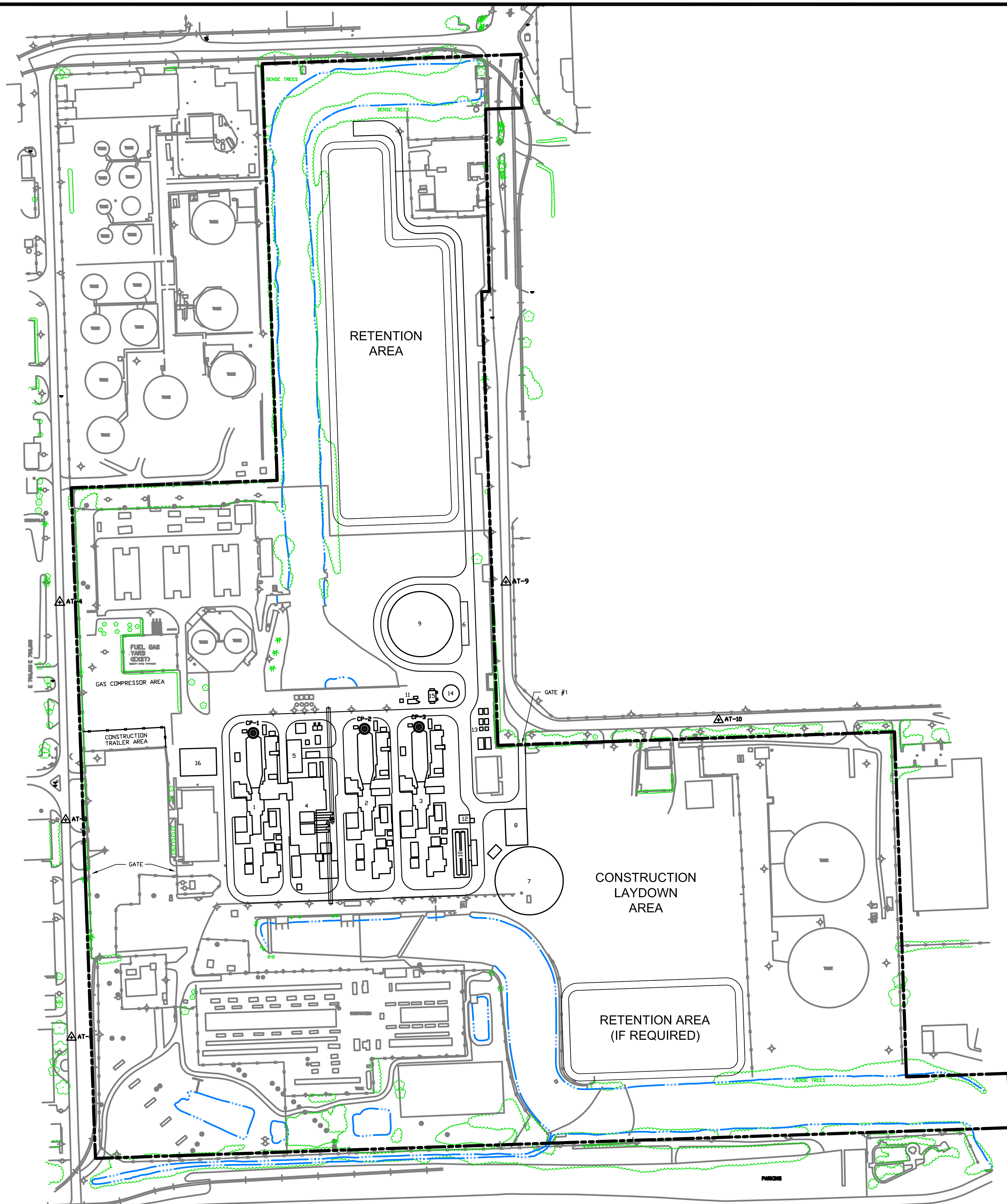
Non-Regulated Waste Disposal

1. Normal trash: minimize and dispose, place into Plant dumpster.
2. Used oil: place into Accumulation Area designated for this purpose.
3. Solid oily waste: place into Solid Oily Waste Dumpster designated for this purpose.
4. Parts cleaning solution: use parts cleaner for all parts cleaning. For special parts cleaning applications, see Environmental Plant Leader for instructions. Also contact Environmental Plant Leader when parts cleaning fluid is spent.

Hazardous Waste Disposal *

1. Solvent-contaminated rags: place into "Solvent Rag" Satellite Accumulation Drum Area. When full, place in Hazardous Waste Area unless rag laundering program has been implemented. Where rag laundering program has been implemented, place rags into designated bins.
2. Solid paint cleanup material: place into Satellite Accumulation Drum Area. When full, place in Hazardous Waste Area.
3. Laboratory waste: place in Satellite Accumulation Drum Area. This drum is for use by on-shift production personnel performing water chemistry. When full, place in Hazardous Waste Area.
4. Outdated lab chemicals: these chemicals will be lab packed by the Environmental Plant Leader.
5. Aerosol can waste (punctured and non-punctured): collect in Satellite Accumulation Drum Area. When full, place in Hazardous Waste Area.
6. Waste paint-related material: place in Satellite Accumulation Drum Area. When full, place in Hazardous Waste Area.
7. Bead blasting material: place in drum designated for this purpose. When full, place in Hazardous Waste Area.

*** While accumulated onsite, hazardous waste drums must include the words "Hazardous Waste" and the accumulation start date. Drums used for satellite accumulation of hazardous waste may use words that identify the contents until moved to storage for disposal and then the words "Hazardous Waste" and the accumulation date(s) must be added.**



LEGEND

PROPERTY LINE

WATER

VEGETATION / BRUSH

FACILITIES LEGEND				
ITEM NO.	DESCRIPTION	NORTH	EAST	REFERENCE LOCATION
1	COMBUSTION TURBINE NO. 5A			
2	COMBUSTION TURBINE NO. 5B			
3	COMBUSTION TURBINE NO. 5C			
4	STEAM TURBINE 5			
5	CONTROL/HURRICANE SHELTER			
6	FUEL TRUCK UNLOADING			
7	DEMINERALIZED WATER STORAGE TANK			
8	DEMIN WATER TREATMENT TRAILER PARKING			
9	FUEL STORAGE TANK			
10	AMMONIA STORAGE TANK & TRANSFER PUMPS			
11	AUX BOILER			
12	H2 BULK STORAGE			
13	AIR COMPRESSORS & RECEIVERS			
14	FIRE WATER STORAGE TANK			
15	FIRE PUMP SHELTER			
16	DRY STORAGE			

REFERENCES

1.) BASE MAP TAKEN FROM CADD FILE ORIGINALLY PREPARED BY BLACK & VEATCH TITLED "FLORIDA POWER & LIGHT, PORT EVERGLADES PLANT, SITE – ARRANGEMENTS, OVERALL SITE PLOT PLAN", DRAWING No. AND CADD FILE NAME 174101–DS–0001, REVISION 0, DATED 08/18/11.

