SECTION 2.0

Project Description

2.1 Introduction

The AES Highgrove Project will be a nominal 300-megawatt (MW) peaking facility consisting of three natural-gas-fired turbines and associated equipment. The facility will be located at 12700 Taylor Street, in an industrially zoned area in the City of Grand Terrace, San Bernardino County, on the site of a plant formerly owned by Southern California Edison (SCE). The project will consist of demolition of the existing plant and constructing the new Highgrove facility on property that was once used by the former generating station for fuel oil storage.

The plant will utilize 3 GE LMS100 simple cycle gas turbines for the project and high-efficiency emissions control technology to meet best available control technology (BACT) requirements. The GE LMS100 technology is approximately 10 percent more efficient than older gas turbine models typically used for peaking. These high efficiencies and associated environmental benefits, are achieved primarily through the addition of an intercooler to the gas turbine cycle. The intercooler requires a source of cooling water and a cooling tower to achieve maximum efficiency on hot days, although cooling water needs will be significantly less than that required for a combined cycle facility.

The project will include the following linear facilities:

- Approximately 600 feet (measured from center point to center point) of onsite electrical transmission lines to connect to SCE's electrical transmission system at the 115-kV Highgrove Substation, directly adjacent to the project
- Extension of the existing potable water system for approximately 1,300 feet to provide potable water and fire protection to the facility using a line size up to 12 inches diameter
- Construction of a 12-inch-diameter natural gas supply line, approximately 7 miles long
- Interconnection to an existing sewer line on Taylor Street for sanitary waste

AES Highgrove has performed a detailed review of available and future water supply alternatives for the project. At the present time, the only alternative considered feasible for process water supply needs is use of the existing onsite wells. At this time, there is inadequate information to confirm the availability, quality, quantity, duration, and impacts of any alternative supply that would support the project's objectives and the immediate need for peaking power in Southern California. AES Highgrove continues to work with local water agencies to evaluate alternative sources to the use of the onsite wells. A more detailed discussion of the alternatives considered is provided in Section 9.0, Alternatives.

Figure 2.1-1, located at the end of this section, shows the location of the Project Site, proposed natural gas supply line, and potable water supply line.

2.1.2 Project Site Overview

The new facility will be located on property that was once part of SCE's former Highgrove Generating Station, which was constructed in the 1950s. Equipment in the Highgrove Generating Station consisted of four thermal generating units with a nominal capacity of 154 MW (combined), cooling towers, boilers, tanks, and associated equipment. The station initially utilized both fuel oil and natural gas for fuel supply. The fuel oil storage tanks were located north of the generating equipment.

The existing plant, currently known as Riverside Canal Power Company, was used for peaking service before and during the 2000-2001 California power crisis. The plant was decommissioned shortly after being acquired by AES in 2001 due to the lack of environmental controls.

When the Highgrove Generating Station was under SCE ownership, different areas of the property were characterized by four general areas of activity:

- SCE's 115-kV electrical substation (Highgrove Substation)
- Generating equipment (boilers, steam turbine-generators, cooling towers and auxiliary equipment, etc.) and controls for the SCE 115-kV substation located in the generator control room (Generating Station Property)
- Fuel oil storage tanks (Tank Farm Property)
- Cage Park Property, a privately owned park used by SCE and its employees

Figure 2.1-2 shows the location of each of these areas. Activities associated with each area, with respect to this project, are described below.

2.1.2.1 Highgrove Substation

The 115-kV Highgrove Substation property is a 3.1-acre parcel owned by SCE and located west of the Generating Station equipment. The Substation is an integral part of the SCE-owned regional grid. Controls for the substation are located inside the control rooms of the existing Generating Station.

Before demolition of the existing plant can occur, the substation controls will need to be relocated. It is anticipated that the substation controls and associated telecommunications equipment will be housed in a new building located inside the existing substation boundaries to provide SCE with sole access to SCE's equipment.

The new facility will interconnect to the electrical grid using existing substation bays that will be vacated when the existing plant is demolished. Therefore, the only other project activity that will occur on the Substation property will be those activities associated with the interconnection of the new facility.

2.1.2.2 Generating Station Property

The Generating Station Property encompasses approximately 10.1 acres with frontage on Taylor Street. Equipment currently located on the Generating Station Property includes four small thermal units rated at 30 to 40 MW each, steam turbine-generators and condensers, control buildings, cooling towers, onsite wells for process and nonpotable domestic water supply, administration and maintenance building, storage tanks and fuel delivery equipment. The property is currently owned by a wholly owned subsidiary of AES and is currently operating as Riverside Canal Power Company.

Project activities associated with this property will include demolition of the existing equipment and grading to allow continued access from Taylor Street The existing plant includes some asbestos-insulated piping, and some steel outdoor structures painted with lead-based paint. Removal of these components will be handled by specialty-contractors authorized to perform necessary abatement activities in accordance with applicable laws, ordinances, regulations and standards (LORS). The majority of site demolition activities will include removal of steel structures and equipment which will either be recycled or taken to an appropriate offsite landfill. Demolition activities will include foundation removal and removal of underground piping. Refer to Subsection 8.13, Waste Management, for further discussion on demolition activities. A portion of the Generating Station Property will also be used for parking and laydown area during construction.

2.1.2.3 Tank Farm Property

The Tank Farm Property encompasses approximately 7.6 acres north of the Generating Station Property. At one time, three large storage tanks were located on the property to store fuel oil for the existing plant. When SCE sold the Generating Station property, the Tank Farm Property was excluded from the sale. The oil storage tanks were originally constructed approximately 10 feet below grade inside bermed areas. The fuel oil tanks were later removed from the Tank Farm Property by SCE, and the Tank Farm Property was sold to the City of Grand Terrace Redevelopment Agency, the current owner. All that remains on the vacant site are the berms that used to contain the storage tanks.

AES has entered into an agreement with the Redevelopment Agency to acquire the Tank Farm Property. The agreement provides that AES will remove existing equipment from the Generating Station Property. Once these demolition activities are complete, the Redevelopment Agency may, at its option, elect to take title to the Generating Station Property or be compensated in full for the Tank Farm Property. The Agreement further provides for a parcel line split and lot line adjustment such that the parties each retain title to a parcel of comparable size to the one they began with. After these changes, AES Highgrove will own a 9.8-acre parcel, on which the new facility will be constructed.

Construction of the proposed facility on the new Project Site allows the new facility to be constructed with greater setback from Taylor Street, offering the following benefits:

- Creation of a larger buffer area between the new facility and a proposed high school on the east side of Taylor
- The ability to construct the plant below-grade inside the bermed area, reducing any potential noise and visual impacts in the area
- The ability for the Redevelopment Agency to own a more developable parcel with much greater street frontage than the Tank Farm Property

2.1.2.4 Cage Park Property

Cage Park Property is a 6.5-acre parcel located south of the Generating Station Property. The property was used in the past by SCE as a privately owned park and is currently owned by AES. This property is not part of nor will be affected by the project.

2.1.3 Proposed High School

The Colton Joint Unified School District is proposing the acquisition of a 65-acre site for the construction and operation of High School #3 and adjunct educational facility (collectively, Grand Terrace Educational Facility) in the City of Grand Terrace. The Grand Terrace Educational Facility would be located with Taylor Street on the west, Michigan Street on the east and Main Street on the south. High School #3 is proposed to be a comprehensive high school for 3,000 students in grades 9-12. The school would include approximately 1,300 parking spaces for project students, staff, and visitors and would encompass the westernmost 55 acres of the site. The adjunct educational facility would encompass the easternmost 10 acres of the site at the corner of Michigan Avenue and Main Street. The adjunct facility would consist of approximately 45,000 square feet of space and approximately 100 parking stalls. It is assumed that at any given time during school operating hours, approximately 300 students and 85 staff members would be on this portion of the site. When the school is constructed, a portion of Pico Street, which currently intersects with Taylor Street, would be vacated or "dead-ended" near the existing Pico Park (Colton Joint Unified School District, 2005). The School District anticipates start of construction on the high school in the summer 2006, with classrooms in session by the fall of 2008.

2.2 Generating Facility Description, Design, and Operation

This subsection describes the facility's conceptual design and proposed operation.

2.2.1 Site Arrangement and Layout

The site layout shown in Figure 2.2-1 and typical elevation views in Figure 2.2-2 illustrate the location and size of the proposed generating facility. Settled areas, parks, and recreational and scenic areas near the site and the proposed transmission line to the adjacent SCE substation are shown in Figure 2.2-3.

