APPLICATION FOR CERTIFICATION

for the

ROSEVILLE ENERGY PARK

Roseville, California

VOLUME I: APPLICATION FOR CERTIFICATION

Submitted to:

California Energy Commission
Sacramento, California

Submitted by:

Roseville Electric
Reliable Energy - Dependable Service

October 2003

Roseville Electric
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October 28, 2003

Mr. Robert L. Therkelsen
Executive Director
California Energy Commission
1516 Ninth Street
Sacramento, CA 95814

Dear Mr. Therkelsen:

In accordance with the provisions of Title 20, California Code of Regulations, Roseville Electric, the municipal electric utility of the City of Roseville, hereby submits this Application for Certification seeking authority to construct and operate the Roseville Energy Park, a 120 megawatt, natural gas-fired, combined-cycle power plant to be located in the City of Roseville, California.

As an officer of Roseville Electric, I hereby attest, under penalty of perjury, that the contents of this application are truthful and accurate to the best of my knowledge.

Dated this 28th day of October 2003.

Sincerely,

Tom Habashi
Electric Utility Director
Roseville Electric
Roseville, California

CITY OF ROSEVILLE
TRADITION • PRIDE • PROGRESS

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ACRONYMS AND ABBREVIATIONS

AA	Administering Agency
AC	Alternating current
ADT	Average daily traffic
AFC	Application for Certification
AGC	Automatic generation control
ANSI	American National Standards Institute
APCD	Air Pollution Control District
APE	Area of Potential Effect
AQMD	Air Quality Management District
ASME	American Society of Mechanical Engineers
AST	Aboveground storage tank
ASTM	American Society for Testing and Materials
BA	Biological Assessment
BACT	Best Available Control Technology
BMP	Best Management Practices
BO	Biological Opinion
BOD	Biochemical oxygen demand
BP	Before present
CAA	Clean Air Act
CAAQS	California Ambient Air Quality Standards
CAC	California Administrative Code
CalARP	California's Accidental Release Prevention Program
CalTrans	California Department of Transportation
CAPCOA	California Air Pollution Control Officer's Association
CARB	California Air Resources Board
CAS	Chemical Abstract Service
CATEF	California Air Toxics Emission Factor
CBC	California Building Code
CCR	California Code of Regulations
CDFG	California Department of Fish and Game
CDMG	California Division of Mines and Geology
CDOE	California Department of Education
CEC	California Energy Commission
CEDD	California Employment Development Department
CEM	Continuous emissions monitoring
CEQA	California Environmental Quality Act
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
cfs	Cubic feet per second
CHRIS	California Historical Resources Information System
CHP	California Highway Patrol
CIP	Clean-In-Place
CIWMA	California Integrated Waste Management Act
CIWMB	California Integrated Waste Management Board
CMP	Congestion Management Program
CNDDB	California Natural Diversity Data Base

CNEL	Community noise equivalent level
CNPS	California Native Plant Society
CO	Carbon monoxide
CO_2	Carbon dioxide
COB	Chief Building Official
CPM	Compliance Project Manager
CPR	Central Pacific Railroad
CPUC	California Public Utility Commission
CRGT	Chemically recuperated gas turbine
CRT	Cathode ray tube
CSC	California species of concern
CTG	Combustion turbine-generator
CUPA	Certified Unified Program Agency
CURE	California Unions for Reliable Energy
CWA	Clean Water Act
dBA	Decibels, A-weighted
DC	Direct current
DCS	Distributed control and information system
DCWWTP	Dry Creek Waste Water Treatment Plant
DFS	Detailed Facilities Study
DHS	Department of Health Services
DHHS	Department of Health and Human Services
DPR	Department of Parks and Recreation
DTSC	California Department of Toxic Substances Control
EAP	Emergency Action Plan
EIR	Environmental Impact Report
EMF	Electric and magnetic field
EPA	Environmental Protection Agency
EPCRA	Emergency Planning and Community Right-to-know Act
ERC	Emission reduction credit
ESA	Endangered Species Act
ESA	Environmental Site Assessment
°F	Degrees Fahrenheit
FAA	Federal Aviation Administration
FEMA	Federal Emergency Management Agency
g	Gravity
GO	General Order
gpm	Gallons per minute
GWh	Gigawatt hours
H&SC	California Health & Safety Code
HAT	Humid air turbine
HCP	Habitat Conservation Plan
HDD	Horizontal directional drilling
HHV	High heat value
HMBP	Hazardous materials business plan
HNO_3	Nitric acid
HOV	High Occupancy Vehicle
HP	High-pressure
HRSG	Heat recovery steam generator
HWCL	Hazardous Waste Control Law
Hz	Hertz

in. HgA	Inches of mercury, absolute
I/O	Input/output
IP	Intermediate-pressure
ISO	International Standards Organization
ISRGT	Intercooled steam recuperated gas turbine
KOP	Key Observation Point
kV	Kilovolt
kV/m	Kilovolts per meter
LAER	lowest achievable emission rate
LC	Load center
LEPC	Local emergency planning committee
LORS	Laws, ordinances, regulations, and standards
LOS	Level of Service
LP	Low-pressure
MAOP	Maximum allowable operating pressure
MCC	Motor control center
MEI	Maximally exposed individual
MF	Micro-filtration
MF/RO	Membrane filtration reverse osmosis
$\mu g/m^3$	Micrograms per cubic meter
mG	Milligauss
mgd	Million gallons per day
mmBtu	Million British thermal units
MRF	Material recovery facility
MSDS	Material Safety Data Sheets
MSL	Mean sea level
MTP	Metropolitan Transportation Plan
MW	Megawatt
MWh	Megawatt hours
NAAQS	National Ambient Air Quality Standards
NAHC	Native American Heritage Commission
NCPA	Northern California Power Agency
NEIH	National Institute of Environmental Health Sciences
NEPA	National Environmental Policy Act
NESC	National Electric Safety Code
NESHAP	National Emissions Standards for Hazardous Air Pollutants
NFPA	National Fire Protection Association
NH_3	Ammonia
NMFS	National Marine Fisheries Service
NOD	Notice of Deficiency
NOI	Notice of Intent
NO	Nitrogen oxide
NO_2	Nitrogen dioxide
NOx	Nitrogen oxides
NPCA	Notice of Proposed Construction or Alteration
NPDES	National Pollutant Discharge Elimination System
NPOC	Nonprecursor organic compounds
NRCS	Natural Resource Conservation Service
NSPS	New Source Performance Standard
NSR	New source review

OCA	Off-site consequences analysis
O&M	Operation and Maintenance
OHP	Office of Historic Preservation
OSHA	Occupational Safety and Health Act
PACI	Pacific Alternating Current Intertie
PGWWTP	Pleasant Grove Waste Water Treatment Plant
PCB	Polychlorinated biphenyl
PCN	Preconstruction Notification
PG&E	Pacific Gas & Electric Company
PM_{10}	Particular matter with a diameter less than 10 microns
$PM_{2.5}$	Particular matter with a diameter less than 2.5 microns
POC	Precursor organic compounds
POTW	Publicly owned treatment works
ppb	Parts per billion
pphm	Parts per hundred million
ppm	Parts per million
ppmvd	Parts per million by volume, dry basis
PPE	Personal Protective Equipment
PRC	Public resource code
PSD	Prevention of significant deterioration
PSIDM	Predicted seismic intensity distribution maps
psig	Pounds per square inch gauge
RCRA	Resource Conservation and Recovery Act
RE	Roseville Electric
REL	Reference Exposure Level
REP	Roseville Energy Park
RI-TVI	Radio Interference and Television Interference
RMP	Risk management plan
RO	Reverse osmosis
ROC	Reactive organic compound
ROW	Right-of-way
RWQCB	Regional Water Quality Control Board
SACOG	Sacramento Area Council of Governments
SARA	Superfund Amendments and Reauthorization Act
SATPG	Sacramento Area Transmission Planning Group
SC	Species of concern
SCR	Selective catalytic reduction
SCADA	Supervisory Control and Data Acquisition
SERC	State emergency response committee
SHPO	State Historic Preservation Officer
SIP	State Implementation Plan
SMUD	Sacramento Municipal Utility District
SO_2	Sulfur dioxide
SO_x	Sulfur oxides
SOP	Standard operating procedure
SPCC	Spill prevention control and countermeasure
SPR	Southern Pacific Railroad
SR	State Route
STG	Steam turbine-generator
STIG	Steam injected gas turbine
SWPPP	Storm Water Pollution Prevention Plan

SWRCB	State Water Resources Control Board
TAC	Toxic air contaminant
TDS	Total dissolved solids
TEWAC	Totally Enclosed Water/Air-Cooled
TPH	Total petroleum hydrocarbons
TPQ	Theshold Planning Quantity
tpy	Tons per year
TQ	Threshold quantity
TSD	Treatment, Storage, and Disposal
TSP	Total suspended particulate
TtFWI	Tetra Tech FW, Inc.
UBC	Uniform Building Code
UCMP	University of California Museum of Paleontology
UPCF	Unified Program Consolidated Form
UPRR	Union Pacific Railroad Company
UPS	Uninterruptible Power Supply
USACE	United States Army Corps of Engineers
USC	United State Code
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
UXO	Unexploded ordinance
VOC	Volatile organic compound
WAPA	Western Area Power Administration
WPCP	Water Pollution Control Plant
WPWMA	West Placer Waste Management Authority
WRSP	West Roseville Specific Plan
ZLD	Zero liquid discharge

1.0 EXECUTIVE SUMMARY

1.1 PROJECT OVERVIEW

The City of Roseville's electric department, doing business as Roseville Electric (RE), proposes to construct, own, and operate an electrical generating plant in the City of Roseville, Placer County, California. The Roseville Energy Park (REP) will be a natural gas-fired, combined-cycle electrical generating facility rated at a nominal net generating capacity of 120 to 125 megawatts (MW), with the ability to peak-fire to 160 MW nominal during summer design conditions. The project is proposed for a 12-acre site that lies within a 40-acre City of Roseville parcel. The project site is within the limits of the City of Roseville, adjacent to and north of the Pleasant Grove Waste Water Treatment Plant (PGWWTP). The project site is owned by the City of Roseville and is zoned Public/Quasi-Public. Surrounding land uses currently include ranching (agricultural grazing) and rural residential. The project area to the south, east, and west, however, is proposed for residential, industrial, and commercial development under the West Roseville Specific Plan (WRSP). The WRSP is a plan for annexation and development of 3,162 acres and is scheduled for City Council final action in December of 2003. Build-out of the WRSP will take place over approximately 10 years.

A parcel map of the REP site is attached as Appendix 1-A. A list of the property owners located within 1,000 feet of the power plant site and within 500 feet of the linear corridors (natural gas pipeline, sanitary sewer discharge pipeline, storm water outfall pipeline) is attached as Appendix 1-B.