325 0 325

SCALE FEET

REV	DATE	DES	REVISION DESCRIPTION	CADD	CHK	RVW

PROJECT

FPL
PORT EVERGLADES ENERGY CENTER

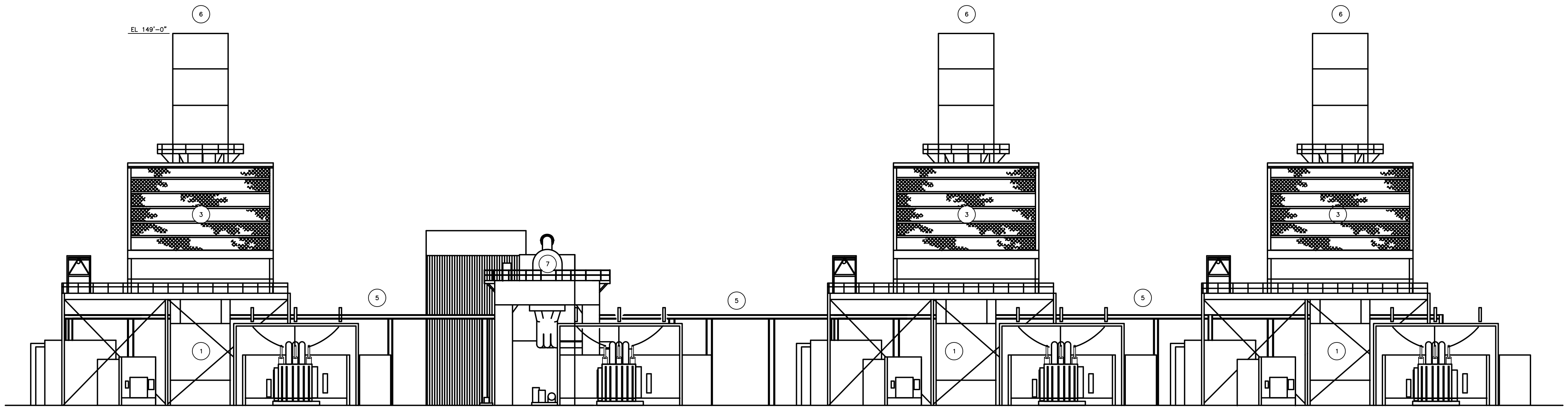
TITLE

CONCEPTUAL PLOT PLAN

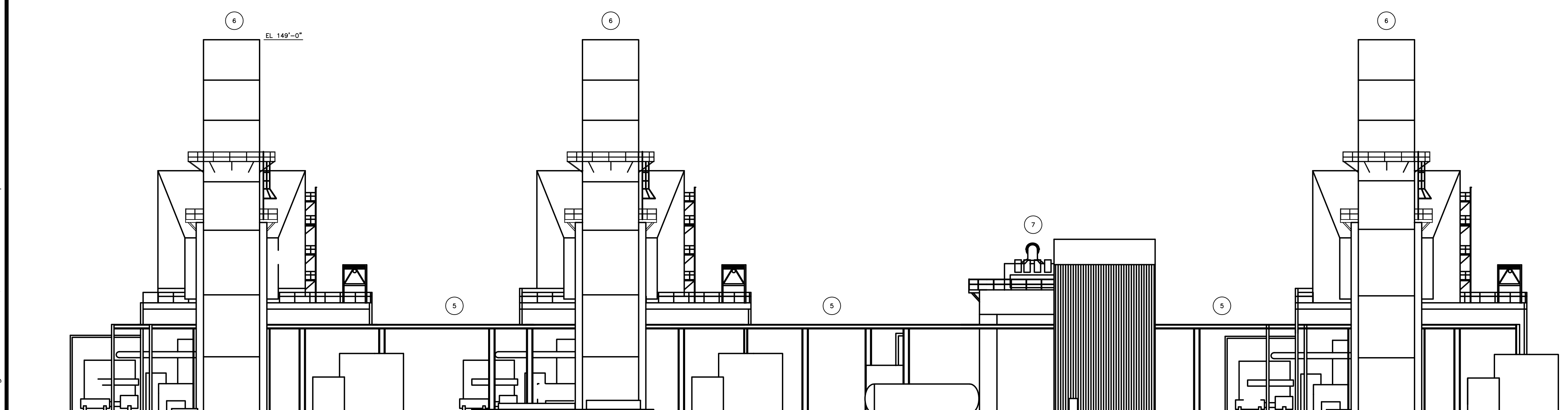
FPL

PROJECT No.		113–87618	FILE No.	11387618–A019
DESIGN	RL	08/25/11	SCALE AS SHOWN	REV. 0
CADD	NRL	1/13/2012	4.2.0-1	
CHECK	RCM	1/13/2012		
REVIEW	KFK	1/13/2012		

Drawing file: 113–87618A019 ConceptualSitePlan.dwg Jan 13, 2012 – 7:39pm



SOUTH ELEVATION
SCALE: 1"=30'-0"



NORTH ELEVATION
SCALE: 1"=30'-0"

LEGEND

ITEM NO.	DESCRIPTION
1	GAS TURBINE & GENERATOR
2	
3	GT AIR INLET FILTER
4	
5	PIPE RACK
6	STACK
7	STEAM TURBINE

REFERENCES: ORGINAL PROFILES CREATED BY BLACK & VEATCH. DRAWING NAME SITE-ARRANGEMENTS ELEVATIONS DRAWING No. 174101-DS-0051, Rev. 0. DATED 18/AUG/2011