The site is located at 12700 Taylor Street, north of the intersection of Taylor and Main streets. Primary access to the site will be provided from Taylor Street at the approximate location used to access the existing Generating Station. A secondary entrance to the site will be provided on the north and will be accessible by public thoroughfare when the future Adventure Way is constructed by the City. (Refer to Subsection 8.4, Land Use for further information related to planned development in the vicinity.)

2.2.2 Process Description

The generating facility will consist of three GE Energy LMS100 natural-gas fired combustion turbine generators (CTGs), for a total nominal generating capacity of 300 MW. Each CTG will be equipped with water injection capability to reduce oxides of nitrogen (NO_x) emissions, selective catalytic reduction (SCR) equipment containing a catalyst to further reduce NOx emissions, and an oxidation catalyst to reduce carbon monoxide (CO) emissions. Auxiliary equipment will include an inlet air filter housing with an evaporative cooler, an intercooler, 2-cell mechanical-draft cooling tower (for each gas turbine), natural gas compressors, water storage tanks, generator step-up, auxiliary and station service transformers and an aqueous ammonia tank.

Each CTG will generate approximately 100 MW at summer design ambient conditions. The project is expected to have an annual capacity factor of approximately 15 to 30 percent, depending on dispatch by the power purchaser to meet customer loads. The generating facility heat balance is shown in Figures 2.2-4. This balance is based on an ambient dry bulb temperature of 80 degrees Fahrenheit (°F) (the expected annual average temperature for peaking operation) with evaporative cooling of the inlet combustion air.

Associated equipment will include emission control systems necessary to meet the proposed emission limits. NO_x emissions will be controlled to 3.5 parts per million by volume, dry basis (ppmvd) corrected to 15 percent oxygen with the combination of water injection in the CTGs and SCR systems in the catalyst housing. A CO catalyst will also be installed in the catalyst housing to limit CO emissions from the CTGs to 6 ppmvd at 15 percent oxygen. Ammonia slip will be limited to 5 ppm at 15 percent O_2.

2.2.3 Generating Facility Cycle

CTG combustion air flows through the inlet air filter and evaporative cooler and associated air inlet ductwork. The air is then compressed in the gas turbine low pressure compressor section and cooled in the gas turbine intercooler before entering the high pressure compressor. The cooled, compressed air then flows to the CTG combustor. Natural gas fuel is injected into the combustor section and ignited. Demineralized water is also injected into the combustor section to control NOx emissions. The hot combustion gases expand through the power turbine sections of the CTGs, causing them to rotate, which drives the electric generators and CTG compressors. Use of the intercooler in the gas turbine compression cycle reduces the energy required to compress the air and results in gross turbine generator efficiencies of approximately 44 percent. The hot combustion gases exit the turbine at approximately 770°F and enter the catalyst housing for exposure to the catalysts to reduce NOx and CO emissions, and exhaust to atmosphere via the exhaust stacks.

2.2.4 Combustion Turbine Generators

2.2.4.1 Combustion Turbine Generators

Electricity will be produced within the generating facility by three GE LMS100 CTGs. The major components of the CTGs are described below.

Thermal energy is produced in the CTGs through the combustion of natural gas, which is converted into mechanical energy required to drive the combustion turbine compressors and electric generators. The LMS100 gas turbine model integrates features of GE Energy's frame and aeroderivative CTG design systems. The low pressure compressor system is derived from the heavy duty frame engine system and the high pressure compressor, combustor and power turbine are derived from the aeroderivative system. Each CTG consists of a stationary combustion turbine generator and associated auxiliary equipment. The CTGs will be equipped with water injection capability to control NOx emissions formed in the combustion process. While GE anticipates future units will be capable of using steam injection and Dry Low Emissions (DLE) combustors, these design options are currently not available. Each CTG will also have a variable bleed valve vent that allows the venting of compressed air to the atmosphere under certain transient compressor operating conditions.

The CTGs will be equipped with the following required accessories to provide safe and reliable operation:

- Evaporative coolers
- Inlet air filters
- Metal acoustical enclosure
- Duplex shell and tube lube oil coolers for the turbine and generator
- Annular Combustor combustion system
- Compressor wash system
- Fire detection and protection system
- Compressor intercooler
- Hydraulic starting system
- Water injection system

The metal acoustical enclosure, which contains the CTGs and accessory equipment, will be located outdoors.

2.2.4.2 Catalyst Housing

The catalyst housings, one for each CTG, are equipped with SCR catalyst modules to further reduce emissions. The SCR emission control system will use vaporized aqueous ammonia in the presence of a catalyst to reduce NO_x in the exhaust gases of the combustion turbine. Diluted ammonia (NH_3) vapor will be injected into the exhaust gas stream via a grid of nozzles located upstream of the catalyst module. The subsequent chemical reaction will reduce NO_x to nitrogen and water, resulting in a NO_x concentration in the exhaust gas no greater than 3.5 ppmvd at 15 percent oxygen (on a 3-hour average basis). The ammonia slip will be limited to 5 ppm.

An oxidation catalyst will also be installed within the housing to control the concentration of CO in the exhaust gas emitted to atmosphere to no greater than 6 ppmvd at 15 percent oxygen. The exhaust from each housing will be discharged from individual 80-foot-tall, 12-foot diameter exhaust stacks.

2.2.5 Major Electrical Equipment and Systems

The bulk of the electric power produced by the facility will be transmitted to the power grid via the connection to the SCE-owned 115-kV Highgrove Substation. A small amount of electric power will be used onsite to power balance-of-plant auxiliaries such as pumps, natural gas compressors, cooling tower fans, control systems, and general facility loads including lighting, heating, and air conditioning. Some will also be converted from alternating current (AC) to direct current (DC), which is used as backup power for control systems and other uses.

Power will be generated by the 3 CTGs at 13.8 kV and stepped up by 3 transformers (generator step-up transformers) to 115 kV for connection to the grid. A fourth transformer (station service transformer) will be installed to start the CTGs using power fed from the grid. Once the units are running, they will serve the facility's auxiliary power needs. An overall single-line diagram of the facility's electrical system is shown on Figure 5.2-1. Each generator will be connected by an isolated-phase bus to fan-cooled step-up transformers that increase the voltage to 115 kV. Surge arresters will be provided at the high-voltage bushings to protect the transformers from surges on the 115-kV system caused by lightning strikes or other system disturbances. The transformers will be set on concrete pads within containment areas designed to contain the non-PCB transformer oil in the event of a leak, spill, or fire. Fire protection systems will also be provided. The high-voltage side of the step-up transformers will be connected to gas insulated (SF6) circuit breakers then to overhead cables approximately 300-900 feet long to the adjacent SCE 115-kV Highgrove Substation. From the substation, power will be transmitted to the grid via transmission lines owned by SCE. Section 5.0, Electrical Transmission, contains additional information regarding the electrical transmission system as well as a summary of the System Impact Study results.

2.2.6 Fuel System

The CTGs will be designed to burn natural gas only. Natural gas requirements at an ambient condition of 80ºF are approximately 850 million British thermal units per hour (MMBtu/hr), per unit, on a higher heating value (HHV) basis.

Natural gas will be delivered to the site via an underground pipeline. (Additional information about natural gas supply can be found in Section 6.0, Gas Supply.) The natural gas will flow through gas scrubber/filtering equipment, gas compressors, a gas pressure control station, and a flow-metering station prior to entering the combustion turbines. The gas company-owned metering station will be located onsite.

Historical data indicates that the pressure at SCE's Line 2001 is expected to vary between 350 and 575 psig. Due to a high air compression ratio, the GE LMS100 unit requires a pressure at the turbine connection of 960 psig, plus or minus 20 psig. Three electric motor-driven gas compressors will be used to boost the pressure to the level required by the gas turbine. The compressors may be located within acoustically treated sound walls or a building, as required to meet noise criteria. (Refer to Subsection 8.05, Noise, for additional information.)

2.2.7 Water Supply and Use

This subsection describes the quantity of water required, the source of the water supply, and water treatment requirements.

2.2.7.1 Water Requirements

The estimated water usage for the plant is provided in Table 2.2-1.

TABLE 2.2-1
Estimated Water Usage

All Uses	Expected Usage	
Average Annual Usage[a]	741 gpm	415 afy
Peak Usage (Maximum Summer Condition) [b]	862 gpm	
Makeup Water for Cooling	**Expected Usage**	
Average Annual Usage[a]	431 gpm	209 afy
Peak Usage (Maximum Summer Condition) [b]	497 gpm	

Basis

[a] Usage is based on an annual operating (capacity) factor of 30%. The ambient temperature assumed for this condition is 80°F.