Figure 1.1-1 is an architectural rendering of the project. Figure 1.1-2 shows the location of the project features. The main project features are as follows:

- The project is a 120 to 125 MW nominal, natural gas-fired, combined-cycle generating plant with two General Electric LM6000 or two Alstom GTX 100 combustion turbine-generators (CTGs), a single condensing steam turbine generator (STG), a deaerating surface condenser; a four-cell mechanical draft cooling tower; and associated support equipment.
- The CTGs are equipped with evaporative coolers on the inlet air system and water-injected combustors for the LM6000 model or dry low NO_x combustors for the GTX 100 model.
- The heat recovery steam generators (HRSGs) will be of the horizontal, natural circulation type, equipped with duct burners. The emission reduction system includes a selective catalytic reduction (SCR) unit to control nitrogen oxide (NO_x) stack emissions and an oxidation catalyst to control carbon monoxide (CO) emissions.
- A 40,000 pound-per-hour natural gas-fired auxiliary boiler and a nominal 750 kW, diesel-fired standby generator will also be included in the project.
- A 50-foot-long pipeline will supply tertiary treated recycled waste water from the City of Roseville's adjacent PGWWTP for use as cooling tower makeup water, firewater, service water, and process makeup water.
- Cooling tower blowdown water will be treated through a zero liquid discharge (ZLD) treatment system located on the project site. As a result, no process wastewater will be discharged from the plant. A relatively small amount of salt cake will be produced by the ZLD system for off-site disposal at an approved landfill.
- A 60-kilovolt (kV) on-site switchyard will deliver the plant's power directly to the grid through a double-circuit 60 kV transmission line that will be located adjacent to the project site. This new

line will be constructed along the current alignment of Phillip Road or an alternative road alignment as part of the West Roseville development and will be looped directly through the project switchyard.

- Approximately 6 miles of 10- to 16-inch diameter underground natural gas pipeline will convey gas from Pacific Gas & Electric Company's (PG&E) gas distribution Line 123 to the project site. This pipeline begins at a connection point near the corner of Baseline Road and Country Club Lane.
- Potable water will temporarily be supplied to the project site from an on-site well. The project will use potable water from the City of Roseville's distribution system when this water becomes available as part of the build-out of West Roseville's infrastructure.
- Storm water runoff will be collected in ponds located on-site and released to an unnamed local drainage located approximately 720 feet east of the power plant fenceline through a 30-inch, storm water outfall pipeline.
- Sanitary waste water will be piped to the PGWWTP's influent junction structure, located approximately 800 feet east of the project site.

1.2 PROJECT OWNERSHIP

The REP will be owned by the City of Roseville. The City, through Roseville Electric, has been providing electrical power to its residents, businesses, and the City's street lighting system since 1912. In 1968, the City became a charter member in the Northern California Power Agency (NCPA), a consortium of municipal electrical utilities. Roseville Electric has interests in natural gas-fired, geothermal, solar, hydroelectric, and other sources of electrical generation that it uses to meet its historical annual peak demand of approximately 300 MW.

It is expected that PG&E will own and maintain the new natural gas supply pipeline that will serve the REP. Alternatively, the City of Roseville may construct the pipeline and either own and operate it, or deed it back to PG&E. RE will contract with PG&E and/or other natural gas suppliers to supply natural gas to the REP.

1.3 PROJECT OBJECTIVES

By constructing the REP, the City of Roseville will improve service to its customers and continue meeting its primary service objectives, which are to provide reliable power and dependable service to the City's electrical customers while minimizing environmental impacts. The quality and reliability of service will be improved by locating the plant within RE's service area, directly connected to the RE distribution grid. RE will have better control over operational issues that may stem from transmission facilities in the Sacramento Valley region that experience congestion during peak periods. Moreover, the REP will conform to recognized grid planning objectives of locating generation in or near load centers so as to increase overall grid reliability. A key objective of the REP is to minimize environmental impacts from the power plant site itself as well as from the gas, water, and transmission lines.

The project also enables Roseville Electric to provide its customers with rate stability at a reasonable cost. RE currently purchases about 80 percent of its energy via both long- and short-term contracts, an amount that would increase without the REP as the City load increases over time. These power contracts expire periodically and must be renegotiated at prevailing market prices and terms. Prices and terms can fluctuate considerably in relation to the potential future tightening of electrical supply, however, and these

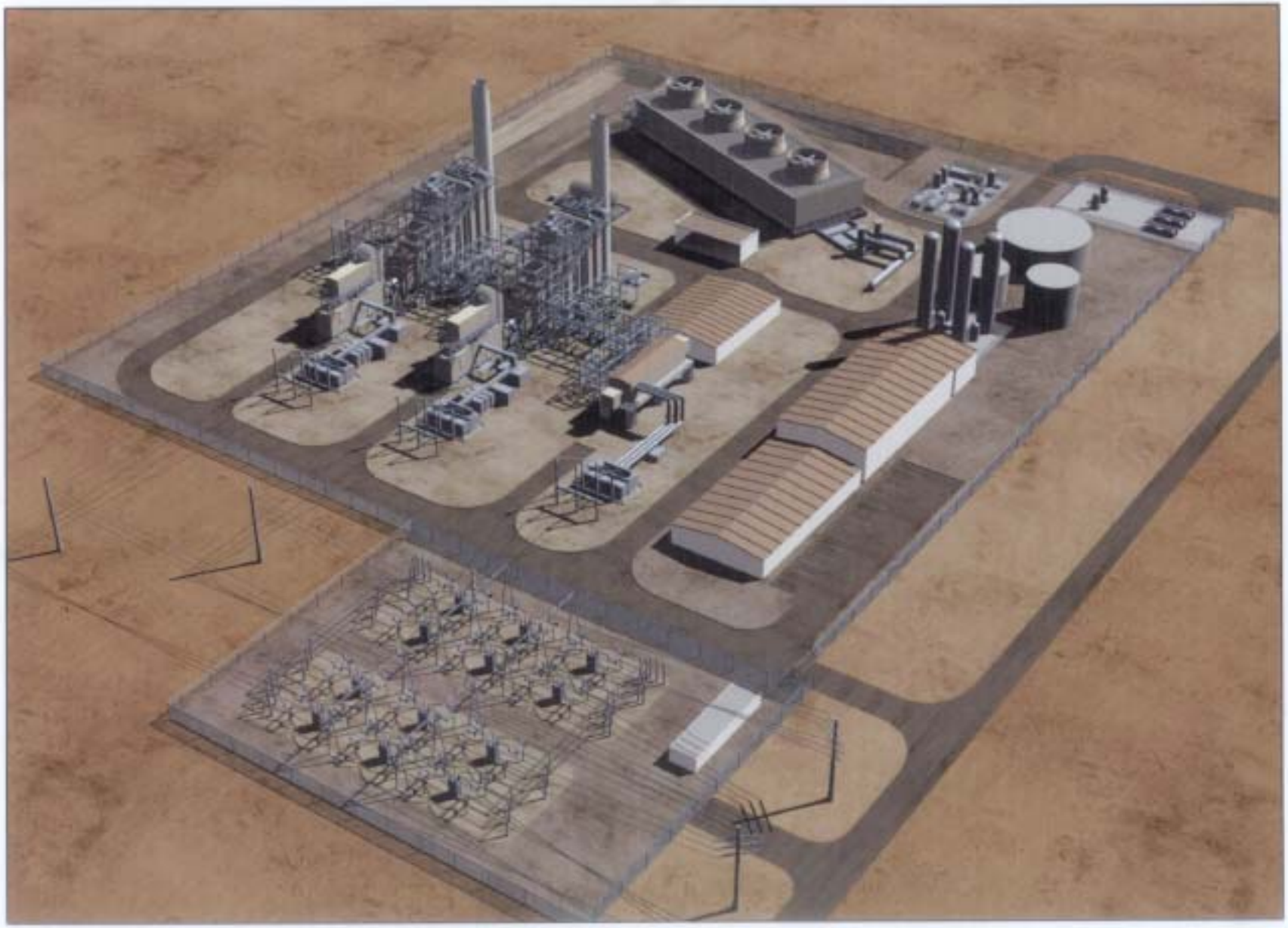


Figure 1.1-1. Architectural rendering of the Roseville Energy Park.

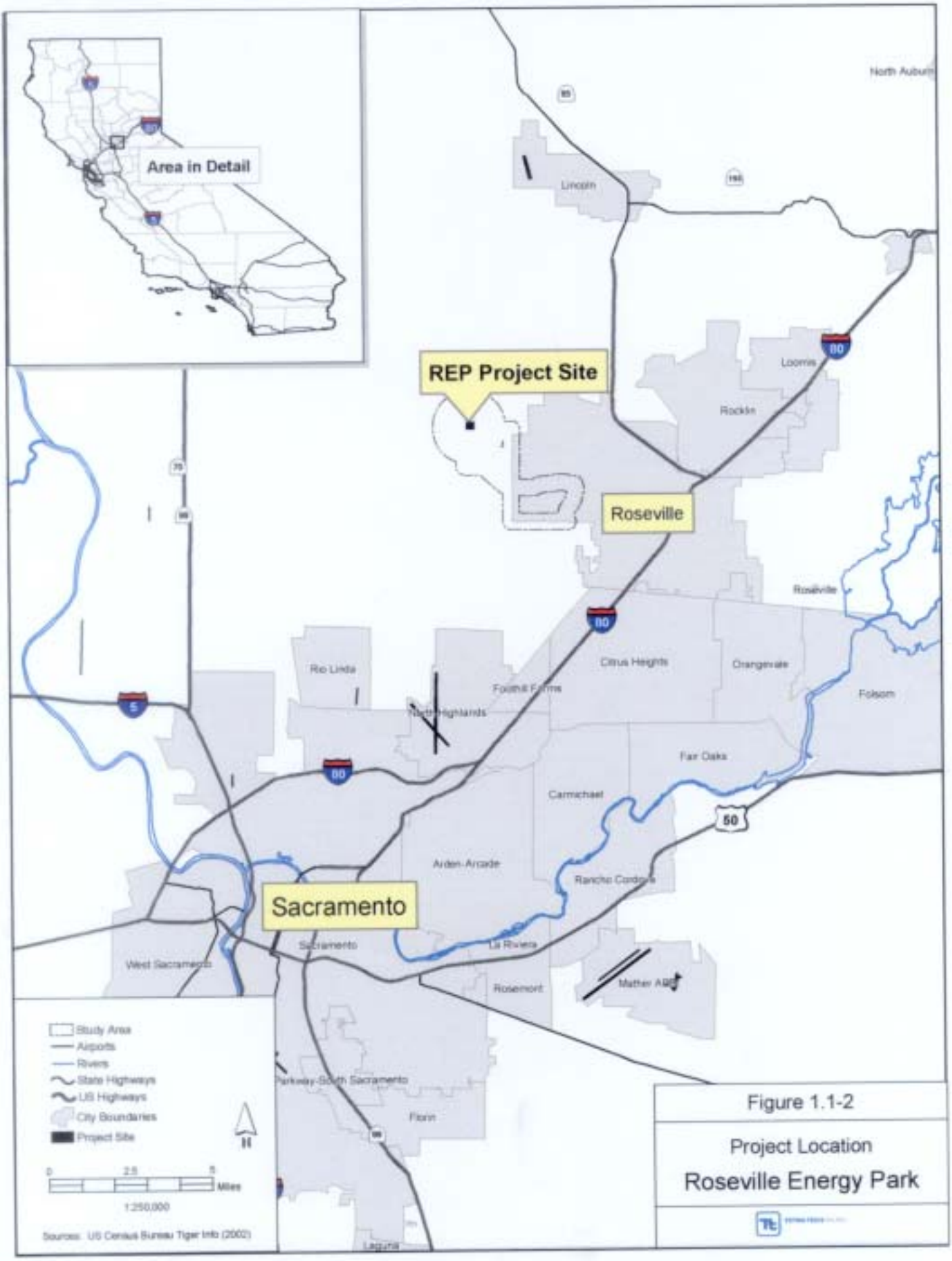


Figure 1.1-2

Project Location

Roseville Energy Park

fluctuations pose some economic risk to the City. The tightening of electrical supply is very likely to occur, due to continued strong regional load growth and the limited number of adequate sites for new power generation facilities. The electrical supply contracts also bring increased exposure to credit risk from a shrinking population of credit-worthy power suppliers.