REV	DATE	DES	REVISION DESCRIPTION	CADD	CHK	RVW
0	01/01/01	XXX	REV_DESC	XXX		

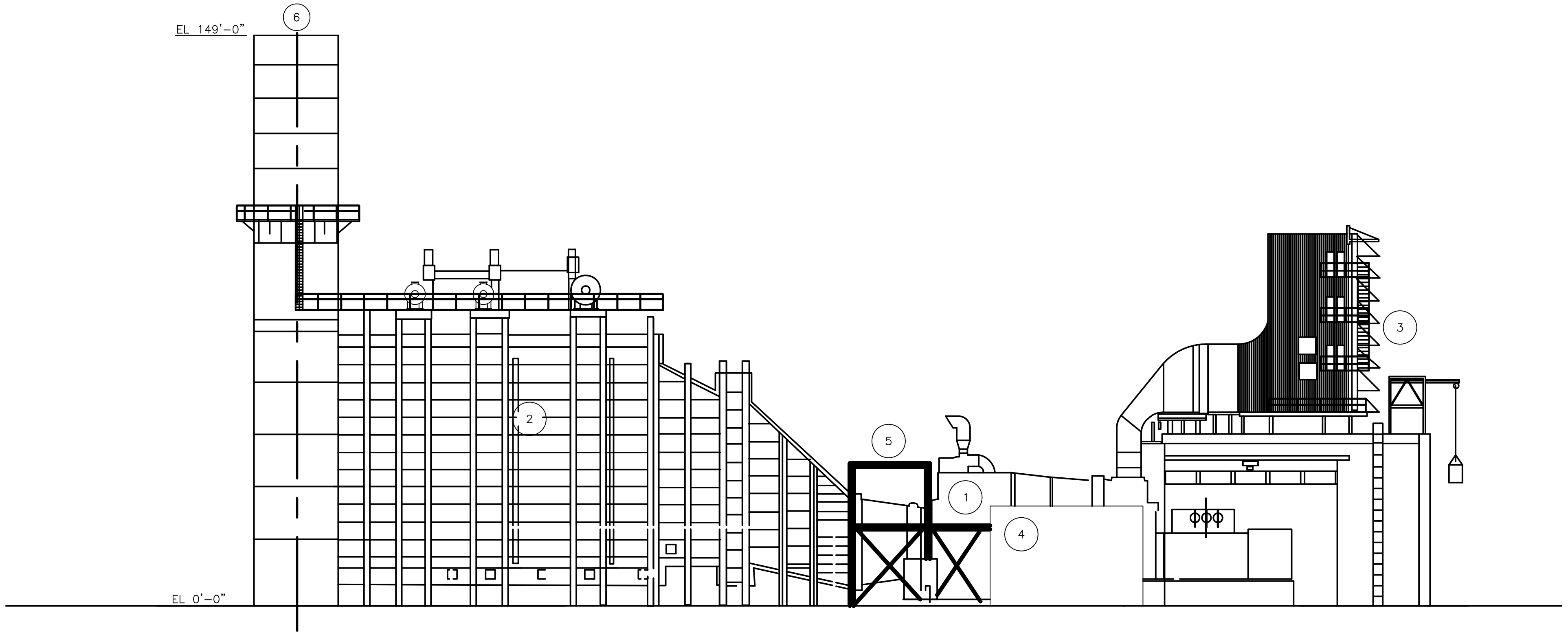
PROJECT
FPL
PORT EVERGLADES ENERGY CENTER

TITLE
NORTH-SOUTH PROFILE OF COMBUSTION TURBINES AND HRSGs

FPL

PROJECT No.		113-87618	FILE No.	113-87618A030
DESIGN	NRL	11/7/2011	SCALE AS SHOWN	REV. 0
CADD	NRL	11/7/2011		
CHECK			**FIGURE 4.2.0-2**	
REVIEW				

Drawing file: 113-87618A030_NorthSouthProfile.dwg Nov 07, 2011 - 3:30pm



WEST ELEVATION
SCALE: 1/16"=1'-0"

EAST ELEVATION
SCALE: 1/16"=1'-0"

LEGEND

ITEM NO.	DESCRIPTION
1	GAS TURBINE & GENERATOR
2	HRSG
3	GT AIR INLET FILTER
4	CT TURBINE ENCLOSURE
5	PIPE RACK
6	STACK

REFERENCES: ORGINAL PROFILES CREATED BY BLACK & VEATCH. DRAWING NAME SITE-ARRANGEMENTS ELEVATIONS DRAWING No. 174101-DS-0050, Rev. 0. DATED 18/AUG/2011

REV	DATE	DES	REVISION DESCRIPTION	CADD	CHK	RVW
0	01/01/01	XXX	REV_DESC	XXX		

PROJECT
FPL
PORT EVERGLADES ENERGY CENTER

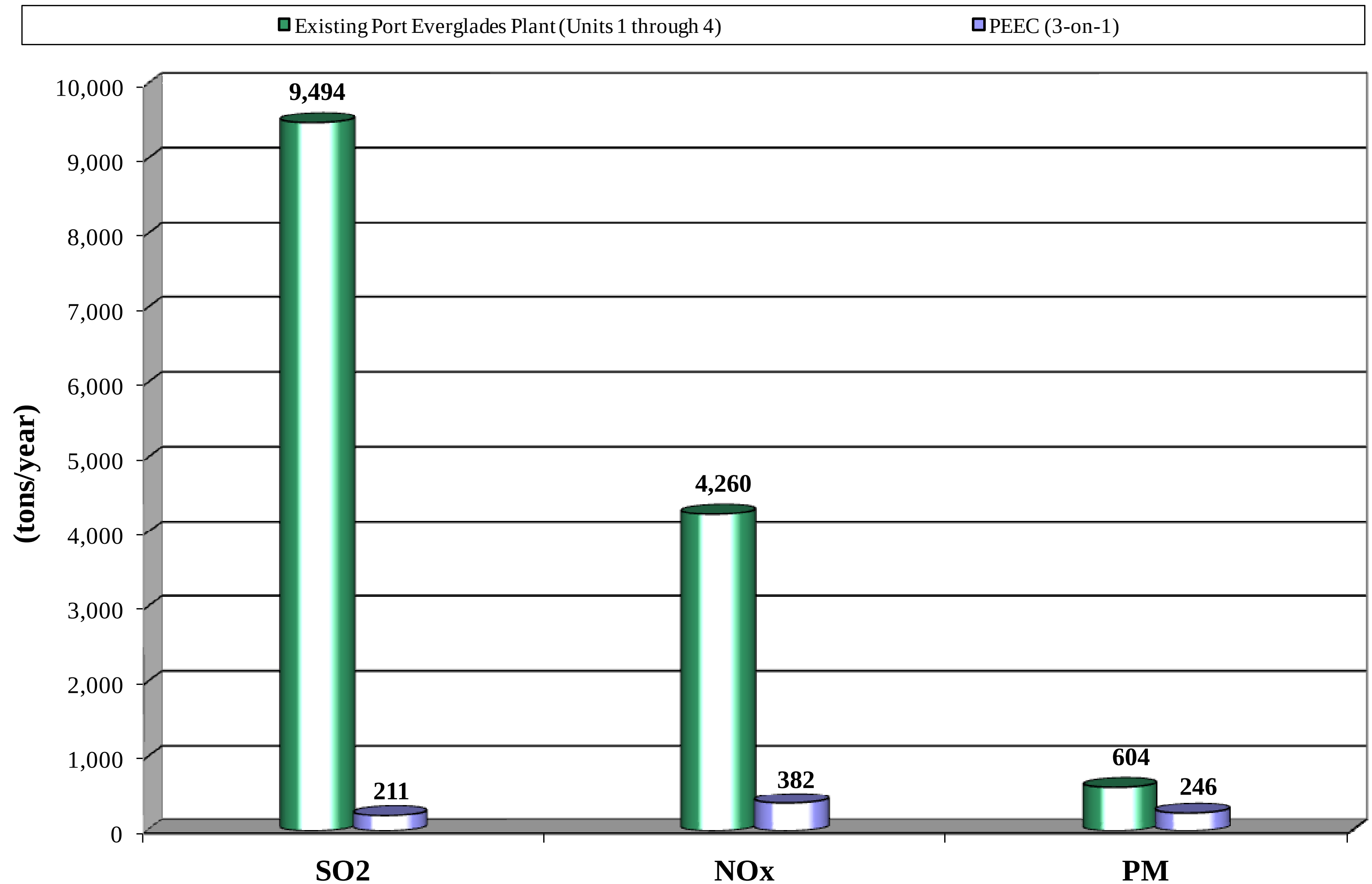
TITLE
EAST-WEST PROFILE OF COMBUSTION TURBINES AND HRSGs

FPL

PROJECT No.		113-87618	FILE No.	113-87618_A029
DESIGN	NRL	11/7/2011	SCALE AS SHOWN	REV. 0
CADD	NRL	11/7/2011		
CHECK				
REVIEW				