[b] The ambient temperature assumed for this condition is 97°F.

gpm = gallons per minute; afy = acre-feet per year

Cooling Use is defined as the water supply required to make up losses in the cooling tower resulting from evaporative cooling, drift and blowdown (exclusive of other plant wastewater streams discharged into the cooling tower supply to minimize makeup water requirements).

2.2.7.2 Water Supply

Process water for CTG evaporative cooling and water injection, landscape irrigation, process system makeup, and cooling will be provided by two of four existing onsite wells. Potable water will be used for domestic water uses, fire protection, and as an emergency backup supply. Potable water will be supplied by the Riverside Highland Water Company, via a 1,300-foot-long water line connecting the plant to the water main in Main Street.

Water used for process makeup will be fed directly from the water supply line from the well into a 350,000-gallon aboveground raw water storage tank. This tank will provide approximately 8 hours of operational storage in the event there is a disruption in the water supply. Additional information on water supply and use is found in Section 7.0, Water Supply. Additional information on water supply alternatives is addressed in Section 9.0, Alternatives.

2.2.7.3 Water Quality and Treatment

Figures 7.1-2a and 7.1-2b illustrate the water treatment and distribution system. Water use can be divided into the following four levels based on the quality required: (1) water for the circulating or cooling water system; (2) service water for the plant; (3) demineralized water for NOx injection water; and (4) potable water. Water treatment required to obtain the various levels of quality are described in the following paragraphs. Water quality is described further in Subsection 8.14, Water Resources.

2.2.7.3.1 Water System

Makeup water will be provided from the storage tank to the cooling tower basins as required to replace water losses from evaporation, drift, and blowdown. A chemical feed system will supply water conditioning chemicals to the circulating water to minimize corrosion and control the formation of mineral scale and biofouling. Sulfuric acid will be fed into the circulating water system in proportion to makeup water flow for alkalinity reduction to control the scaling tendency of the circulating water.

The acid feed equipment will consist of a bulk sulfuric acid storage tank and two full-capacity sulfuric acid metering pumps.

To further inhibit scale formation, a polyacrylate solution will be fed into the circulating water system as a sequestering agent in an amount proportional to the circulating water blowdown flow. The scale inhibitor feed equipment will consist of a chemical solution bulk storage tank and two full-capacity scale inhibitor metering pumps.

To prevent biofouling in the circulating water system, sodium hypochlorite will be fed into the system. The hypochlorite feed equipment will consist of a bulk storage tank and 2 full-capacity hypochlorite metering pumps. A bulk storage tank, 100- to 400-gallon totes, and 2 full-capacity metering pumps will be provided for the feeding of either stabilized bromine or sodium bromide as alternate biocides.

2.2.7.3.2 Service Water

Service water for plant functions in which operating personnel may have direct contact will be provided potable water supply. Therefore, no additional treatment is required for these systems.

2.2.7.3.3 Demineralized Water

Demineralized water will be used for NOx injection water. The demineralized water will be produced by a reverse osmosis (RO) and Electro Deionization (EDI) system using service water as the feedstock. The demineralized water will be stored in a 100,000-gallon demineralized water storage tank.

The NOx injection water will be drawn from the demineralized water storage tank. Demineralized water will also be used for the CTG compressor wash water.

2.2.8 Plant Cooling Systems

Three 2-cell cooling towers will be provided to meet gas turbine auxiliary cooling requirements including the lube oil coolers and gas turbine compressor intercooler. Use of cooling water to meet the cooling requirements of the intercooler prevents efficiency and load losses at high ambient temperatures.

Cold water from the cooling tower will be supplied to the gas turbine auxiliaries via a GE-provided pump skid. Cold water supplied to the intercooler cools the compressed air from the low pressure compressor in the gas turbine prior to entering the high pressure compressor. Heat is then rejected from the intercoolers and the heated water returns to the cooling tower. Cold water is also supplied to the gas turbine lube oil coolers. Heat is rejected from the lube oil to the water, and then the hot water is returned to the cooling tower.

2.2.9 Waste Management

Waste management is the process whereby all wastes produced by the project are properly collected, treated if necessary, and disposed of. Wastes include wastewater, solid nonhazardous waste, and both liquid and solid hazardous waste. Waste management is discussed in more detail in Subsection 8.13, Waste Management.

2.2.9.1 Wastewater Collection, Treatment, and Disposal

The primary wastewater collection system will collect process wastewater from all of the plant equipment, including the cooling tower and water treatment equipment. Figures 7.1-2a and 7.1-2b show the expected wastewater streams and flow rates for the Highgrove Project. The second wastewater collection system will collect sanitary wastewater from sinks, toilets, showers, and other sanitary facilities, and discharge to the city sanitary sewer system. The two wastewater systems are described below.

2.2.9.1.1 Circulating Water System Blowdown

Circulating water system blowdown will consist of the process waste streams that have been concentrated and residues of the chemicals added to the circulating water. The cooling tower concentrates these streams near the mineral solubility limit for the constituents of concern (calcium, silica and total dissolved solids). This concentrated water must then be removed from the cooling tower via blowdown to prevent the formation of mineral scale in heat transfer equipment. The chemicals added to the circulating water control scaling and biofouling of the cooling tower and control corrosion of the circulating water piping and intercooler. Cooling tower blowdown will be trucked to the Santa Ana Regional Interceptor (SARI) brine pipeline system, which conveys water to the Orange County Sanitation District wastewater treatment plant, which discharges to an ocean outfall.

2.2.9.1.3 Plant Drains and Oil/Water Separator

General plant drains will collect area washdown, sample drains, and drainage from facility equipment areas. Water from these areas will be collected in a system of floor drains, hub drains, sumps, and piping and routed to the wastewater collection system. Drains that potentially could contain oil or grease will first be routed through an oil/water separator. Clear water from the separator will be directed to the wastewater discharge system and trucked offsite to the SARI line.

Wastewater from combustion turbine water washes will be collected in a holding tank. If cleaning chemicals were not used during the water wash procedure, the wastewater will be discharged to the oil/water separator. Wastewater containing cleaning chemicals will be trucked offsite for disposal at an approved wastewater disposal facility.

2.2.9.1.6 Solid Wastes

AES Highgrove will produce maintenance and plant wastes typical of natural gas-fueled power generation operations. Generation plant wastes include oily rags, broken and rusted metal and machine parts, defective or broken electrical materials, empty containers, and other solid wastes, including the typical refuse generated by workers. Recyclable materials will be taken offsite. Waste collection and disposal will be in accordance with applicable regulatory requirements to minimize health and safety effects.

2.2.9.1.7 Hazardous Wastes

Several methods will be used to properly manage and dispose of hazardous wastes generated by the Highgrove Project. Waste lubricating oil will be recovered and reclaimed by a waste oil recycling contractor. Spent lubrication oil filters will be disposed of in a Class I landfill. Spent SCR and oxidation catalysts will be reclaimed by the supplier or disposed of in accordance with regulatory requirements. Workers will be trained to handle hazardous wastes generated at the site.

Chemical cleaning wastes will consist of detergent solutions used during turbine washing and regular equipment maintenance. These wastes, which may include high metal concentrations, will be temporarily stored onsite in portable tanks and disposed of offsite by the chemical cleaning contractor in accordance with applicable regulatory requirements.

2.2.10 Management of Hazardous Materials

There will be a variety of chemicals stored and used during the construction and operation of the Highgrove Project. The storage, handling, and use of all chemicals will be conducted in accordance with applicable LORS. Chemicals will be stored in appropriate chemical storage facilities. Bulk chemicals will be stored in storage tanks, and other chemicals will be stored in returnable delivery containers. Chemical storage and chemical feed areas will be designed to contain leaks and spills. Berm and drain piping design will allow a full-tank capacity spill without overflowing the berms. For multiple tanks located within the same bermed area, the capacity of the largest single tank will determine the volume of the bermed area and drain piping. Drain piping for volatile chemicals will be trapped and isolated from other drains to eliminate noxious or toxic vapors. After neutralization, if required, water collected from the chemical storage areas will be directed to the cooling tower basin, or trucked offsite for disposal at an approved wastewater disposal facility. Chemicals that may react with each other (e.g., acid and base) shall not use common containment.

The aqueous ammonia storage area will have spill containment and ammonia vapor detection equipment inside the containment area. Aqueous ammonia will be transported, and stored onsite, in a 19 percent solution, by weight.