With the REP to provide local generation as an alternative to contractual supplies, the City's economic risks will be managed more easily. The City will contract for supplies of natural gas to operate the REP, and the cost of gas will form a major cost component of the project's operating cost. Natural gas, however, is a more manageable commodity for purposes of risk management and operational flexibility than are the contracts for power supply. Additionally, the fixed capital cost of the REP will help stabilize the future cost of power.

Additional cost savings accrue to the City of Roseville's residents due to the following:

- Decreased reliance upon and decreased charges for using California's aging electric grid
- Decreased cost of transmission losses
- Reduced exposure to potential transmission congestion charges for using the grid
- Reduced cost incurred from mismatches between the relatively inflexible terms of supply contracts and RE's electric demand
- Decreased cost of financing with tax-advantaged municipal debt (whereas supply alternatives are typically financed at more expensive for-profit merchant power costs)

1.4 PROJECT SCHEDULE

Roseville Electric is filing this Application for Certification (AFC) under the California Energy Commission's (CEC) 12-month licensing process. Assuming the project receives a license by December 2004, construction of the REP will begin in the early spring of 2005. Pre-operational testing of the power plant will begin in the fall of 2005, and full-scale commercial operation is expected to commence by summer of 2006.

1.5 PROJECT ALTERNATIVES

A "no project" alternative was considered and rejected. The no project alternative fails to meet the basic project objectives of the REP project as described in this AFC. For example, the no project alternative is inconsistent with one of the primary objectives of RE's program to provide electrical power to its business and residential customers from local generation units with reduced dependence on purchasing power delivered via high voltage transmission lines. In addition, the no project alternative could result in greater fuel consumption and air pollution in the state, because older, less efficient plants with higher air emissions would continue to generate power instead of being replaced with cleaner, more efficient, plants, such as the REP. Also, during limited availability of in-state generated electricity, imported electrical energy has proven to be expensive and is not always available.

In addition to the no project alternative, the Applicant has analyzed three possible alternative power plant sites. Each of these sites was rejected as infeasible because each fails to meet most of the REP project's basic objectives, fails to avoid or minimize potentially significant environmental effects, and/or includes the potential for the alternative itself to result in one or more significant environmental impacts. A complete discussion of project alternatives, including the no project alternative is presented in Section 9.

Similarly, alternative routes for the natural gas pipeline and electric transmission line were also reviewed and found to be infeasible, failed to avoid or minimize any potential significant environmental effects, or had the potential to cause significant environmental effects that would otherwise be avoided or minimized by the preferred alignment. Natural gas pipeline route alternatives are also presented in Section 9.

Several alternative generating technologies were reviewed in a process that resulted in the selection of a state-of-the-art, combined-cycle, natural gas-fired combustion turbine power plant for the REP. The alternative technologies included conventional oil and natural gas-fired plants, simple-cycle combustion turbines, biomass-fired plants, waste-to-energy plants, solar plants, wind generation plants, and others. None of these technologies was considered better than or equal to the combined-cycle technology selected for the REP in meeting RE's project goals.

1.6 ENVIRONMENTAL CONSIDERATIONS

Pursuant to the requirements set forth in existing environmental laws and the CEC's regulations, sixteen areas of possible environmental impact from the proposed project were investigated. Detailed descriptions and analyses of these areas are presented in Sections 8.1 through 8.16 of the AFC. As discussed in detail in this AFC, with the implementation of the proposed mitigation measures and the anticipated Conditions of Certification, there will be no significant unmitigated environmental impacts associated with the construction and operation of the REP. This Executive Summary highlights findings related to two subject areas that have historically been of interest in CEC proceedings: air quality and biological resources. It also contains a discussion of the WRSP, the City of Roseville's plan for annexation and development of 3,162 acres east, west, and south of the project site.

1.6.1 Air Quality

The REP site is located in a State of California Ambient Air Quality Standards Non-attainment Area for ozone and for particulate matter with a diameter less than 10 microns (PM_{10}). An assessment of the impact to air quality was performed using detailed air dispersion modeling. The potential air quality impacts from the REP will be mitigated by the proposed combustion turbine emission control technology and cooling tower drift control technology. Emission reduction credits (ERCs) will be obtained to offset the project's emissions of NO_x. Also, a range of options is offered to mitigate the project's contribution to state-level non-attainment for PM_{10}. These mitigation measures will result in the project having no significant adverse impact on air quality or public health. See Section 8.1 for a detailed analysis of air quality.

1.6.2 Biological Resources

The project site contains seasonal wetlands that will be filled to prepare the site for construction. Some of the wetlands provide habitat for protected species, including invertebrates such as the vernal pool fairy shrimp (*Branchinecta lynchi*), vernal pool tadpole shrimp (*Lepidurus packardi*), and California linderiella tadpole shrimp (*Linderiella occidentalis*) as well as one amphibian species, the western spadefoot toad (*Scaphiopus hammondii*). The project site also contains foraging habitat for raptors such as the burrowing owl (*Athene cunicularia*) and Swainson's hawk (*Buteo swainsoni*). RE has begun consultation with the U.S. Fish and Wildlife Service (USFWS) and California Department of Fish and Game (CDFG) to develop a mitigation plan for potential project effects on the protected species and with the U.S. Army Corps of Engineers (USACE) to develop a mitigation plan for dredging and filling of jurisdictional wetlands.

Construction of most of the project's natural gas pipeline will take place within utility easements along existing City and County streets. Alternatively, within the WRSP area, potential effects of pipeline construction and operation in West Roseville will be taken into consideration through the permitting and mitigation planning done for the build-out of West Roseville. The West Roseville permitting process is underway and is expected to be completed by December of 2003.

1.6.3 West Roseville Specific Plan

The WRSP is a development plan for 3,162 acres of land surrounding the REP to the east, west, and south (south of the PGWWTP) under two separate master developments, called the Fiddyment Ranch and Westpark developments. Land uses specified under the WRSP include low-, medium-, and high-density residential, community commercial, business professional, open space, park, and public/quasi-public (schools, water storage tanks) uses. The estimated number of housing units in West Roseville when the four-phase build-out is complete, will be 8,438. The City of Roseville has recently circulated a Draft Environmental Impact Report analyzing the potential effects of the annexation of West Roseville, and of developing West Roseville under the WRSP. Final approval of the annexation could take place as early as December 2003, and construction of Phase I in the Westpark and Fiddyment Ranch developments could begin as early as spring 2004.

Under the California Environmental Quality Act (CEQA), the CEC must conduct an analysis of the project's potential environmental effects on the environmental setting as it exists today. The annexation of West Roseville and the build-out of the WRSP, however, are reasonably foreseeable events and are very likely to take place. In accordance with CEQA, the analysis in this AFC addresses the potential effects of the REP in relation to the existing environmental setting. This analysis also takes place in the context, however, of well-developed planning for areas within the WRSP that are near the REP. It is, for this reason, impossible to conduct a thorough analysis of the project without some consideration of the WRSP planning process. The AFC, thus, refers to potential future conditions under the WRSP in some sections. The potential effects of the REP in conjunction with the WRSP build-out are also assessed as potential cumulative effects. The build-out of the WRSP is expected to take place over 10 years.

Though the REP is not within the WRSP boundary, the WRSP was formulated with the understanding that the REP would be developed at its designated site. By the same token, the REP project design has been integrated with the infrastructure design plan for West Roseville. For example, three of the natural gas pipeline routes follow the street grid planned for West Roseville, which has not yet been constructed. The WRSP includes a new 60 kV transmission distribution line along the current Phillip Road, adjacent to the REP. This transmission line is being permitted and constructed as part of the WRSP, but is not yet in place. Once it is constructed, RE will loop this transmission line through the REP switchyard, which is adjacent to Phillip Road and the REP will not need a dedicated transmission line.

If the annexation of West Roseville does not take place as expected or is delayed indefinitely, two of the REP's linear routings would change somewhat. Under these circumstances, the natural gas pipeline route would follow the current alignment of Phillip Road from the project to Fiddyment Road (Alternative B1 in this AFC). It would then follow Fiddyment Road to Baseline Road and Baseline Road to PG&E Line 123, near Country Club Drive. In this case, it would also be necessary for the REP to construct a 60 kV transmission line to connect the REP with the Fiddyment Receiving Station. The route for this transmission line would be the same as for the natural gas pipeline as far as the receiving station (Phillip Road to Fiddyment Road, Fiddyment Road to the Fiddyment Receiving Station). The potential effects of this transmission line are taken into consideration, however, as part of the analysis of the environmental

effects of natural gas pipeline alternative B1. Where necessary in the discussions of potential environmental effects in Chapter 8 (Sections 8.1 through 8.16), a subsection that addresses the differences in potential project effects, if any, has been added at the end of the Environmental Consequences discussion. This section addresses the scenario in which the West Roseville annexation and WRSP build-out do not take place or are delayed indefinitely.

1.7 KEY BENEFITS

1.7.1 Environmental

The REP will use advanced, high-efficiency, combustion turbine technology and SCR and CO catalyst to minimize emissions from the facility. NO_x emissions (a precursor to ozone formation) produced by the REP will be at least 90 percent less per megawatt than those produced by many older, existing power plants. In addition to the significant reduction of emissions, the REP's operating efficiency will be such that the plant will consume less fuel than older plants of similar size. The REP will also purchase and permanently retire emission reduction credits that will more than compensate for its low level of emissions.

The use of tertiary treated water as primary cooling and process water for the REP will prevent an additional continuous demand on the local potable water system and will allow effective use of the area's recycled water supply.

1.7.2 Employment

The project will provide for a peak of approximately 206 construction jobs over an 18- to 20-month period and approximately 25 technical and skilled, family-wage positions throughout the life of the plant. In addition to the direct employment benefit, the REP plant will require and use the services of local or regional firms for major maintenance and overhauls, plant supplies, and other support services throughout the life of the facility.

1.7.3 Energy Efficiency

The REP will be an efficient, environmentally responsible source of economic and reliable electrical energy to serve the growing energy demands of the RE service area.

1.8 COMMUNITY OUTREACH

Beginning in March of 2003, RE conducted an extensive public information and community outreach program to make certain that the citizens of Roseville have been informed about the City's plans to construct the REP and have the opportunity to comment on those plans (Table 1.8-1). This program has included the following public information inititatives:

- Articles in RE's bimonthly newsletter to its ratepayers, *Electric Dispatch*
- Articles in RE's quarterly business newsletter, *Business Partners*
- Public information meetings held in the Roseville neighborhoods specifically to inform the public about the REP and to accept public comment
- Project representation at information booths established at major public events in Roseville
- Press releases to local media and public forum advertisements in the *Press Tribune*, *Sacramento Bee*, and on Channel 11

Table 1.8-1. REP program community outreach activities.