FIGURE 4.2.0-3

Drawing file: 113-87618A029_EastWestProfile.dwg Nov 07, 2011 - 3:30pm

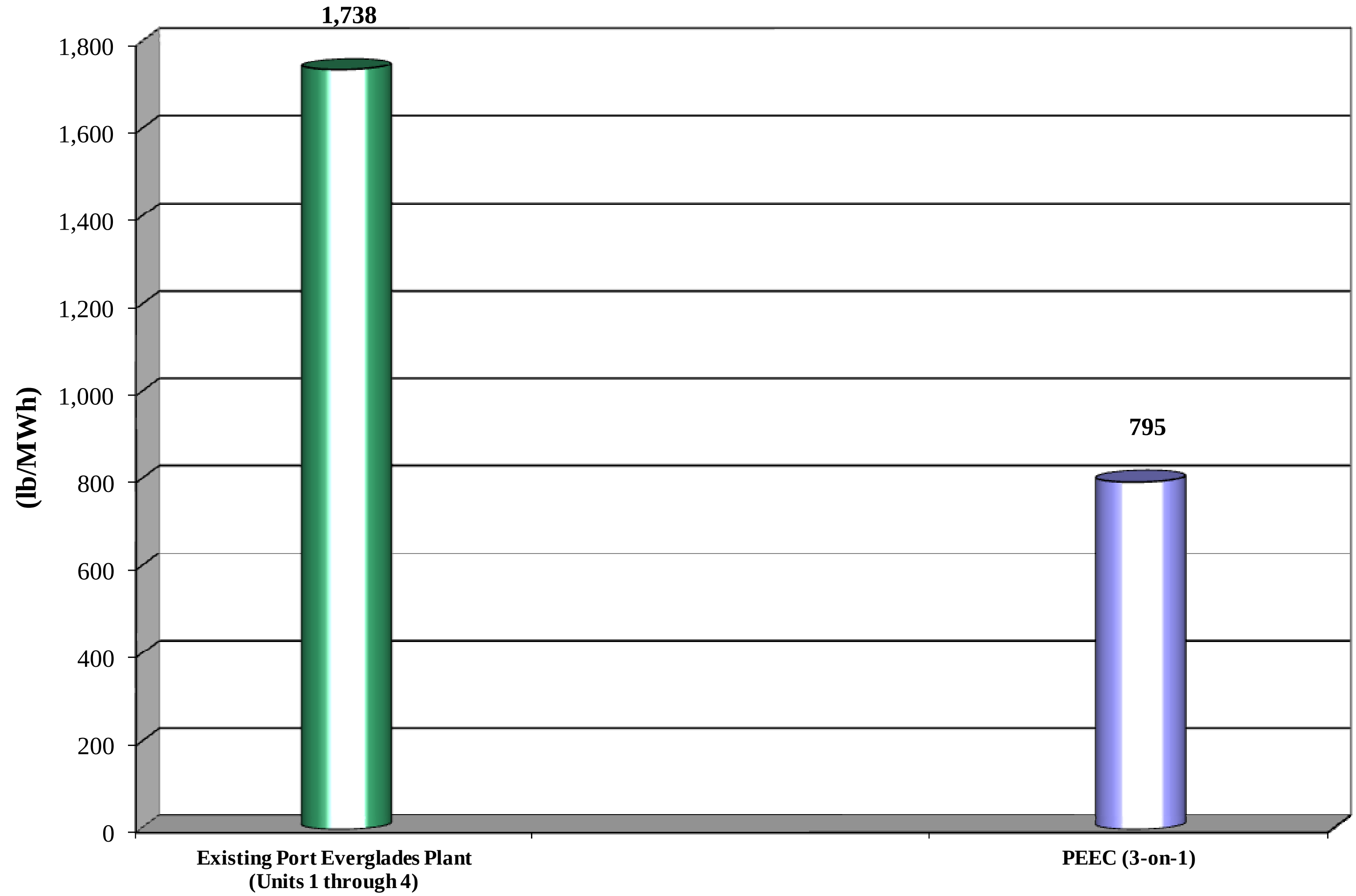


Notes: Existing Port Everglades based on 2006 and 2007 with an approximate capacity factor of 29%.
PEEC based on 100% capacity factor on natural gas and light oil;
7,760 hours on gas and 1,000 hours of oil at full load.

Figure 4.4.1-1.
Comparison of Historical Actual SO_2, NO_x, and PM Annual Emissions (TPY) for the Existing Port Everglades Plant Units 1 through 4 Compared to Projected Maximum Potential Annual Emissions (TPY) for PEEC

Y:\Projects\2011\113-87618 FPL PEEC SCA\Chapters\Chapter 4\Figures\Figure 4.4.1-1.docx

Source: Golder, 2011.



Notes: Existing Port Everglades based on 2007 eGrid Data from EPA (2010).
PEEC based on 100% capacity factor on natural gas and light oil;
7,760 hours on gas and 1,000 hours of oil at full load.

Figure 4.4.2-1.
Comparison of CO_2 Emission Rates (lb/MW-hr) for the Existing Port Everglades Plant Units 1 through 4 and PEEC

Y:\Projects\2011\113-87618 FPL PEEC SCA\Chapters\Chapter 4\Figures\Figure 4.4.2-1.docx

Source: Golder, 2011.