Safety showers and eyewashes will be provided in the vicinity of all chemical storage and use areas. Hose connections will be provided near the chemical storage and feed areas to flush spills and leaks to the plant wastewater collection system. Approved personal protective equipment will be used by plant personnel during chemical spill containment and cleanup activities. Personnel will be properly trained in the handling of these chemicals and instructed in the procedures to follow in case of a chemical spill or accidental release. Adequate supplies of absorbent material will be stored onsite for spill cleanup.

A list of the chemicals anticipated to be used at the generating facility and their locations is provided in the Hazardous Materials Handling section (Subsection 8.12). This list identifies each chemical by type, intended use, and estimated quantity to be stored onsite. Subsection 8.12 includes additional information on hazardous materials handling.

2.2.11 Emission Control and Monitoring

Air emissions from the combustion of natural gas in the CTGs will be controlled using state-of-the-art systems emissions control systems. Emissions that will be controlled include NO_x, reactive organic gases (ROG), CO, and particulate matter. To ensure that the systems perform correctly, continuous emissions monitoring systems will be used. Subsection 8.1, Air Quality, includes additional information on emission control and monitoring.

2.2.11.1 NO_x Emission Control

SCR will be used to control NO_x concentrations in the exhaust gas emitted to the atmosphere to 3.5 ppmvd at 15 percent oxygen from the gas turbines/SCRs. The SCR process will use aqueous ammonia. Ammonia slip, or the concentration of unreacted ammonia in the exiting exhaust gas, will be limited to 5 ppmvd at 15 percent oxygen from the catalyst housing. The SCR equipment will include a reactor chamber, catalyst modules, ammonia storage system, ammonia vaporization and injection system, and monitoring equipment and sensors.

2.2.11.2 Carbon Monoxide

An oxidizing catalytic converter will be used to reduce the CO concentration in the exhaust gas emitted to the atmosphere from the gas turbines to 6 ppmvd at 15 percent oxygen at the stack.

2.2.11.3 Particulate Emission Control

Particulate emissions will be controlled by the use of natural gas, which is low in particulates, as the sole fuel for the CTGs and through the use of high-efficiency filters on the inlet air supplied to the CTGs.

2.2.11.4 Continuous Emission Monitoring

Continuous emission monitors (CEMs) will sample, analyze, and record fuel gas flow rate, NO_x and CO concentration levels, and percentage of O_2 in the exhaust gas from the three catalyst housing stacks. This system will generate reports of emissions data in accordance with permit requirements. The plant control system (PCS) will alarm when emissions approach or exceed pre-selected limits.

2.2.12 Fire Protection

The fire protection system will be designed to protect personnel and limit property loss and plant downtime in the event of a fire. Fire water will be supplied via a new 8 to 12-inch-diameter connection to a water main, which will be extended from an existing main line on Main Street. This connection will be sized in accordance with National Fire Protection Association (NFPA) guidelines to provide protection from the onsite worst-case single fire (2,000 gpm and a typical pipe velocity of 8 feet per second). Fire water will be provided to a dedicated underground fire loop piping system. Both the fire hydrants and the fixed suppression systems will be supplied from the fire water loop. Fixed fire suppression systems will be installed at determined fire risk areas. Sprinkler systems will also be installed in the Administration Building as required by NFPA and local code requirements. The CTG units will be protected by a CO_2 fire protection system. Hand-held fire extinguishers of the appropriate size and rating will be located in accordance with NFPA 10 throughout the facility. Subsection 8.12, Hazardous Materials Handling, includes additional information for fire and explosion risk, and Subsection 8.8, Socioeconomics, provides information on local fire protection capability.

2.2.13 Plant Auxiliaries

The following systems will support, protect, and control the generating facility.

2.2.13.1 Lighting

The lighting system provides personnel with illumination for operation under normal conditions and for egress under emergency conditions, and includes emergency lighting to perform manual operations during an outage of the normal power source. The system also provides 120-volt convenience outlets for portable lamps and tools.

2.2.13.2 Grounding

The electrical system is susceptible to ground faults, lightning, and switching surges that result in high voltage that constitute a hazard to site personnel and electrical equipment. The station grounding system provides an adequate path to permit the dissipation of current created by these events.

The station grounding grid will be designed for adequate capacity to dissipate heat from ground current under the most severe conditions in areas of high ground fault current concentration. The grid spacing will maintain touch and step voltage potentials within acceptable limits.

Bare conductors will be installed below-grade in a grid pattern. Each junction of the grid will be bonded together by an exothermic weld or compression connection.

Ground resistivity readings will be used to determine the necessary numbers of ground rods and grid spacing to ensure safe step and touch potentials under severe fault conditions.

Grounding stingers will be brought from the ground grid and connected to all building steel and non-energized metallic parts of electrical equipment.

2.2.13.3 Plant Control System

The PCS provides modulating control, digital control, monitoring, and indicating functions for the plant power block systems.

The following functions will be provided:

- Controlling the CTGs and other systems in a coordinated manner
- Controlling the balance-of-plant systems in response to plant demands
- Monitoring controlled plant equipment and process parameters and delivery of this information to plant operators.
- Monitoring the stack CEM units for critical alarms, and collecting data for historical log-in.
- Providing control displays (printed logs, operator interface) for signals generated within the system or received from input/output (I/O)
- Providing consolidated plant process status information through displays presented in a timely and meaningful manner
- Providing alarms for out-of-limit parameters or parameter trends, displaying on operator interface units and recording on an alarm log printer

The PCS will interface with the control systems furnished by the CTG supplier to provide remote control capabilities, as well as data acquisition, annunciation, and historical storage of turbine and generator operating information.

The system will be designed with sufficient redundancy to preclude a single device failure from significantly affecting overall plant control and operation. This also will allow critical control and safety systems to have redundancy of controls, as well as an uninterruptible power source.

2.2.13.4 Cathodic Protection

The cathodic protection system will be designed to control the electrochemical corrosion of designated metal piping buried in the soil. Depending upon the corrosion potential and the site soils, either passive or impressed current cathodic protection will be provided.

2.2.13.5 Freeze Protection

Not required.

2.2.13.6 Service Air

The service air system will supply compressed air to hose connections for general plant use. Service air headers will be routed to hose connections located at various points throughout the facility.

2.2.13.7 Instrument Air

The instrument air system provides dry air to pneumatic operators and devices. An instrument air header will be routed to locations within the facility equipment areas and within the water treatment facility where pneumatic operators and devices will be located.

2.2.14 Interconnection to Electrical Grid

The three CTGs will each be connected to SCE's transmission system via the existing SCE 115-kV Highgrove Substation, immediately adjacent to the Project Site. Each CTG will be connected via a 115-kV overhead transmission line from the high voltage terminals of each unit's generator step-up transformer to a transition structure in the substation. Refer to Section 5.0, Transmission, for additional discussion about the interconnection.

2.2.15 Project Construction

Construction of the generating facility, from demolition, to site preparation and grading, to commercial operation, is expected to take place from second quarter 2007 to the second quarter 2008. Major milestones are listed in Table 2.2-2.

TABLE 2.2-2
Project Schedule Major Milestones

Activity	Date
Demolition	Q2 2007
Startup and Test	Q2 2008
Commercial Operation	Q3 2008

There will be an average and peak workforce of approximately 77 and 147, respectively, of construction craft people, supervisory, support, and construction management personnel onsite during construction (see Table 8.8-8 in the Socioeconomics section).

Construction will be scheduled to occur between 7 a.m. and 7 p.m., Monday through Saturday. Additional hours may be necessary to make up schedule deficiencies, or to complete critical construction activities. During some construction periods and during the startup phase of the project, some activities will continue 24 hours per day, 7 days per week. The peak construction site workforce is expected to occur in months 7 and 8 of the construction period.

Table 2.2-3 provides an estimate of the average and peak construction traffic during the appropriate 11-month construction period.

TABLE 2.2-3
Average and Peak Construction Traffic

Vehicle Type	Average Daily Trips	Peak Daily Trips
Construction Workers	59	113
Delivery	5	8
Heavy Trucks	5	12
Total	**69**	**133**

Construction laydown and parking areas will be within the former plant site, south of the new plant area (Figure 2.2-5). Construction access will be from Taylor Street, as shown on Figure 2.2-1. Materials and equipment will be delivered by truck.

2.2.16 Generating Facility Operation

The Highgrove Project will be designed as a peaking facility to serve load during periods of high demand, which generally occur during daytime hours, and more frequently during the summer than other periods. Because the LMS100 CTGs are more efficient than other peaking units and many of the aging gas-fired steam generation facilities in California, it is expected that the Highgrove Project will operate at an annual capacity factor of 15 to 30 percent.