Interest Group or Occasion	Location	Date
Project-focused meetings or presentations:		
Sun City Asian-American Club	Roseville Sierra Pines	March 21, 2003
Residential forum (two sessions)	Maidu Community Center	May 6, 2003
Residential forum (two sessions)	Woodcreek Golf Club	May 7, 2003
Sun City Community Relations	Timbers Lodge	May 12, 2003
Blue Oaks, Quail Glen, Woodcreek, Junction West Neighborhood Association	Diamond Creek School	May 13, 2003
Roseville Leadership Group	Corporation Yard	May 15, 2003
Roseville Coalition of Neighborhood Associations	Corporation Yard	May 15, 2003
Commercial Public Forum	Maidu Community Center	May 16, 2003
Roseville Public Utilities Commission	City Council Chambers	May 27, 2003
Roseville City Council	City Council Chambers	June 4, 2003
Project-focused information booth or talk:		
Roseville Chamber of Commerce Exposition	Sun City	March 3, 2003
Sacramento Business Journal Energy Forum	Sacramento Convention Center	April 3, 2003
Roseville Electric Earth Day	Civic Center	April 26, 2003
Cinco de Mayo Festival	Placer County Fairgrounds	May 4, 2003
Roseville Chamber of Commerce	Mahany Sports Park	May 8, 2003
Senior Resource Fair	Maidu Community Center	May 14, 2003
North Roseville Safety/REP Forum (talk)	North Roseville Recreation Center	May 16, 2003
Downtown Tuesday Nights	Vernon Street	Weekly, June 3 through August 26, 2003
Home Depot Safety Day (talk)	Home Depot	June 7, 2003
Fire Station #6 Grand Opening	Fire Station #6	June 30, 2003

1.9 PERSONS WHO PREPARED THE AFC

Persons with primary responsibility for the preparation of each section of this AFC are listed in Appendix 1-C.

2.0 PROJECT DESCRIPTION

2.1 INTRODUCTION

The Roseville Energy Park (REP) will be a natural gas-fired, combined-cycle electrical generating facility rated at a nominal net generating capacity of 120 to 125 megawatts (MW) (without duct firing under average ambient conditions), and with the ability to peak-fire using duct burners to 160 MW (under hot ambient conditions). The project will be located on a 12-acre project site within a 40-acre City of Roseville parcel within the limits of the City of Roseville, adjacent to and north of the Pleasant Grove Waste Water Treatment Plant (PGWWTP). The fenced power plant area will encompass 9.1 acres.

2.2 REP DESCRIPTION, DESIGN, AND OPERATION

This section describes the design and operational characteristics of the proposed REP plant.

2.2.1 Site Plan and Access

The REP general arrangement shown in Figure 2.2-1, the project site plan shown in Figure 2.2-2, and the typical elevation views shown in Figures 2.2-3a and 2.2-3b illustrate the location and size of the REP. Approximately 9.1 enclosed acres will be required to accommodate the generation facilities, control/administration building, switchyard, emission control equipment, storage tanks, gas compressor station, storm water pond, and parking area.

The primary access to the REP will be from an entrance driveway on Phillip Road near the western end of the power plant site. A secondary entrance will be located near the eastern end of the site. Most of the surface within the enclosed area will be graveled or hydro-seeded with a mixture of grasses. A paved driveway will run around the perimeter of the power block.

The project site is located in Township 11N, Range 5E, Section 23. The listed and mapped assessor's parcel numbers of the power plant site are 017-100-017 and 017-100-029, and 017-100-030. These parcels will be merged into a single parcel before construction begins (see Section 8.6, Land Use, for further information). Appendix 1-A contains a parcel map showing the City of Roseville's 70-acre holding, north of the PGWWTP, and the 40-acre REP parcel within this holding, and consisting of the assessor's parcel numbers listed above. Figure 2.2-1 shows the 12-acre power plant area and the 9.1-acre power plant fenced area. Figure 2.2-2 shows the 40-acre REP parcel and adjacent City-owned parcel to the west, together forming a 50-acre construction zone. This figure also shows construction parking, office, and laydown areas.

2.2.2 Process Description

The REP power train will consist of the following: 1) two General Electric LM6000 PC SPRINT or Alstom GTX100 combustion turbine-generators (CTGs), equipped with water injection (for the LM6000) or dry low-NO_x combustors (for the GTX100) to control oxides of nitrogen (NO_x) and evaporative coolers for reducing inlet air temperatures; 2) two heat recovery steam generators (HRSGs) with duct burners; 3) selective catalytic reduction (SCR) and oxidation catalyst equipment to control NO_x and carbon monoxide (CO) emissions, respectively; 4) a single condensing steam turbine generator (STG); 5) a deaerating surface condenser; 6) a mechanical draft cooling tower; and 7) associated support equipment.

Each CTG will generate approximately 43 to 47 MW at annual average ambient conditions. The CTG exhaust gases will be used to generate steam in the HRSGs. The HRSGs will employ a two-steam-

pressure design with duct firing equipment. Steam from the HRSGs will be admitted to a condensing STG. The STG will produce approximately 75 to 87 MW under average annual ambient conditions with HRSG duct firing. The project is expected to have an overall annual availability of approximately 95 percent.

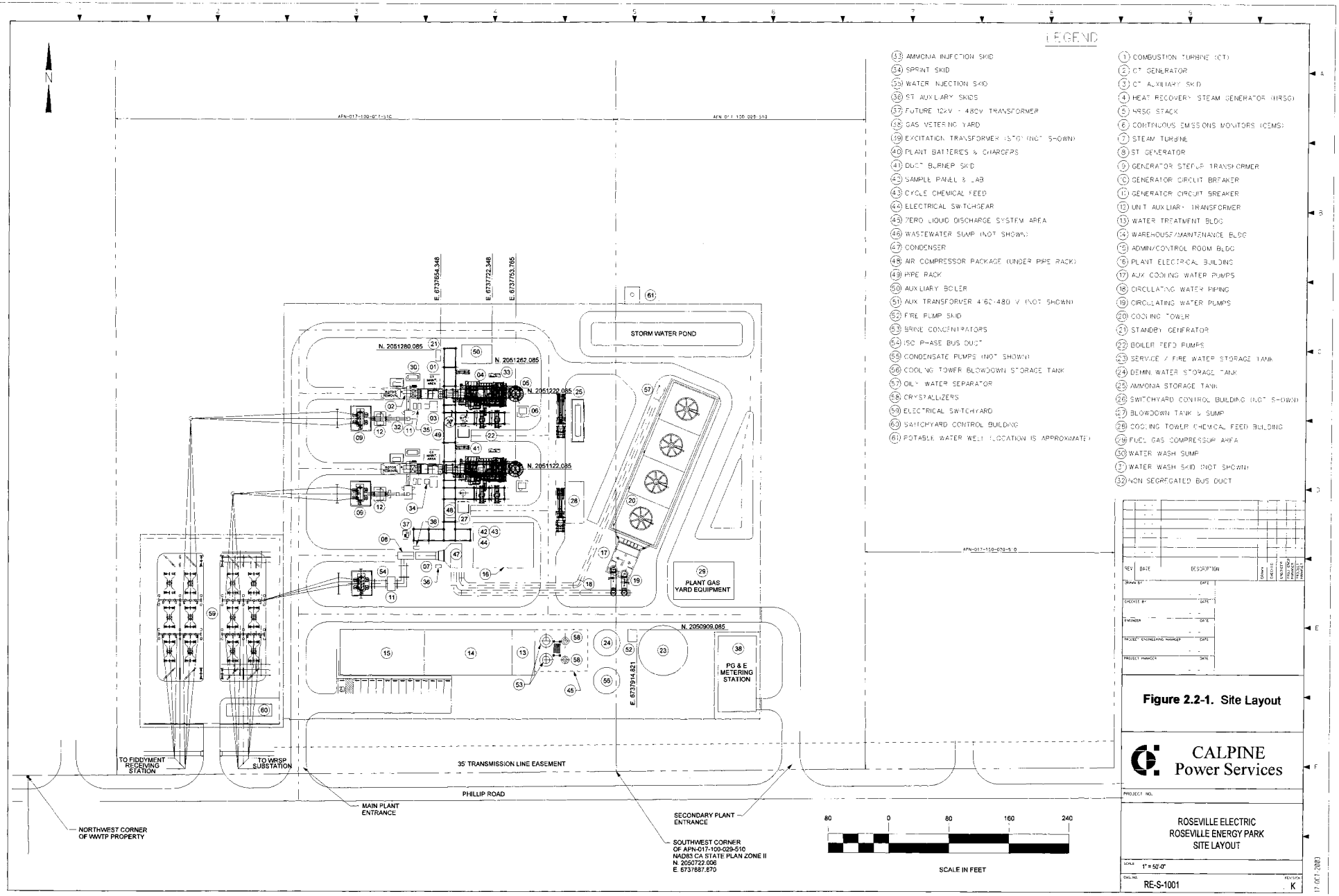
The heat balance for the power plant's baseload operation assuming the use of LM6000 CTGs is shown in Figure 2.2-4 (Table 2.2-1). This balance is based on operation at an ambient temperature of 62°F, with evaporative cooling of the CTG inlet air to 54°F, and without the use of duct firing. The predicted net electrical output of the facility under these conditions is approximately 120 MW at a heat rate of approximately 7,500 British thermal units per kilowatt hour (Btu/kWh) on a higher heating value (HHV) basis. This corresponds with an efficiency of about 45.5%. Figure 2.2-4 is a similar heat balance assuming the use of GTX100 CTGs (Table 2.2-2). The predicted net electrical output of the facility under these conditions is approximately 125 MW at a heat rate of approximately 7,330 Btu/kWh on an HHV basis, corresponding to an efficiency of about 46.5%. With HRSG duct firing, the facility will be able to produce a net output of up to 160 MW at an ambient temperature of 99°F with evaporative cooling of the CTG inlet air to 75°F (using either the LM6000 or the GTX100 CTGs). The incremental heat rate of the peaking capacity will range between approximately 9,800 and 10,600 Btu/kWh, corresponding to an efficiency of 32 to 35%, which is comparable to that of a CTG operating in simple cycle mode.

Associated equipment will include the emission control systems needed to meet the proposed emission limits. NO_x emissions will be controlled to a maximum of 2.0 (average basis) parts per million by volume, dry basis (ppmvd), corrected to 15 percent oxygen, by a combination of water-injected or dry low NO_x combustors in the CTGs and SCR systems in the HRSGs. Carbon monoxide will be controlled to a maximum of 4.0 ppmvd (average basis[1]) at 15 percent oxygen under all operating conditions, by means of an oxidation catalyst.