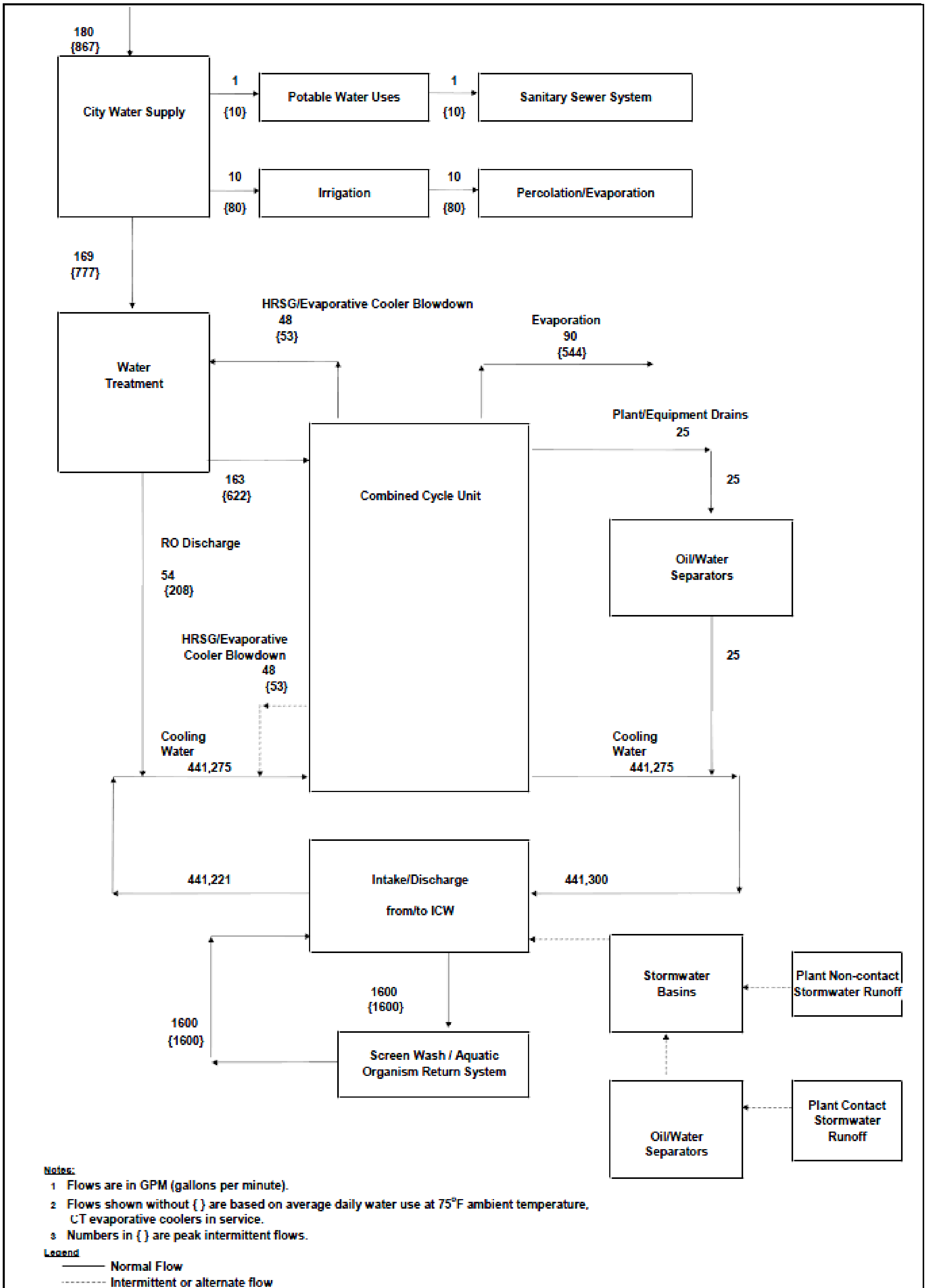


Figure 4.5.0-1
Water Balance for PEEC

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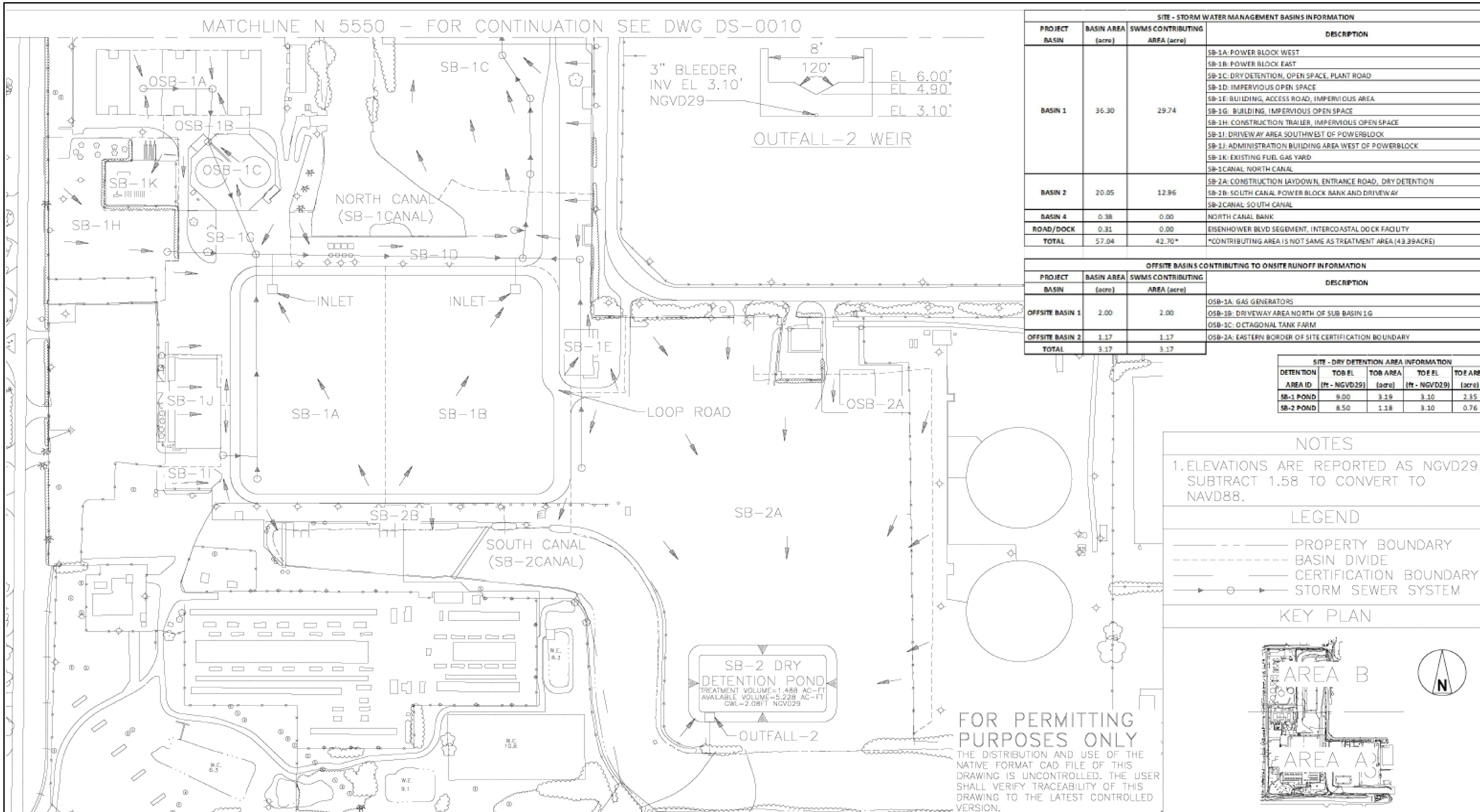
Source: FPL, 2012.



SITE - STORM WATER MANAGEMENT BASINS INFORMATION

PROJECT BASIN	BASIN AREA (acre)	SWMS CONTRIBUTING AREA (acre)	DESCRIPTION
BASIN 1	36.30	29.74	SB-1A: POWER BLOCK WEST
			SB-1B: POWER BLOCK EAST
			SB-1C: DRY DETENTION, OPEN SPACE, PLANT ROAD
			SB-1D: IMPERVIOUS OPEN SPACE
			SB-1E: BUILDING, ACCESS ROAD, IMPERVIOUS AREA
			SB-1G: BUILDING, IMPERVIOUS OPEN SPACE
			SB-1H: CONSTRUCTION TRAILER, IMPERVIOUS OPEN SPACE
			SB-1I: DRIVEWAY AREA SOUTHWEST OF POWERBLOCK
			SB-1J: ADMINISTRATION BUILDING AREA WEST OF POWERBLOCK
			SB-1K: EXISTING FUEL GAS YARD
			SB-1CANAL: NORTH CANAL
BASIN 2	20.05	12.96	SB-2A: CONSTRUCTION LAYDOWN, ENTRANCE ROAD, DRY DETENTION
			SB-2B: SOUTH CANAL POWER BLOCK BANK AND DRIVEWAY
			SB-2CANAL: SOUTH CANAL
BASIN 4	0.38	0.00	NORTH CANAL BANK
ROAD/DOCK	0.31	0.00	EISENHOWER BLVD SEGEMENT, INTERCOASTAL DOCK FACILITY
TOTAL	57.04	42.70*	*CONTRIBUTING AREA IS NOT SAME AS TREATMENT AREA (43.39ACRE)

OFFSITE BASINS CONTRIBUTING TO ONSITE RUNOFF INFORMATION

PROJECT BASIN	BASIN AREA (acre)	SWMS CONTRIBUTING AREA (acre)	DESCRIPTION
OFFSITE BASIN 1	2.00	2.00	OSB-1A: GAS GENERATORS
			OSB-1B: DRIVEWAY AREA NORTH OF SUB BASIN 1G
			OSB-1C: OCTAGONAL TANK FARM
OFFSITE BASIN 2	1.17	1.17	OSB-2A: EASTERN BORDER OF SITE CERTIFICATION BOUNDARY
TOTAL	3.17	3.17	

SITE - DRY DETENTION AREA INFORMATION

DETENTION AREA ID	TOB EL (ft - NGVD29)	TOB AREA (acre)	TOE EL (ft - NGVD29)	TOE AREA (acre)
SB-1 POND	9.00	3.19	3.10	2.35
SB-2 POND	8.50	1.18	3.10	0.76

Figure 4.8.2-1a
Construction Stormwater Management Plan – Area A – Drawing No. 174101-DS-0009