The proposed Highgrove facility is expected to employ up to 13 full-time employees. Anticipated job classifications are shown in Table 2.2-4.

It is anticipated that all of the electricity produced by the plant will be sold under contract to the power market or on a merchant plant basis. The exact operational profile of the plant will be dependent on weather conditions and the power purchaser’s economic dispatch decisions.

Because the capacity will be sold through contract and the prices that will be offered for spot purchases are unknown at this time, the exact mode of operation cannot be described. It is conceivable, however, that the facility could be operated in one or all of the following modes:

- **Summer Design Load**. The facility would be operated at maximum continuous output for as many hours per year as is profitable. As the facility is designed to be a peaking

TABLE 2.2-4
Typical Plant Operation Workforce

Department	Personnel	Shift	Workdays
Operations	7 Operating Technicians 1 Instrument and Controls Technician	Rotating 12-hour shift, 2 operators per shift, 2 relief operators	6-7 days a week
Maintenance	2 Maintenance Technicians	Standard 8-hour days	5 days a week (Maintenance technicians will also work unscheduled days and hours as required [weekends])
Administration	3 Administrators (1 Plant Manager, 1 Assistant Plant Manager/Engineer, 1 Administrative Assistant)	Standard 8-hour days	5 days a week, with additional coverage as required

facility, it is expected to operate only during high ambient temperature periods and/or periods of peak demand.

- **Load Following**. The facility would be operated to meet contractual requirements up to the maximum available output at high load times of the day. The output of the unit would therefore be adjusted periodically to meet whatever load proved profitable to the power purchaser.
- **Partial Shutdown**. This mode of operation can be expected to occur during late evening and early morning hours and on weekends when only a portion of the plant's maximum output may be needed and it is economically favorable to shut down one, two or all three CTGs. If the units are not undergoing maintenance, they will in most cases be available to the power purchaser as non-spinning reserve units.
- **Full Shutdown**. This would occur if forced by equipment malfunction, fuel supply interruption, transmission line disconnect, or scheduled maintenance. Because the Highgrove facility is a peaking unit, full shutdown for economic reasons would be expected for a majority of the off-peak hours of the year, although non-spinning reserve capability would still be available.

In the unlikely event of a situation that causes a long-term cessation of operations, security of the facilities will be maintained on a 24-hour basis, and the California Energy Commission (CEC) will be notified. Depending on the length of shutdown, a contingency plan for the temporary cessation of operations may be implemented. Such contingency plan will be in conformance with all applicable LORS and protection of public health, safety, and the environment. The plan, depending on the expected duration of the shutdown, could include the draining of all chemicals from storage tanks and other equipment and the safe shutdown of all equipment. All wastes from equipment shutdown will be disposed of according to applicable LORS. If the cessation of operations becomes permanent, the plant will be decommissioned (see Section 4.0, Facility Closure).

2.3 Facility Safety Design

The Highgrove facility will be designed to maximize safe operation. Potential hazards that could affect the facility include earthquake, flood, and fire. Facility operators will be trained in safe operation, maintenance, and emergency response procedures to minimize the risk of personal injury and damage to the plant.

2.3.1 Natural Hazards

The principal natural hazard associated with the Highgrove site is earthquakes. The site is located in Seismic Risk Zone 4. Structures will be designed to meet the seismic requirements of CCR Title 24 and the latest edition of the California Building Code (CBC). (See Subsection 8.15, Geologic Hazards and Resources.) This subsection includes a review of potential geologic hazards, seismic ground motion, and potential for soil liquefaction due to ground-shaking. Potential seismic hazards would be mitigated by implementing the CBC construction guidelines. Appendix 10B, Structural Engineering, includes the structural seismic design criteria for the buildings and equipment.

Flooding is not a hazard of concern. According to the Federal Emergency Management Agency (FEMA), the site is not within either the 100- or 500-year flood plain. Subsection 8.14, Water Resources, includes additional information on the potential for flooding.

2.3.2 Emergency Systems and Safety Precautions

This subsection discusses the fire protection systems, emergency medical services, and safety precautions to be used by project personnel. Subsection 8.8, Socioeconomics, includes additional information on area medical services, and Subsection 8.7, Worker Safety, includes additional information on safety for workers. Appendixes 10A through 10G contain the design practices and codes applicable to safety design for the project. Compliance with these requirements will minimize project effects on public and employee safety.

2.3.2.1 Fire Protection Systems

The project will rely on both onsite fire protection systems and local fire protection services.

2.3.2.1.1 Onsite Fire Protection Systems

The fire protection systems are designed to protect personnel and limit property loss and plant downtime from fire or explosion. The project will have the following fire protection systems.

CO2 Fire Protection System

This system protects the combustion turbine, generator, and accessory equipment compartments from fire. The system will have fire detection sensors in all compartments. Actuating one sensor will provide a high-temperature alarm on the combustion turbine control panel. Actuating a second sensor will trip the combustion turbine, turn off ventilation, close ventilation openings, and automatically release the CO2. The CO2 will be discharged at a design concentration adequate to extinguish the fire.

Transformer Deluge Spray System
This system provides fire suppression for the generator transformers and auxiliary power transformers in the event of a fire. The deluge systems are fed by the plant underground fire water system.

Fire Hydrants/Hose Stations
This system will supplement the plant fire protection system. Water will be supplied from the plant underground fire water/domestic water system.

Fire Extinguisher
The plant Administrative/Maintenance Building, water treatment facility, and other structures will be equipped with portable fire extinguishers as required by the local fire department.

2.3.2.1.2 Local Fire Protection Services
In the event of a major fire, the plant personnel will be able to call upon the local Fire Department for assistance. The Hazardous Materials Risk Management Plan (see Subsection 8.12, Hazardous Materials Handling) for the plant will include all information necessary to permit all firefighting and other emergency response agencies to plan and implement safe responses to fires, spills, and other emergencies.

2.3.2.2 Personnel Safety Program
The Highgrove Project will operate in compliance with federal and state occupational safety and health program requirements. Compliance with these programs will minimize project effects on employee safety. These programs are described in Subsection 8.7, Worker Safety.

2.4 Facility Reliability

This subsection discusses the expected facility availability, equipment redundancy, fuel availability, water availability, and project quality control measures.

2.4.1 Facility Availability
Because of the Highgrove Project's predicted high efficiency relative to other units traditionally used for peaking service, it is anticipated that the facility will normally be called upon to operate at annual capacity factors between 15 percent and 30 percent. The facility will be designed to operate between 50 and 100 percent of base load to support dispatch service in response to customer demands for electricity.

The Highgrove facility will be designed for an operating life of 30 years. Reliability and availability projections are based on this operating life. Operation and maintenance procedures will be consistent with industry standard practices to maintain the useful life status of plant components.

The percent of time that the power plant is projected to be operated is defined as the "service factor." The service factor considers the amount of time that a unit is operating and generating power, whether at full or partial load. The projected service factor, which considers the projected percent of time of operation, differs from the "equivalent availability factor" (EAF), which considers the projected percent of energy production capacity achievable.

The EAF may be defined as a weighted average of the percent of full energy production capacity achievable. The projected equivalent availability factor for the Highgrove facility is estimated to be approximately 92 to 98 percent.

The EAF, which is a weighted average of the percent of energy production capacity achievable, differs from the "availability of a unit," which is the percent of time that a unit is available for operation, whether at full load, partial load, or standby.

2.4.2 Redundancy of Critical Components

The following subsections identify equipment redundancy as it applies to project availability. A summary of equipment redundancy is shown in Table 2.4-1. (Final plant design could differ based upon design optimization.)

TABLE 2.4-1
Major Equipment Redundancy

Description	Number	Note
CTGs	Three trains	
Cooling tower	One per CTG	Two-cell mechanical draft design
Demineralizer—RO Systems	Three - 50 % capacity trains	Redundant pumps will be provided.
Gas Compressors	Three - 50 % capacity trains	

2.4.2.1 Simple-cycle Power Block

Three separate combustion turbine power generation trains will operate in parallel within the simple-cycle power block. Each CTG will provide approximately 33 percent of the total power block output. The major components of the simple-cycle power block consist of the following subsystems.

2.4.2.1.1 Combustion Turbine Generator Subsystems

The combustion turbine subsystems include the combustion turbine, inlet air filtration and evaporative inlet cooling system, generator and excitation systems, and turbine control and instrumentation. The combustion turbine is comprised of a compressor section, a combustion section, and a turbine section. Air compressed in the compressor section of the combustion turbine is heated by the combustion of natural gas, and then allowed to expand in the turbine section, which turns the rotor and drives the compressor and generator. Exhaust gas from the combustion turbine will be directed into an SCR to control NO_x emissions and an oxidation catalyst to control CO emissions. The generator will be air cooled. The generator excitation system will be a solid-state static system. Combustion turbine control and instrumentation (interfaced with the distributed control system) will cover the turbine governing system, and the protective system.