2.2.3 Power Plant Cycle

CTG combustion air will flow through the inlet air filters, evaporative coolers, and associated air inlet ductwork, be compressed in the compressor section, and then enter the CTG combustion sections. Natural gas fuel will be injected into the compressed air in the combustion sections and ignited. The hot combustion gases will expand through the power turbine section of the CTGs, causing them to rotate and drive both the electric generators and CTG compressors. The hot combustion gases will exit the turbine sections and enter the HRSGs, where they will heat water (feedwater) that is pumped into the HRSGs. The feedwater will be converted to superheated steam and delivered to the steam turbine at both high pressure (HP) and low pressure (LP). The use of multiple steam delivery pressures will permit an increase in cycle efficiency and flexibility. High-pressure steam will be delivered to the HP section of the steam turbine, LP steam will be injected at the beginning of the LP section of the steam turbine, and both flows will be expanded in the LP steam turbine section. Steam leaving the LP section of the steam turbine will enter the deaerating surface condenser and transfer heat to circulating cooling water, which will cause the steam to condense to water. The condensed water, or condensate, will be delivered to the HRSG feedwater system. The condenser cooling water will circulate through a mechanical draft evaporative cooling tower where the heat absorbed in the condenser will be rejected to the atmosphere.

[1] See the Air Quality section (8.1) for a description of the averaging times.


LEGEND
(33) AMMONIA INJECTION SKID
(34) SPRINT SKID
(35) WATER INJECTION SKID
(36) ST AUXILIARY SKIDS
(37) FUTURE 12kV - 480v TRANSFORMER
(55) GAS METERING YARD
(39) EXCITATION TRANSFORMER (STG) (NOT SHOWN)
(40) PLANT BATTERIES & CHARGERS
(41) DUCT BURNER SKID
(42) SAMPLE PANEL & LAB
(43) CYCLE CHEMICAL FEED
(44) ELECTRICAL SWITCHGEAR
(45) ZERO LIQUID DISCHARGE SYSTEM AREA
(46) WASTEWATER SUMP (NOT SHOWN)
(47) CONDENSER
(48) AIR COMPRESSOR PACKAGE (UNDER PIPE RACK)
(49) PIPE RACK
(50) AUXILIARY BOILER
(51) AUX TRANSFORMER 4160-480 V (NOT SHOWN)
(52) FIRE PUMP SKID
(53) BRINE CONCENTRATORS
(54) ISO PHASE BUS DUCT
(55) CONDENSATE PUMPS (NOT SHOWN)
(56) COOLING TOWER BLOWDOWN STORAGE TANK
(57) OILY WATER SEPARATOR
(58) CRYSTALLIZERS
(59) ELECTRICAL SWITCHYARD
(60) SWITCHYARD CONTROL BUILDING
(61) POTABLE WATER WELL (LOCATION IS APPROXIMATE)
(1) COMBUSTION TURBINE (CT)
(2) CT GENERATOR
(3) CT AUXILIARY SKID
(4) HEAT RECOVERY STEAM GENERATOR (HRSG)
(5) HRSG STACK
(6) CONTINUOUS EMISSIONS MONITORS (CEMS)
(7) STEAM TURBINE
(8) ST GENERATOR
(9) GENERATOR STEP-UP TRANSFORMER
(10) GENERATOR CIRCUIT BREAKER
(11) GENERATOR CIRCUIT BREAKER
(12) UNIT AUXILIARY TRANSFORMER
(13) WATER TREATMENT BLDG
(14) WAREHOUSE/MAINTENANCE BLDG
(15) ADMIN/CONTROL ROOM BLDG
(16) PLANT ELECTRICAL BUILDING
(17) AUX COOLING WATER PUMPS
(18) CIRCULATING WATER PIPING
(19) CIRCULATING WATER PUMPS
(20) COOLING TOWER
(21) STANDBY GENERATOR
(22) BOILER FEED PUMPS
(23) SERVICE / FIRE WATER STORAGE TANK
(24) DEMIN WATER STORAGE TANK
(25) AMMONIA STORAGE TANK
(26) SWITCHYARD CONTROL BUILDING (NOT SHOWN)
(27) BLOWDOWN TANK & SUMP
(28) COOLING TOWER CHEMICAL FEED BUILDING
(29) FUEL GAS COMPRESSOR AREA
(30) WATER WASH SUMP
(31) WATER WASH SKID (NOT SHOWN)
(32) NON SEGREGATED BUS DUCT
N
APN-017-100-07-51C
APN 017-100-029-510
APN-017-100-070-510
E. 6737654.346
E. 6737722.346
E. 6737753.766
N. 2051280.085
N. 2051262.085
N. 2051220.085
N. 2051122.085
N. 2050909.085
E. 6737914.821
STORM WATER POND
PLANT GAS YARD EQUIPMENT
PG & E METERING STATION
TO FIDDYMENT RECEIVING STATION
TO WRSP SUBSTATION
35' TRANSMISSION LINE EASEMENT
PHILLIP ROAD
MAIN PLANT ENTRANCE
SECONDARY PLANT ENTRANCE
NORTHWEST CORNER OF WWTP PROPERTY
SOUTHWEST CORNER OF APN-017-100-029-510 NAD83 CA STATE PLAN ZONE II N. 2050722.006 E. 6737887.870
80 0 80 160 240
SCALE IN FEET
REV DATE DESCRIPTION
DRAWN BY DATE
CHECKED BY DATE
ENGINEER DATE
PROJECT ENGINEERING MANAGER DATE
PROJECT MANAGER DATE
Figure 2.2-1. Site Layout
CALPINE Power Services
PROJECT NO.
ROSEVILLE ELECTRIC
ROSEVILLE ENERGY PARK
SITE LAYOUT
SCALE 1" = 50'-0"
DWG NO. RE-S-1001
REVISION K
17 OCT 2003
24x36

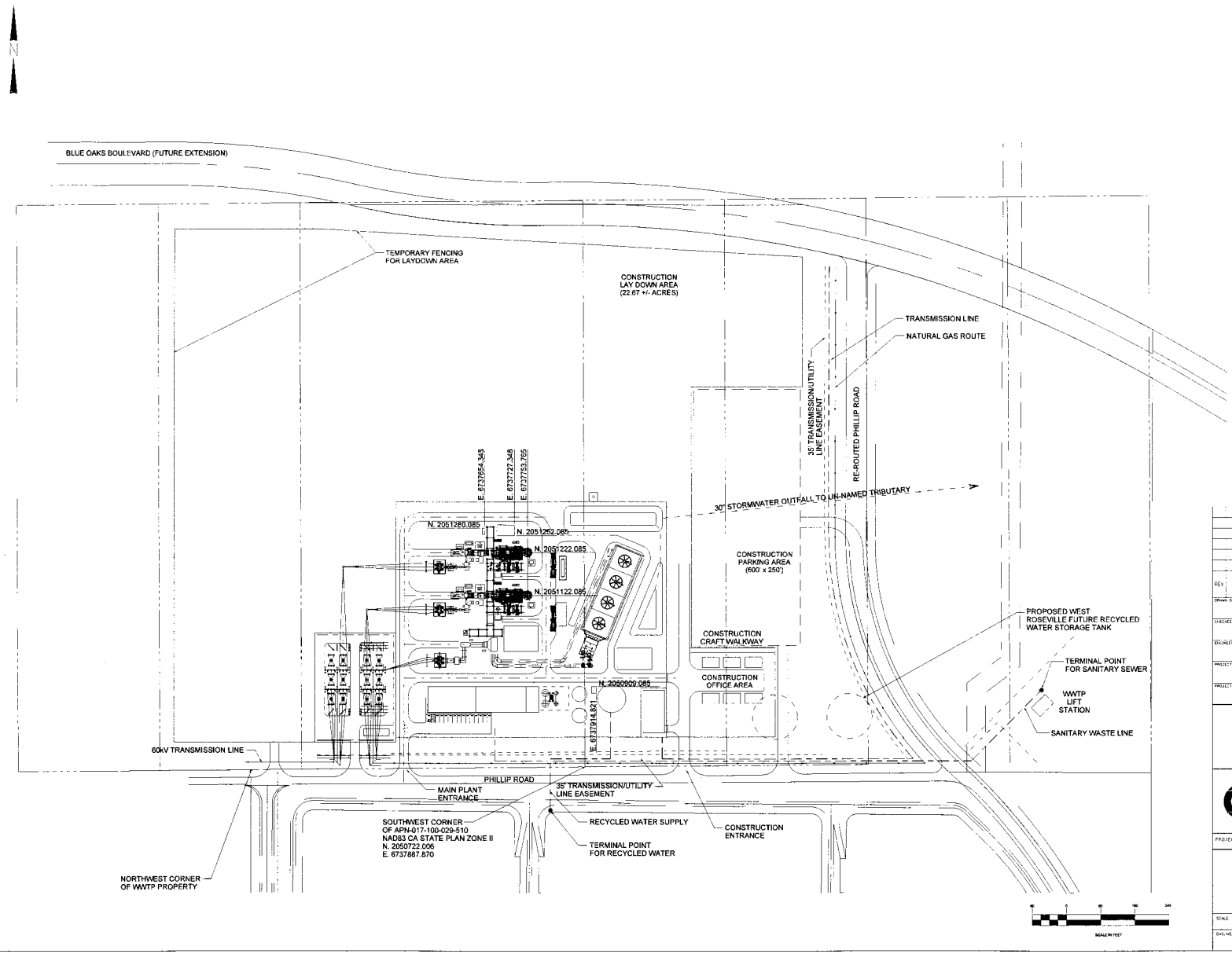


Figure 2.2-2. Site Plan

CALPINE Power Services

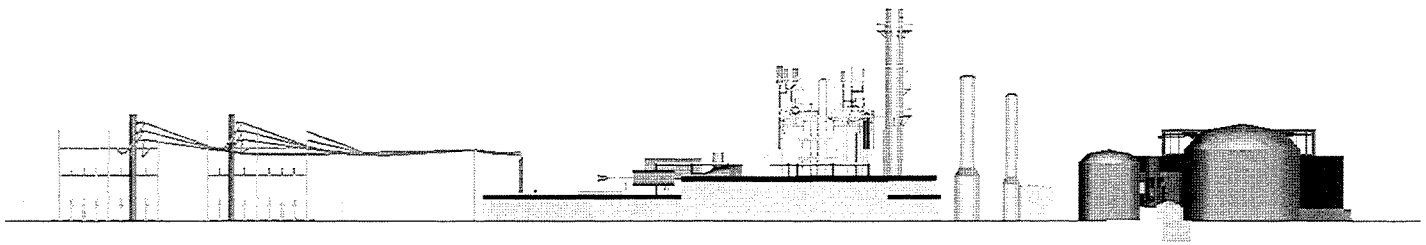
ROSEVILLE ELECTRIC
ROSEVILLE ENERGY PARK
SITE PLAN

SCALE 1" = 100'-0"

DWG NO. RE-S-1002 REVISION D

17-OCT-2003

24 x 36



NORTH ELEVATION

25 0 25 50 75

SCALE IN FEET

REV	DATE	DESCRIPTION	BY/CHK

Figure 2.2-3a. Plant Elevation (North)