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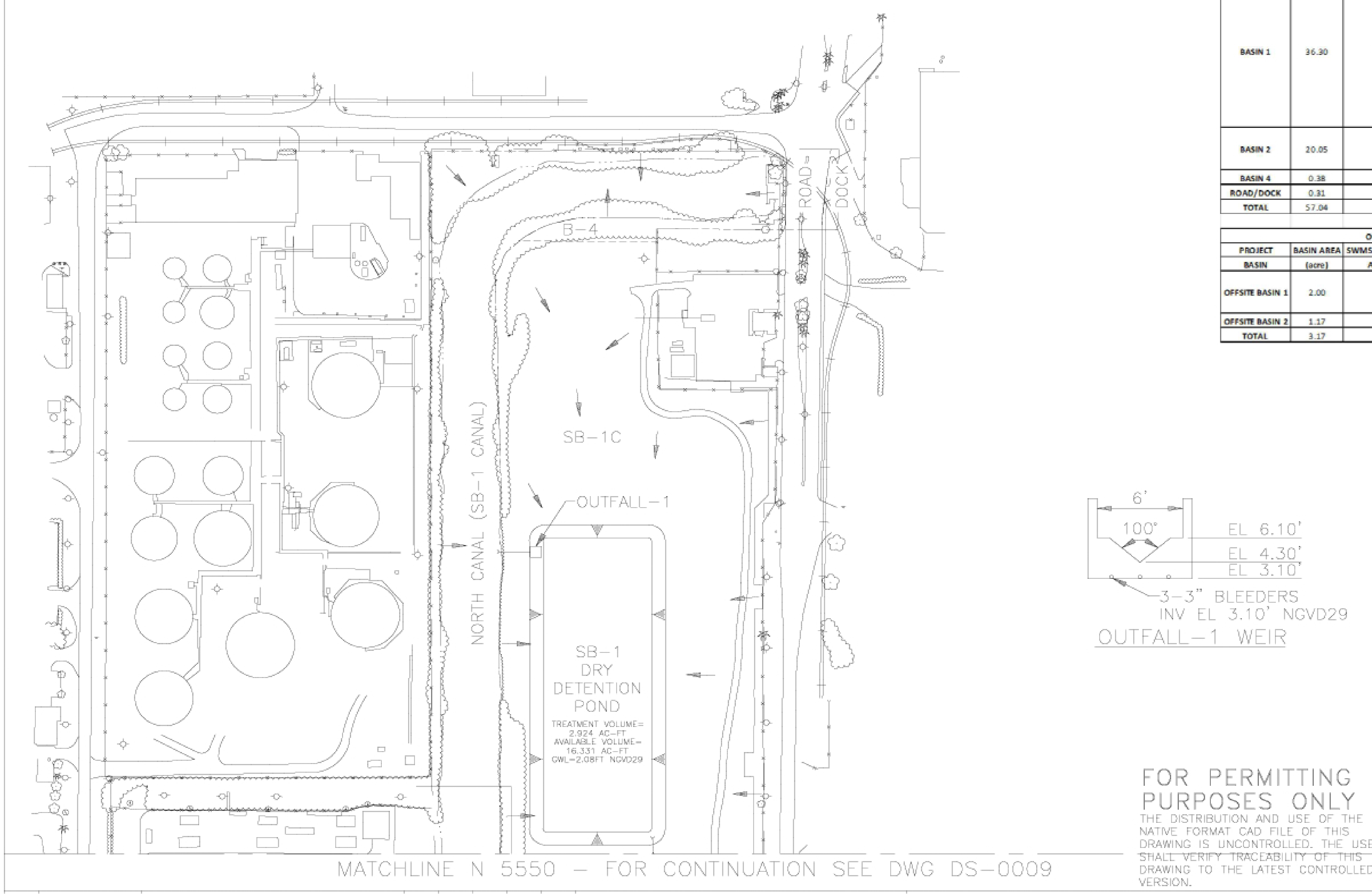
Source: Black & Veatch, 2012.

SITE - STORM WATER MANAGEMENT BASINS INFORMATION			
PROJECT BASIN	BASIN AREA (acre)	SWMS CONTRIBUTING AREA (acre)	DESCRIPTION
BASIN 1	36.30	29.74	SB-1A: POWER BLOCK WEST
			SB-1B: POWER BLOCK EAST
			SB-1C: DRY DETENTION, OPEN SPACE, PLANT ROAD
			SB-1D: IMPERVIOUS OPEN SPACE
			SB-1E: BUILDING, ACCESS ROAD, IMPERVIOUS AREA
			SB-1G: BUILDING, IMPERVIOUS OPEN SPACE
			SB-1H: CONSTRUCTION TRAILER, IMPERVIOUS OPEN SPACE
			SB-1I: DRIVEWAY AREA SOUTHWEST OF POWERBLOCK
			SB-1J: ADMINISTRATION BUILDING AREA WEST OF POWERBLOCK
			SB-1K: EXISTING FUEL GAS YARD
			SB-1CANAL: NORTH CANAL
BASIN 2	20.05	12.96	SB-2A: CONSTRUCTION LAYDOWN, ENTRANCE ROAD, DRY DETENTION
			SB-2B: SOUTH CANAL POWER BLOCK BANK AND DRIVEWAY
			SB-2CANAL: SOUTH CANAL
BASIN 4	0.38	0.00	NORTH CANAL BANK
ROAD/DOCK	0.31	0.00	EISENHOWER BLVD SEGEMENT, INTERCOASTAL DOCK FACILITY
TOTAL	57.04	42.70*	*CONTRIBUTING AREA IS NOT SAME AS TREATMENT AREA (43.39ACRE)

OFFSITE BASINS CONTRIBUTING TO ONSITE RUNOFF INFORMATION			
PROJECT BASIN	BASIN AREA (acre)	SWMS CONTRIBUTING AREA (acre)	DESCRIPTION
OFFSITE BASIN 1	2.00	2.00	OSB-1A: GAS GENERATORS
			OSB-1B: DRIVEWAY AREA NORTH OF SUB BASIN 1G
			OSB-1C: OCTAGONAL TANK FARM
OFFSITE BASIN 2	1.17	1.17	OSB-2A: EASTERN BORDER OF SITE CERTIFICATION BOUNDARY
TOTAL	3.17	3.17	

SITE - DRY DETENTION AREA INFORMATION				
DETENTION AREA ID	TOB EL (ft - NGVD29)	TOB AREA (acre)	TOE EL (ft - NGVD29)	TOE AREA (acre)
SB-1 POND	9.00	3.19	3.10	2.35
SB-2 POND	8.50	1.18	3.10	0.76



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NOTES

1. ELEVATIONS ARE REPORTED AS NGVD29, SUBTRACT 1.58 TO CONVERT TO NAVD88.

LEGEND

PROPERTY BOUNDARY
BASIN DIVIDE
CERTIFICATION BOUNDARY
STORM SEWER SYSTEM

KEY PLAN

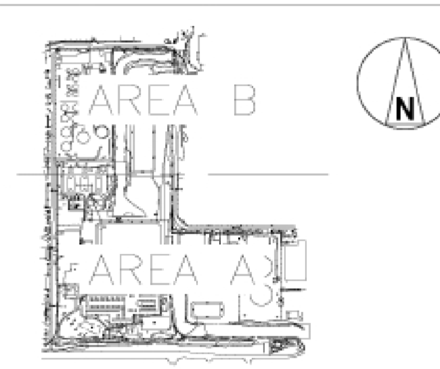

Figure 4.8.2-1b
Construction Stormwater Management Plan – Area B – Drawing No. 174101-DS-0010