2.4.2.2 Distributed Control System (DCS)

The DCS will be a redundant microprocessor-based system that will provide the following functions:

- Control the CTG, and other systems in response to unit load demands (coordinated control)
- Provide control room operator interface
- Monitor plant equipment and process parameters and provide this information to the plant operators in a meaningful format
- Provide visual and audible alarms for abnormal events based on field signals or software-generated signals from plant systems, processes, or equipment

Plant operation will be controlled from the operator panel located in the control room. The operator panel will consist of two individual CRT/keyboard consoles and one engineering workstation. Each CRT/keyboard console will be an independent electronic package so that failure of a single package does not disable more than one CRT/keyboard. The engineering workstation will allow the control system operator interface to be revised by authorized personnel.

2.4.2.5 Demineralized Water System

Makeup to the demineralized water system will be from the raw water storage tank. The demineralized water system will consist of three 50 percent capacity RO units and an EDI (Electro Deionization) system for additional treatment.

2.4.2.6 Demineralized Water Makeup and Storage

The demineralized water makeup and storage subsystem provides demineralized water pumping capabilities to supply high-purity water for use as CTG injection water and wash water. Demineralized water will be stored in one 100,000-gallon water storage tank. The demineralized water storage tank will provide an approximate 14-hour supply of demineralized water at peak load. The system also includes two full-capacity, horizontal, centrifugal, cycle makeup water pumps.

2.4.2.7 Circulating Water System

The circulating water system provides cooling water to the intercooler for the combustion turbine and lube oil coolers. A separate circulating water system is provided for each of the three CTG units. Each system consists of an evaporative-type cooling tower, pumps, and interconnecting piping and valves.

2.4.2.9 Compressed Air

The compressed air system comprises the instrument air and service air subsystems. The service air system supplies compressed air to the instrument air dryers and to hose connections for general plant use. The service air system will include one 100 percent capacity air motor-driven compressor, service air headers, distribution piping, and hose connections. The instrument air system supplies dry compressed air at the required pressure and capacity for all control air demands, including pneumatic controls, transmitters, instruments, and valve operators. The instrument air system will include two 100 percent capacity air dryers with prefilters and after filters, an air receiver, instrument air headers, and distribution piping.

2.4.3 Fuel Availability

Fuel for the facility will be supplied by Southern California Gas Company (SoCalGas). The project will construct a new 7-mile natural gas pipeline line to connect to an existing natural gas interstate transmission pipeline owned by SoCalGas. There is sufficient capacity in the transmission gas line to supply the Highgrove Project. See Section 6.0, Natural Gas Supply for a more detailed description.

2.4.4 Water Availability

Water for the Highgrove Project will be provided by two of four redundant onsite wells. The onsite wells are existing and were used to provide process and domestic water needs when the existing plant was fully operational. Water from Riverside Highland Water Company, via the City's potable water system, will be used as an emergency backup supply. The availability of water to meet the needs of the project is discussed in more detail in Section 7.0, Water Supply.

2.4.5 Project Quality Control

The Quality Control Program that will be applied to the Highgrove Project is summarized in this subsection. The objective of the Quality Control Program is to ensure that all systems and components have the appropriate quality measures applied; whether it be during design, procurement, fabrication, construction, or operation. The goal of the Quality Control Program is to achieve the desired levels of safety, reliability, availability, operability, constructability, and maintainability for the generation of electricity.

The required quality assurance for a system is obtained by applying controls to various activities, according to the activity being performed. For example, the appropriate controls for design work are checking and review, and the appropriate controls for manufacturing and construction are inspection and testing. Appropriate controls will be applied to each of the various activities for the project.

2.4.5.1 Project Stages

For quality assurance planning purposes, the project activities have been divided into the following nine stages that apply to specific periods of time during the project.

2.4.5.1.1 Conceptual Design Criteria

Activities such as definition of requirements and engineering analyses.

2.4.5.1.2 Detail Design

Activities such as the preparation of calculations, drawings, and lists needed to describe, illustrate, or define systems, structures, or components.

2.4.5.1.3 Procurement Specification Preparation

Activities necessary to compile and document the contractual, technical and quality provisions for procurement specifications for plant systems, components, or services.

2.4.5.1.4 Manufacturer's Control and Surveillance
Activities necessary to ensure that the manufacturers conform to the provisions of the procurement specifications.

2.4.5.1.5 Manufacturer Data Review
Activities required to review manufacturers' drawings, data, instructions, procedures, plans, and other documents to ensure coordination of plant systems and components, and conformance to procurement specifications.

2.4.5.1.6 Receipt Inspection
Inspection and review of product at the time of delivery to the construction site.

2.4.5.1.7 Construction/Installation
Inspection and review of storage, installation, cleaning, and initial testing of systems or components at the facility.

2.4.5.1.8 System/Component Testing
Actual operation of generating facility components in a system in a controlled manner to ensure that the performance of systems and components conform to specified requirements.

2.4.5.1.9 Plant Operation
As the project progresses, the design, procurement, fabrication, erection, and checkout of each generating facility system will progress through the nine stages defined above.

2.4.5.2 Quality Control Records
The following quality control records will be maintained for review and reference:

- Project instructions manual
- Design calculations
- Project design manual
- Quality assurance audit reports
- Conformance to construction records drawings
- Procurement specifications (contract issue and change orders)
- Purchase orders and change orders
- Project correspondence

For procured component purchase orders, a list of qualified suppliers and subcontractors will be developed. Before contracts are awarded, the subcontractors' capabilities will be evaluated. The evaluation will consider suppliers' and subcontractors' personnel, production capability, past performance, and quality assurance program.

During construction, field activities are accomplished during the last four stages of the project: receipt inspection, construction/installation, system/component testing, and plant operations. The construction contractor will be contractually responsible for performing the work in accordance with the quality requirements specified by contract.

The subcontractors' quality compliance will be surveyed through inspections, audits, and administration of independent testing contracts.

A plant operation and maintenance program, typical of a project this size, will be implemented by AES Highgrove, to control operation and maintenance quality. A specific program for this project will be defined and implemented during initial plant startup.

2.5 Laws, Ordinances, Regulations, and Standards

The applicable LORS for each engineering discipline are included as part of the Engineering Appendixes 10A through 10G.

2.6 References

Colton Joint Unified School District. 2005. Grand Terrace Educational Facility Environmental Draft Impact Report. September.