CALPINE

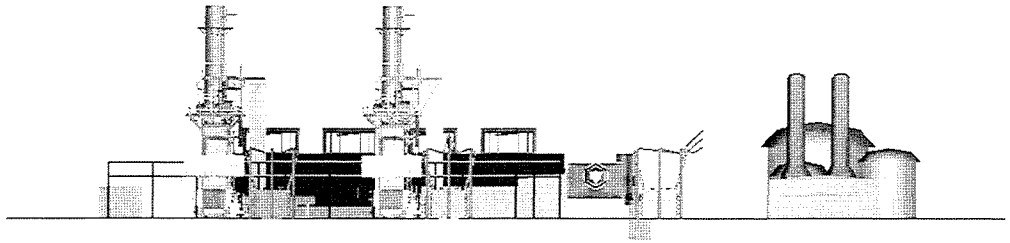
ROSEVILLE ELECTRIC
ROSEVILLE ENERGY PARK
NORTH ELEVATION

SCALE 1" = 30'-0"

DWG NO. RE-S-1003

REVISION A

24x36



EAST ELEVATION

SCALE IN FEET
25 0 25 50 75

Figure 2.2-3b. Plant Elevation (East)

CALPINE

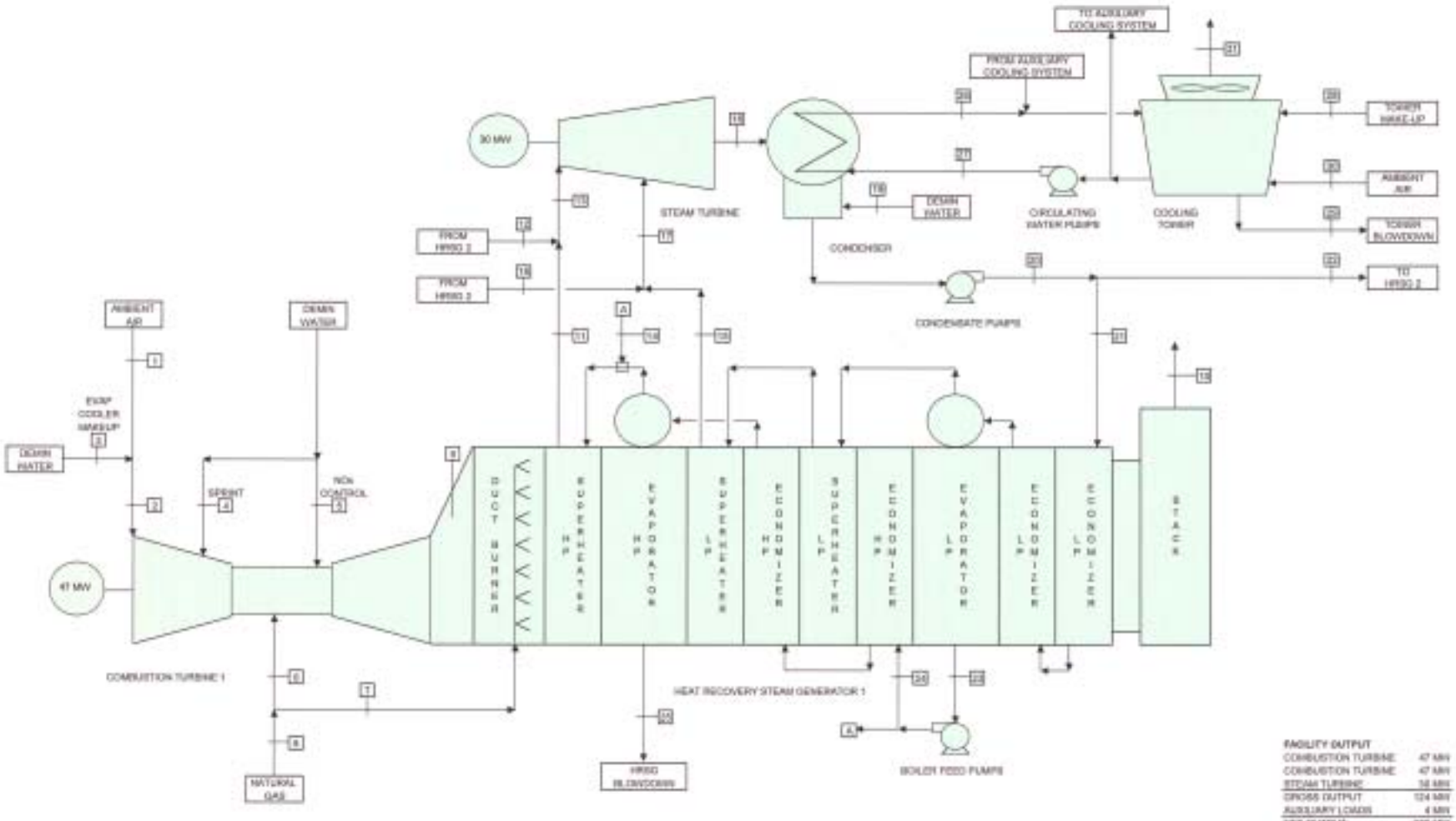
ROSEVILLE ELECTRIC
ROSEVILLE ENERGY PARK
EAST ELEVATION

1" = 30'-0"

RE-S-1004

A

24x36



FACILITY OUTPUT	
COMBUSTION TURBINE	47 MW
COMBUSTION TURBINE	47 MW
STEAM TURBINE	58 MW
GROSS OUTPUT	124 MW
AUXILIARY LOADS	4 MW
NET OUTPUT	120 MW

Rev.		By	Date
A	Issued for APC	JBM	12/13/03

Notes:
1. Heat and Mass Balance data for each flow stream is provided in Table 2.2-1.
2. Fuel gas flowrates are based on an assumed natural gas lower heating value of 20,508 Btu/lb.
3. Cooling tower makeup and blowdown flowrates are based on 5 cycles of concentration.
4. Assumes no HRSG blowdown.

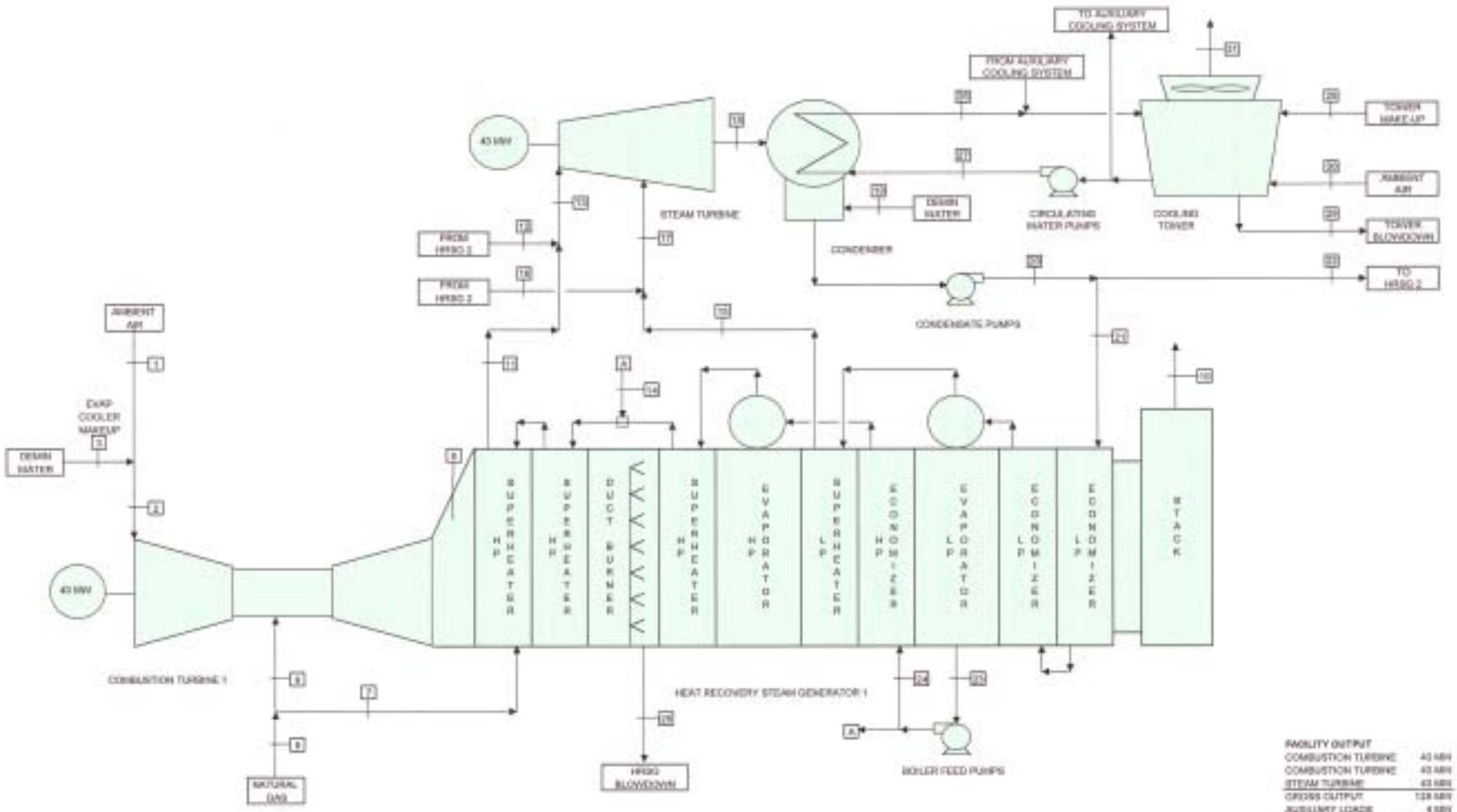
Design Case:	Base Load - Average Ambient		
Configuration:	2x1, HPD	Site Altitude:	160 ft
Dry Bulb Temp.:	62 deg. F	Wet Bulb Temp.:	53 deg. F
Evaporative Cooling:	On		
SPRINT:	On		
Duct Firing:	Off		

CALPINE

Roseville Energy Park

Heat and Mass Balance, GE LM6000 PC SPRINT

Figure 2.2-4 | Rev. A



A	Issued for AFC	JBM	10/13/03
Rev.		By	Date

Notes:
1. Heat and Mass Balance data for each flow stream is provided in Table 2.2-2.
2. Fuel gas flowrates are based on an assumed natural gas lower heating value of 23,060 Btu/lb.
3. Cooling tower makeup and blowdown flowrates are based on 5 cycles of concentration.
4. Assumes no HRSG blowdown.

Design Case:	Base Load - Average Ambient
Configuration:	2x1, HPD
Site Altitude:	150 ft
Dry Bulb Temp.:	62 deg. F
Wet Bulb Temp.:	53 deg. F
Evaporative Cooling:	On
Duct Firing:	Off

CALPINE

Roseville Energy Park

Heat and Mass Balance, Alstom GTX100

Figure 2.2-6

Rev. A

Table 2.2-1. Heat and mass balance data, GE LM6000, base load, average ambient conditions.