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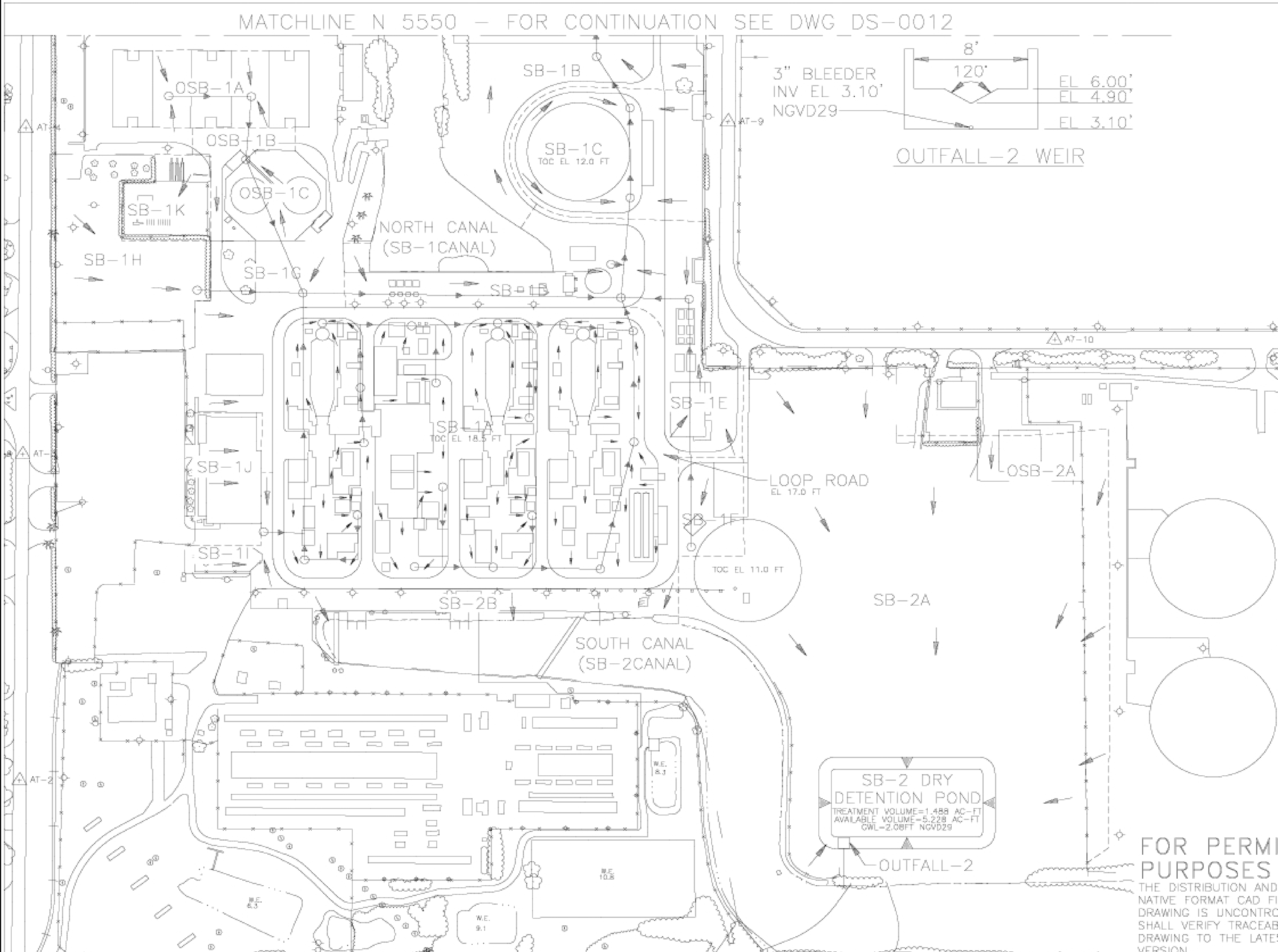
Source: Black & Veatch, 2012.

FPL.



SITE - STORM WATER MANAGEMENT BASINS INFORMATION			
PROJECT BASIN	BASIN AREA (acre)	SWMS CONTRIBUTING AREA (acre)	DESCRIPTION
BASIN 1	36.78	30.22	SB-1A: POWER BLOCK
			SB-1B: NORTH DETENTION POND, PLANT ROAD, OPEN SPACE
			SB-1C: FUEL STORAGE TANK
			SB-1D: FIRE PUMP & TANK, AUX BOILER
			SB-1E: AIR COMPRESSORS & RECEIVERS, BUILDING
			SB-1F: DEMIN TANK & TRAILER PARKING
			SB-1G: DRY STORAGE, BUILDING, OPEN SPACE
			SB-1H: GAS COMPRESSOR AREA
			SB-1I: DRIVEWAY AREA SOUTHWEST OF POWERBLOCK
			SB-1J: ADMINISTRATION BUILDING AREA WEST OF POWERBLOCK
			SB-1K: EXISTING FUEL GAS YARD
			SB-1CANAL: NORTH CANAL
BASIN 2	19.57	12.48	SB-2A: CONSTRUCTION LAYDOWN AREA, ENTRANCE ROAD, OPEN SPACE
			SB-2B: SOUTH CANAL POWER BLOCK BANK
			SB-2CANAL: SOUTH CANAL
BASIN 4	0.38	0.00	NORTH CANAL BANK
ROAD/DOCK	0.31	0.00	EISENHOWER BLVD SEGEMENT, INTRACOASTAL DOCK FACILITY
TOTAL	57.04	42.70*	*CONTRIBUTING AREA IS NOT SAME AS TREATMENT AREA (43.39ACRE)

OFFSITE BASINS CONTRIBUTING TO ONSITE RUNOFF INFORMATION			
PROJECT BASIN	BASIN AREA (acre)	SWMS CONTRIBUTING AREA (acre)	DESCRIPTION
OFFSITE BASIN 1	2.00	2.00	OSB-1A: GAS GENERATORS
			OSB-1B: DRIVEWAY AREA NORTH OF SUB BASIN 1G
			OSB-1C: OCTAGONAL TANK FARM
OFFSITE BASIN 2	1.17	1.17	OSB-2A: EASTERN BORDER OF SITE CERTIFICATION BOUNDARY
TOTAL	3.17	3.17	

SITE - DRY DETENTION AREA INFORMATION				
DETENTION AREA ID	TOB EL (ft - NGVD29)	TOB AREA (acre)	TOE EL (ft - NGVD29)	TOE AREA (acre)
SB-1 POND	9.00	3.19	3.10	2.35
SB-2 POND	8.50	1.18	3.10	0.76

NOTES

1. ELEVATIONS ARE REPORTED AS NGVD29, SUBTRACT 1.58 TO CONVERT TO NAVD88.

LEGEND

PROPERTY BOUNDARY
BASIN DIVIDE
CERTIFICATION BOUNDARY
STORM SEWER SYSTEM

KEY PLAN

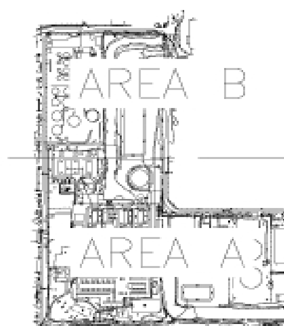


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Figure 4.8.3-1a
Operation Stormwater Management Plan – Area A – Drawing No. 174101-DS-0011