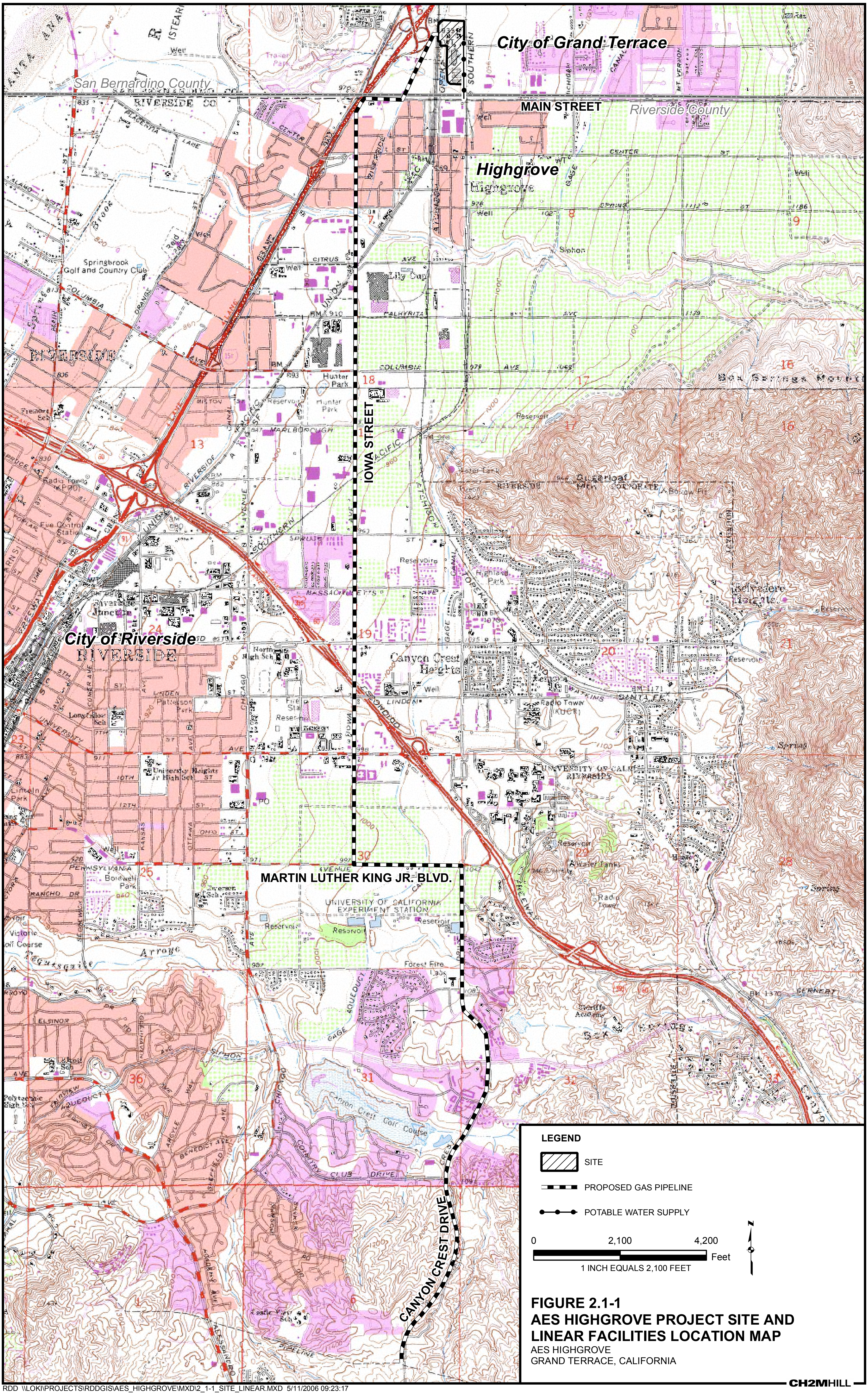

FIGURE 2.1-1
AES HIGHGROVE PROJECT SITE AND LINEAR FACILITIES LOCATION MAP
AES HIGHGROVE
GRAND TERRACE, CALIFORNIA

FIGURE 2.1-2
HISTORIC AREAS OF ACTIVITY
AES HIGHGROVE
GRAND TERRACE, CALIFORNIA

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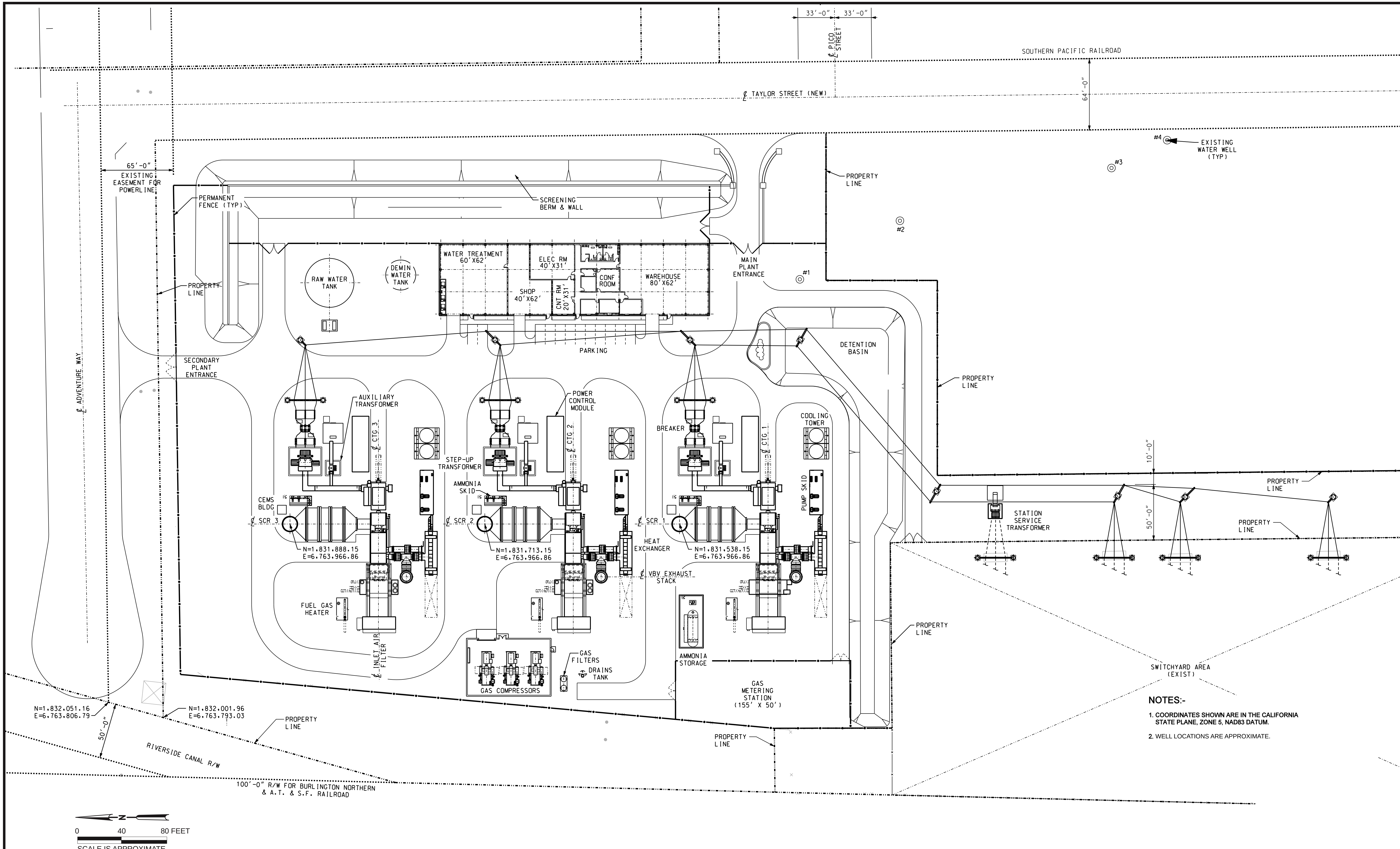

FIGURE 2.2-1
GENERAL ARRANGEMENT
AES HIGHGROVE
GRAND TERRACE, CALIFORNIA
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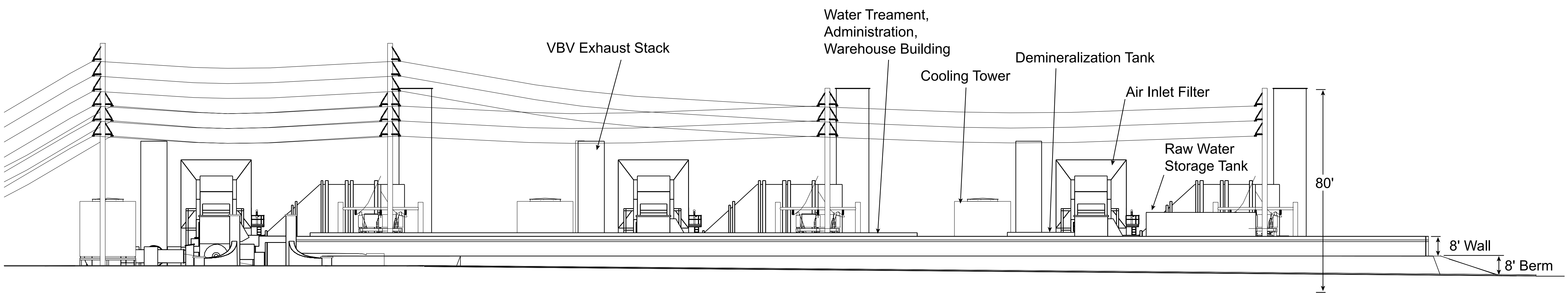