Stream No.	1	2	3	4	5
Mass Flow, lb/hr	999,013	1,000,843	1,830	2,545	21,568
Temperature, °F	62	54	70	70	70
Pressure, psia	14.64	14.48	30	30	30
Stream No.	**6**	**7**	**8**	**9**	**10**
Mass Flow, lb/hr	19,796	0	19,796	1,043,707	1,043,707
Temperature, °F	200	200	200	828	167
Pressure, psia	690	40	690	15.14	14.64
Stream No.	**11**	**12**	**13**	**14**	**15**
Mass Flow, lb/hr	91,803	91,803	183,606	-	43,656
Temperature, °F	768	768	768	313	307
Pressure, psia	908	908	908	1,678	74
Stream No.	**16**	**17**	**18**	**19**	**20**
Mass Flow, lb/hr	43,656	87,311	270,917	-	270,917
Temperature, °F	307	307	80	70	80
Pressure, psia	74	74	0.50	30	120
Stream No.	**21**	**22**	**23**	**24**	**25**
Mass Flow, lb/hr	135,459	135,459	91,803	91,803	-
Temperature, °F	80	80	307	313	534
Pressure, psia	120	120	74	1,678	917
Stream No.	**26**	**27**	**28**	**29**	**30**
Mass Flow, lb/hr	26,721,307	26,721,307	240,404	47,981	23,010,269
Temperature, °F	74	65	70	74	62
Pressure, psia	30	40	20	30	14.64
Stream No.	**31**				
Mass Flow, lb/hr	23,202,692				
Temperature, °F	70				
Pressure, psia	14.64				

2.2.4 Combustion Turbine-Generators, Heat Recovery Steam Generators, Steam Turbine-Generator, and Condenser

The following paragraphs describe the major components of the generating facility.

2.2.4.1 Combustion Turbine-Generators

Thermal energy will be produced in the CTGs through the combustion of natural gas, which will be converted into mechanical energy required to drive the combustion turbine compressors and electric generators. Each CTG system will consist of a CTG with supporting systems and associated auxiliary equipment. The LM6000 CTGs use a water injection system in the low-pressure compressor, high-pressure compressor, and combustors to increase power and lower NO_x emissions. The GTX 100 CTGs employ dry low NO_x combustor technology to control NO_x emissions and use no water injection for either emissions control or increasing power output.

Table 2.2-2. Heat and mass balance data, Alstom GTX100, base load, average ambient conditions.

Stream No.	**1**	**2**	**3**	**4**	**5**
Mass Flow, lb/hr	1,008,802	1,010,650	1,848	n/a	n/a
Temperature, °F	62	54	70	n/a	n/a
Pressure, psia	14.64	14.48	30	n/a	n/a
Stream No.	**6**	**7**	**8**	**9**	**10**
Mass Flow, lb/hr	20,262	0	20,262	1,029,844	1,029,844
Temperature, °F	200	200	200	1,009	174
Pressure, psia	450	40	450	15.13	14.64
Stream No.	**11**	**12**	**13**	**14**	**15**
Mass Flow, lb/hr	127,987	127,987	255,973	14,089	35,653
Temperature, °F	950	950	950	294	435
Pressure, psia	900	900	900	1,663	50
Stream No.	**16**	**17**	**18**	**19**	**20**
Mass Flow, lb/hr	35,653	71,306	327,279	-	327,279
Temperature, °F	435	435	84	70	84
Pressure, psia	50	50	0.58	30	100
Stream No.	**21**	**22**	**23**	**24**	**25**
Mass Flow, lb/hr	163,640	163,640	142,076	127,987	-
Temperature, °F	84	84	435	294	537
Pressure, psia	100	100	50	1,663	938
Stream No.	**26**	**27**	**28**	**29**	**30**
Mass Flow, lb/hr	26,721,307	26,721,307	290,884	57,977	22,808,224
Temperature, °F	78	66	70	78	62
Pressure, psia	30	40	20	30	14.64
Stream No.	**31**				
Mass Flow, lb/hr	23,041,131				
Temperature, °F	74				
Pressure, psia	14.64				

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

- Inlet air filters and evaporative coolers
- Metal acoustical enclosure
- Lube oil system for the combustion turbine and the generator
- Water-injected or dry low NO_x combustion system
- SPRINT Power Boost System (LM6000 only)
- Compressor wash system-both online and offline
- Fire detection and protection system (using carbon dioxide)
- Fuel gas system, including flow meter, strainer, and duplex filter
- Starter system
- Turbine controls
- Direct-air-cooled synchronous generators

- Generator controls, protection, excitation, power system stabilizer, and automatic generation control (AGC)

The CTGs and accessory equipment will be contained in a metal acoustical enclosure.

2.2.4.2 Heat Recovery Steam Generators

The HRSGs will transfer heat from the exhaust gases of the CTGs to the feedwater, which will become steam. The HRSGs will be two-pressure, non-reheat natural circulation units equipped with inlet and outlet ductwork, duct burners, insulation, lagging, and separate exhaust stacks.

Major heat transfer components of each HRSG will include LP economizers, LP evaporator, LP drum, LP superheater(s), HP economizer(s), HP evaporator, HP drum, and HP superheater(s). The LP economizers will receive condensate from the condenser hot well via the condensate pumps. The LP economizers will be the final heat transfer section to receive heat from the combustion gases before they are exhausted to the atmosphere.

Condensate will be directed through the LP economizers and into the LP drum. The boiler HP feed pumps, drawing suction from the LP drum, will provide additional pressure to serve the HP sections of the HRSG. Similarly, as described above, the LP and HP steam will be produced for supply to the steam turbine.

High-pressure feedwater will flow through the HP economizer(s) to the HP steam drum, where a saturated liquid state will be maintained. Next, the saturated water will flow from the steam drum through downcomers to the inlet headers of the HP evaporator. The saturated water will flow upward through the HP evaporator tubes by natural circulation. Saturated steam will form in the tubes while energy from the combustion turbine exhaust gas is absorbed. The HP-saturated liquid/vapor mixture will then return to the steam drum, where the two phases will be separated by the steam separators in the drum. The saturated water will return to the HP evaporator while the vapor passes to the HP superheater inlet. The saturated steam (vapor) will pass through the HP superheater(s) to the HP steam turbine inlet.

The LP evaporator will function similarly to the HP evaporator. The saturated LP steam (vapor) will pass through the LP superheater(s) to the LP steam turbine inlet.

Duct burners will be installed in the HRSGs. These burners can be used to increase steam generation and operating flexibility and will improve steam temperature control. The duct burners will burn natural gas. The duct burner for each HRSG, assuming the use of LM6000 CTGs, will be sized to release up to 255 mmBtu on an HHV basis per hour per HRSG. The corresponding heat release if GTX100 CTGs are used is 225 mmBtu/hr (HHV) per HRSG.

The HRSGs will be equipped with an SCR emission control system that will use ammonia vapor in the presence of a catalyst to reduce the NO_x concentration in the exhaust gases. The catalyst module will be located in the HRSG casing. Diluted ammonia vapor (NH_3) will be injected into the exhaust gas stream through a grid of nozzles located upstream of the catalyst module. The subsequent chemical reaction will reduce most of the NO_x to nitrogen and water. A CO catalyst will control CO emissions.

2.2.4.3 Steam Turbine System

The steam turbine system will consist of a condensing steam turbine, gland steam system, lubricating oil system, hydraulic control system, and steam admission/induction valving. The steam turbine will drive a totally enclosed water/air-cooled (TEWAC) synchronous generator.

Steam from the HRSG HP and LP superheaters will enter the respective steam turbine sections through the inlet steam system. The steam will expand through the turbine blading, driving the generator. On exiting the turbine, the steam will flow into the condenser.

2.2.4.4 Auxiliary Boiler

An auxiliary boiler, capable of providing up to 40,000 pounds per hour (lb/hr) of saturated steam at 600 pounds per square inch gauge (psig), will be provided for HRSG HP steam drum sparging, condenser hotwell sparging, steam turbine gland steam, and deaeration steam when the plant is offline. For prolonged outages, a nitrogen blanket will be used to lay-up the HRSG to alleviate the need to run the auxiliary boiler (decrease in fuel use and emissions). An electric superheater will be provided for the steam turbine gland steam. The auxiliary boiler will be a forced-draft unit served by a feedwater deaerator and boiler feedwater pump system. It will be equipped with an economizer to maximize fuel efficiency. The auxiliary boiler will be equipped with an ultra low-NO_x burner and flue gas recirculation to control the stack NO_x concentration to not more than 9 ppmvd at 3 percent oxygen (average basis) and the CO concentration to not more than 50 ppmvd at 3 percent oxygen (average basis).

2.2.5 Major Electrical Equipment and Systems

The electric power produced by the facility will be transmitted to the Roseville Electric grid. Some power will be used on-site to operate auxiliaries such as gas compressors, pumps and 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) for backup power for control systems and other uses. Transmission and auxiliary uses are discussed in the following subsections.

2.2.5.1 AC Power Transmission

Power will be generated by the two CTGs at 13.8 kV, and one STG at 13.8 kV. The generator output will be connected by iso-phase bus or non-segregated bus to three oil-filled, two-winding, generator step-up transformers, which will increase the voltage to 60 kV. Surge arresters will be provided at the high-voltage bushings to protect the transformers from surges on the 60 kV system caused by lightning strikes or other system disturbances. The transformers will be set on concrete pads within containments, which will hold the transformer oil in the event of a leak or spill. The high-side of each transformer will connect to the REP switchyard. From the switchyard, power will be transmitted to RE's grid by looping a new 60 kV transmission line into the REP switchyard. This new 60 kV line will be constructed as part of the West Roseville Specific Plan (WRSP) build-out and will be a double-circuit line running from RE's Fiddyment Receiving Station to a new WRSP substation and passing adjacent to the REP. The new WRSP 60 kV lines will be routed along the south boundary of the REP site. If the annexation contemplated in the WRSP does not occur, the output of the REP will be connected directly to the Fiddyment Receiving Station via a new radial double-circuit 60 kV transmission line that will run along the existing alignment of Phillip Road to Fiddyment Road, then south along Fiddyment Road to the receiving station.

2.2.5.2 AC Power Distribution to Auxiliaries

The facility will have two sources of power for the auxiliary system. Auxiliary power to the combustion turbine and steam turbine power block will be supplied by a 4,160- and 480-volt AC switchgear lineup. Power to the switchgear will be supplied by two oil-filled 13.8 to 4.16 kV unit auxiliary transformers. The high voltage sides (13.8 kV) of each of the unit auxiliary transformers will be connected to one of the CTGs. Normally, these connections will allow the switchgear to receive power generated by the connected CTG or by back-feeding power from the 60 kV switchyard via the connected CTG's step-up

transformer. A 750 kW diesel engine-driven standby generator will be provided to generate 4,160-volt power if the REP is not operating, and there is an outage of the 60 kV system. While this generator will not be sized to allow a "black start" of the REP, it will be sufficient to serve the necessary essential services loads while the plant is offline.

The 4,160-volt switchgear lineup will supply power to the various 4,000-volt motors and to the load center (LC) transformers rated 4,160 to 480 volts for 480-volt power distribution. The switchgear will have vacuum breakers for the main incoming feeds and for power distribution and fused contactors for motor feeds.

The LC transformers will be of the dry type if located inside and will be of the oil-filled type if located outside. Each transformer will supply 480-volt, three-phase power to LC switchgear. The LC switchgear will provide power through feeder breakers to the various 480-volt motor control centers (MCCs). The MCCs will distribute power to 480-volt motors, to 480-volt power panels, and to other intermediate 480-volt loads. The MCCs will distribute power to 480 to 480/240-volt isolation transformers when 277-volt, single-phase lighting loads are to be served. The 480-volt power panels will distribute power to small 480-volt loads.

Power for the AC power supply (120-volt/208-volt) system will be provided by the 480-volt MCCs and 480-volt power panels. Transformation of 480-volt power to 120/208-volt power will be provided by 480-120/208-volt, dry-type transformers.