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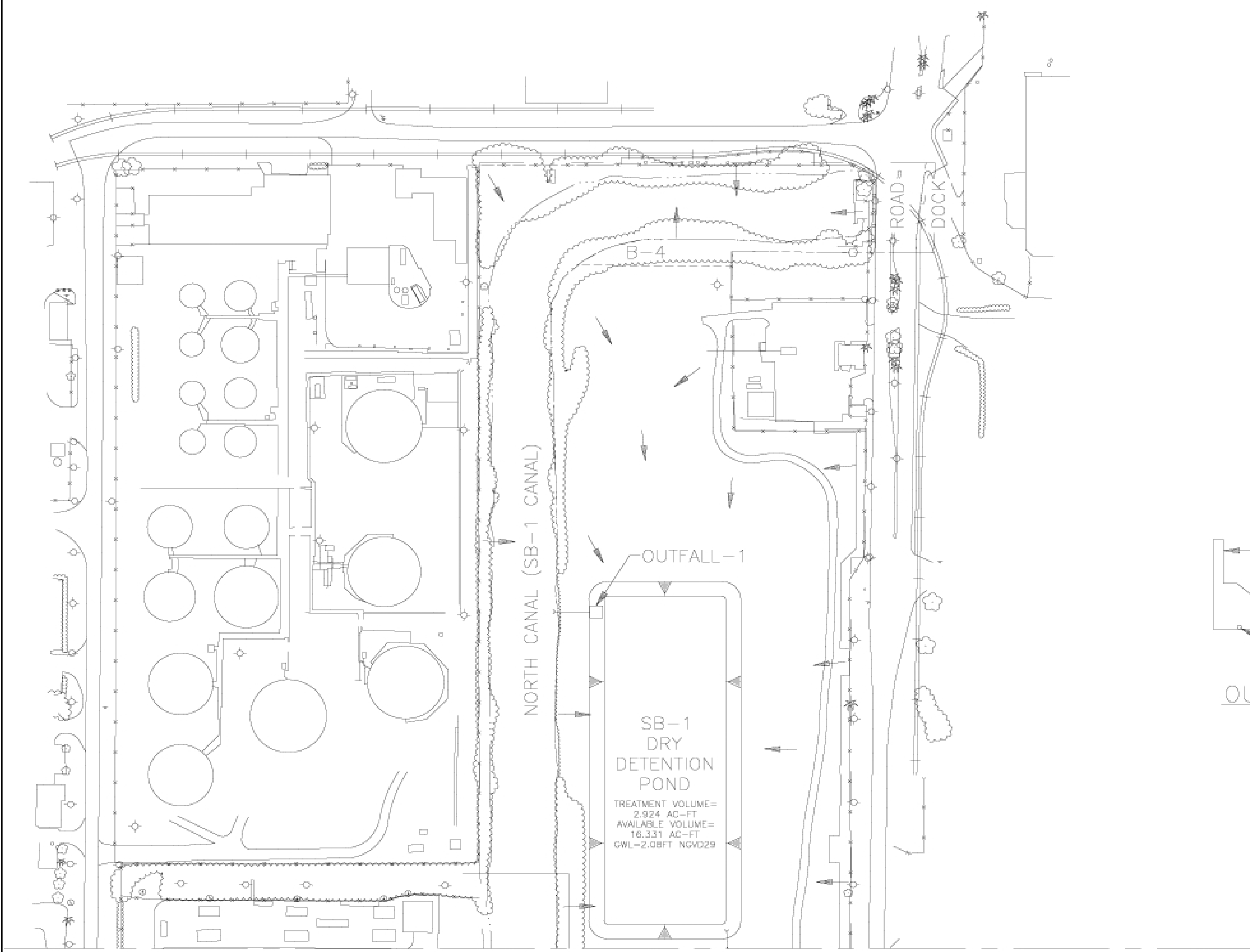
Source: Black & Veatch, 2012.

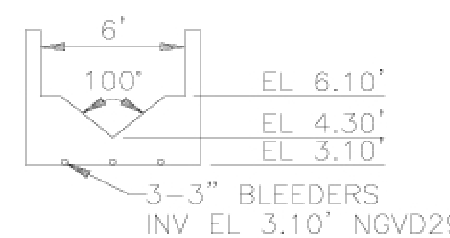
FPL

SITE - STORM WATER MANAGEMENT BASINS INFORMATION			
PROJECT BASIN	BASIN AREA (acre)	SWMS CONTRIBUTING AREA (acre)	DESCRIPTION
BASIN 1	36.78	30.22	SB-1A: POWER BLOCK
			SB-1B: NORTH DETENTION POND, PLANT ROAD, OPEN SPACE
			SB-1C: FUEL STORAGE TANK
			SB-1D: FIRE PUMP & TANK, AUX BOILER
			SB-1E: AIR COMPRESSORS & RECEIVERS, BUILDING
			SB-1F: DEMIN TANK & TRAILER PARKING
			SB-1G: DRY STORAGE, BUILDING, OPEN SPACE
			SB-1H: GAS COMPRESSOR AREA
			SB-1I: DRIVEWAY AREA SOUTHWEST OF POWERBLOCK
			SB-1J: ADMINISTRATION BUILDING AREA WEST OF POWERBLOCK
			SB-1K: EXISTING FUEL GAS YARD
			SB-1CANAL: NORTH CANAL
BASIN 2	19.57	12.48	SB-2A: CONSTRUCTION LAYDOWN AREA, ENTRANCE ROAD, OPEN SPACE
			SB-2B: SOUTH CANAL POWER BLOCK BANK
			SB-2CANAL: SOUTH CANAL
BASIN 4	0.38	0.00	NORTH CANAL BANK
ROAD/DOCK	0.31	0.00	EISENHOWER BLVD SEGEMENT, INTRACOASTAL DOCK FACILITY
TOTAL	57.04	42.70*	*CONTRIBUTING AREA IS NOT SAME AS TREATMENT AREA (43.39ACRE)

OFFSITE BASINS CONTRIBUTING TO ONSITE RUNOFF INFORMATION			
PROJECT BASIN	BASIN AREA (acre)	SWMS CONTRIBUTING AREA (acre)	DESCRIPTION
OFFSITE BASIN 1	2.00	2.00	OSB-1A: GAS GENERATORS
			OSB-1B: DRIVEWAY AREA NORTH OF SUB BASIN 1G
			OSB-1C: OCTAGONAL TANK FARM
OFFSITE BASIN 2	1.17	1.17	OSB-2A: EASTERN BORDER OF SITE CERTIFICATION BOUNDARY
TOTAL	3.17	3.17	

SITE - DRY DETENTION AREA INFORMATION				
DETENTION AREA ID	TOB EL (ft - NGVD29)	TOB AREA (acre)	TOE EL (ft - NGVD29)	TOE AREA (acre)
SB-1 POND	9.00	3.19	3.10	2.35
SB-2 POND	8.50	1.18	3.10	0.76





OUTFALL-1 WEIR

NOTES

1. ELEVATIONS ARE REPORTED AS NGVD29, SUBTRACT 1.58 TO CONVERT TO NAVD88.

LEGEND

- PROPERTY BOUNDARY
- BASIN DIVIDE
- CERTIFICATION BOUNDARY
- STORM SEWER SYSTEM

KEY PLAN

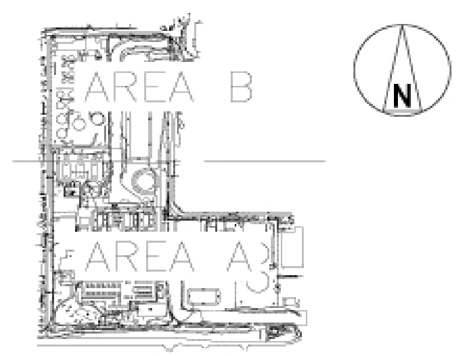


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Figure 4.8.3-1b
Operation Stormwater Management Plan – Area B – Drawing No. 174101-DS-0012

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