FIGURE 2.2-2
PLANT ELEVATION LOOKING WEST
AES HIGHGROVE
GRAND TERRACE, CALIFORNIA

FIGURE 2.2-3
SETTLED AREAS, PARKS, RECREATION, AND SCENIC AREAS NEAR THE SITE
AES HIGHGROVE
GRAND TERRACE, CALIFORNIA

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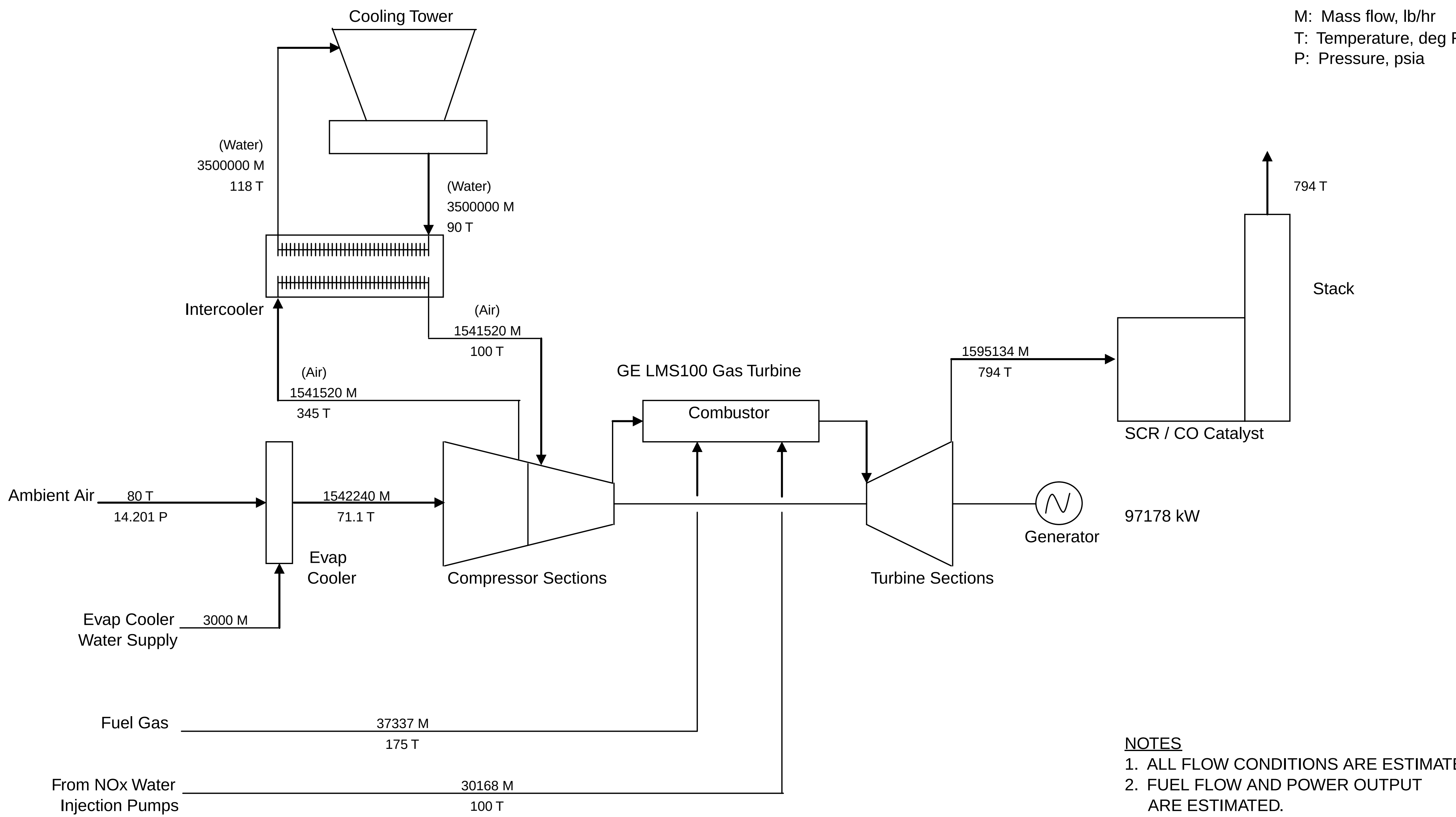

NOTES
1. ALL FLOW CONDITIONS ARE ESTIMATED.
2. FUEL FLOW AND POWER OUTPUT ARE ESTIMATED.

Ambient Conditions

Dry Bulb Temperature	80	Deg F
Wet Bulb Temperature	70	Deg F
Relative Humidity	60	%

Performance Summary (Per Gas Turbine Except Where Noted)

Gross Output	97178	kW
Auxiliary Loads	3526	kW
Net Power	93652	kW
Heating Value	20577	Btu/lb LHV
Fuel Consumption	768.3	MMBtu/hr LHV
Net Heat Rate	8204	Btu/kW-hr LHV
Net Power-Site Total	280956	kW

Figure source: Worley Parsons, Figure 2.2-5a, Process Flow Diagram Annual Operating Ambient Conditions, 5/10/2006.

FIGURE 2.2-4
HEAT BALANCE
AES HIGHGROVE
GRAND TERRACE, CALIFORNIA

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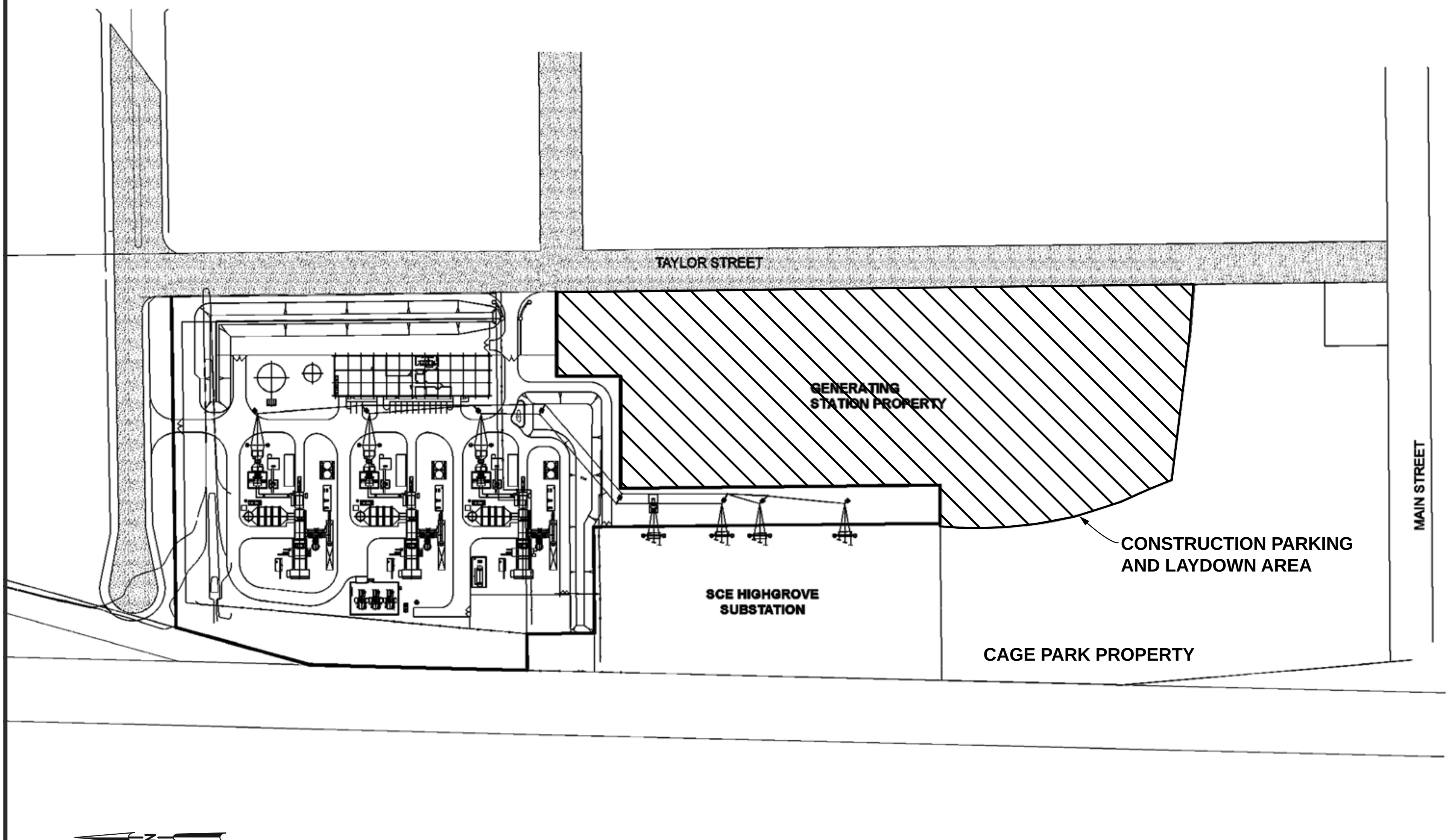

FIGURE 2.2-5
CONSTRUCTION PARKING AND LAYDOWN AREA
AES HIGHGROVE
GRAND TERRACE, CALIFORNIA

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