2.2.5.3 DC Power Supply

One common DC power supply system consisting of one 120-volt DC battery, two 100 percent, 125-volt DC full-capacity battery chargers, metering, ground detectors, and distribution panels will be supplied for balance-of-plant and steam turbine equipment.

Under normal operating conditions, the battery chargers will supply DC power to the DC loads. The battery chargers will receive 480-volt, three-phase AC power from the AC power supply (480-volt) system and continuously charge the battery. The ground detection scheme will detect grounds on the DC power supply system.

Under abnormal or emergency conditions, when power from the AC power supply (480-volt) system is unavailable, the battery itself, rather than the charger, will provide DC power for the DC system loads. Recharging of a discharged battery will occur whenever 480-volt power becomes available from the AC power supply (480-volt) system. The rate of charge will depend on the characteristics of the battery, battery charger, and connected DC load during charging. The anticipated maximum recharge time will be 24 hours.

The 120-volt DC system will also be used to provide control power to the 480-volt switchgear, to the 480-volt LCs, to critical control circuits, and to the emergency DC motors. In addition, each CTG will be supplied with its own DC power supply system, including battery and battery chargers.

2.2.5.4 Essential Service AC Uninterruptible Power Supply (UPS)

The combustion turbines and steam turbine power block will also have an essential service 120-volt AC, single-phase, 60 Hz power source. This source will supply AC power to essential instrumentation, critical equipment loads, and unit protection and safety systems that require uninterruptible AC power. The essential service AC system and DC power supply system will be designed to ensure that critical

safety and unit protection control circuits have power and can take the correct action on a unit trip or loss of plant AC power.

The essential service AC system will consist of one full-capacity inverter, a solid-state transfer switch, a manual bypass switch, an alternate source transformer and-voltage regulator, and an AC panelboard.

The normal source of power to the system will be the DC power supply system through the inverter to the panelboard. A solid-state static transfer switch will monitor the inverter output and the alternate AC source continuously. The transfer switch will automatically transfer essential AC loads without interruption from the inverter output to the alternate source upon loss of the inverter output.

A manual bypass switch will also be included to enable isolation of the inverter-static transfer switch for testing and maintenance without interruption to the essential service AC loads.

2.2.6 Fuel System

The CTGs will be designed to burn natural gas. Maximum natural gas requirements during base load operation, with no duct firing, are approximately 22,000 mmBtu/day, higher heating value (HHV) basis at the annual average ambient conditions. Operating to the limits used for air permitting, the REP will consume approximately 9,100,000 mmBtu (HHV) per year.

The pressure of natural gas delivered to the site via a new 5.8- to 6.4-mile pipeline (see Section 5) will vary according to the pressure in PG&E's line 123, but is expected to be approximately 200 to 265 pounds per square inch gauge (psig) under most normal operating conditions. The natural gas will flow through an inlet filter and then be pressurized by compressors located on site, as needed. The gas will then flow through gas scrubber/filtering equipment, a gas pressure control station, and unit flow metering stations before entering the combustion turbines. LP gas for the HRSG duct burner systems, auxiliary boiler, and building heating systems will be provided by a central pressure reduction station and an LP gas distribution system.

2.2.7 Water Supply and Use

The City of Roseville will provide the industrial process water supply for the REP from the PGWWTP. The PGWWTP will supply tertiary-treated, recycled water to meet cooling and other process makeup, landscape irrigation, and fire fighting requirements. A "will-serve" letter from the City water department that describes its commitment of water supply to the project is included in Appendix 7-A.

Water required for potable uses will be provided from an existing well located on the REP site initially. The City of Roseville potable water distribution system will be extended to serve the area surrounding the REP site eventually (as part of the build-out of the WRSP). When this occurs, the REP's potable water system will be connected to the City water main, and the on-site well will be disconnected. If the West Roseville annexation does not proceed, then the well will continue to provide the project's potable water. Chapter 7 (Water Supply) describes the project water supply and water quality in greater detail.

2.2.7.1 Water Quality

An analysis of the water sources is provided in Chapter 7, Water Supply.

2.2.7.2 Water Treatment

The PGWWTP recycled water is suitable for use as cooling tower makeup without additional treatment. Recycled water used for process uses will require additional treatment.

2.2.8 Plant Cooling Systems

The steam turbine cycle heat rejection system will consist of a deaerating steam surface condenser, cooling tower, and cooling water (circulating water) system. The heat rejection system will receive exhaust steam from the low-pressure steam turbine and condense it to water (condensate) for reuse. A surface condenser is a shell and tube heat exchanger; the steam condenses on the shell side, and the cooling water flows through the tubes, making one or more passes. The condenser will be designed to operate at a pressure of approximately 3 inches of mercury, absolute (in. HgA) at an ambient temperature of 99°F. It will transfer approximately 558 mmBtu/hr from condensing steam to cooling water. Approximately 53,464 gallons per minute (gpm) of circulating cooling water is required to condense the turbine exhaust steam at maximum plant load at 99°F, ambient temperature. Approximately 950 gpm of additional circulating water will be used for the auxiliary cooling load.

The cooling water will circulate through a counter-flow mechanical draft cooling tower that uses electric motor-driven fans to move air in a direction opposite to the flow of the cascading water. The heat removed in the condenser will be discharged to the atmosphere by heating the air and evaporating some of the cooling water. High efficiency drift eliminators will reduce drift (the fine mist of water droplets entrained in the warm air leaving the cooling tower) to 0.0005 percent of the circulating water flow.

2.2.9 Waste Management

All wastes produced at the REP plant will be properly collected, treated if necessary, and disposed. Wastes will include sanitary waste water, solid nonhazardous waste, and hazardous waste (liquid and solid). Waste management is discussed in more detail in Section 8.14.

2.2.9.1 Waste Water Collection, Treatment, and Disposal

The average flow rates shown are based on 62° F ambient temperature and the peak flow rates assume 99° F ambient temperature. Since the REP will incorporate a zero liquid discharge (ZLD) system, waste water discharged from the plant will be limited to sanitary waste water. HRSG blowdown will be cooled and directed to the cooling tower. Effluent from the plant's oil/water separator will also be directed to the cooling tower. Cooling tower blowdown will be directed, in turn, to an on-site ZLD system. The ZLD system will have no wastewater discharge stream, but will produce high quality distillate that will be directed through a mixed bed demineralizer polisher for use as a steam cycle makeup.

Details of the REP waste water treatment systems are included in Chapter 7.

2.2.9.2 Solid Waste

The REP will produce maintenance and plant wastes typical of 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 miscellaneous solid wastes, including the typical refuse generated by workers. These materials will be collected by a waste collection company and transported to a material recovery facility (MRF), such as the Western Placer Waste Management Authority MRF located at 3033 Fiddyment Road. Recyclables will be removed, and the remaining residue will be deposited in a landfill such as the Western Regional Landfill (see Section 8.14, Waste Management). Waste collection and disposal will be conducted in accordance with applicable regulatory requirements to minimize health and safety effects.

The waste product from the ZLD process will consist of a salt cake resulting from the filter press operation. The salt cake is expected to be a non-hazardous solid waste that will be collected in on-site

containers and periodically transported for off-site disposal in a landfill, such as the Western Regional Landfill.

2.2.9.3 Hazardous Wastes

Several methods will be used to properly manage and dispose of hazardous wastes generated by the REP. Waste lubricating oil will be recovered and recycled by a waste oil recycling contractor. Spent lubrication oil filters will be disposed of in a Class I landfill. Spent SCR catalyst will be recycled by the supplier or disposed of in a Class I landfill. Workers will be trained to handle any hazardous waste generated at the site.

Chemical cleaning wastes will consist of alkaline and acid cleaning solutions used during pre-operational chemical cleaning of the HRSGs, acid cleaning solutions used for chemical cleaning of the HRSGs after the units are put into service, and turbine wash and HRSG fireside wash waters. These wastes, which may have high metal concentrations, will be stored temporarily on-site in a portable tank. Combustion turbine wash water will be drained to in-ground, double-walled tanks. The tank contents will be tested, then emptied, and the contents disposed of off-site in accordance with regulatory requirements.

2.2.10 Management of Hazardous Materials

Various chemicals will be stored and used during the construction and operation of the REP. All chemicals will be stored, handled, and used in accordance with applicable laws, ordinances, regulations, and standards (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 in accordance with Article 80 of the Uniform Fire Code. Berm 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. Storage areas located outdoors will include additional volume to accommodate the 25-year, 24-hour storm event. Storage areas located indoors in areas having fire protection sprinkler systems will include additional volume to accommodate 20 minutes of the sprinkler flow. In the event of a spill, absorbent material or other appropriate handling methods will be used to remove the hazardous material and the collected material will be disposed by an appropriately authorized hazardous material handling company.

Aqueous ammonia will be stored in a horizontal tank mounted in a containment basin.

Safety showers and eyewashes will be provided next to, or in the area of, chemical storage and use areas. Hose connections will be provided near the chemical storage and feed areas to wash down minor spills and leaks. Wash down water and rainwater, which falls within containment areas, will be discharged to the plant process drain system through a controlled release. This wastewater will ultimately be discharged to the cooling tower basin. Larger spills will be neutralized, if required, and disposed of off-site in accordance with applicable LORS if not suitable for reuse onsite. State-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 on-site for spill cleanup. Electric equipment insulating materials will be specified to be free of polychlorinated biphenyls (PCBs).

A list of the chemicals anticipated for use at the power plant is provided in Section 8.5, Hazardous Materials Handling. This section identifies each chemical by type and intended use, estimates the

quantity to be stored on-site, and identifies the storage location. Section 8.14, Waste Management, includes additional information on hazardous waste handling. Section 8.12, Traffic and Transportation, contains information on the transport of hazardous materials.

2.2.11 Emissions Control and Monitoring

Air emissions from the combustion of natural gas in the CTGs and HRSG duct burners will be controlled using state-of-the-art systems. Emissions that will be controlled include NO_x, reactive organic compounds (ROCs), CO, and particulate matter. Continuous emissions monitoring systems (CEMS) will be employed in accordance with regulatory requirements. Section 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 CTG/HRSG exhaust gas emitted to the atmosphere to an average of 2.0 ppmvd at 15 percent oxygen. The SCR process will use aqueous ammonia as the source of the ammonia vapor that will react with NO_x, in the exhaust gas to produce harmless nitrogen and water. Ammonia slip, the unreacted ammonia in the exiting exhaust gas, will be limited to a concentration of 10 ppmvd at 15 percent oxygen. The SCR equipment will include a reactor chamber, catalyst modules, ammonia storage system, ammonia vaporization and injection system, and monitoring equipment and sensors. Auxiliary boiler NO_x emissions will be controlled to an average of 9 ppmvd at 3 percent oxygen through the use of an ultra-low NO_x burner and flue-gas recirculation. The standby generator NO_x emissions will be limited through use of a California Air Resources Board- (CARB-) certified diesel engine.

2.2.11.2 CO and ROC Emissions Control

The formation of CO and ROC will be controlled at the CTG combustor and HRSG duct burners by state-of-the-art combustion technology and a CO catalyst. Auxiliary boiler CO emissions will be controlled to an average of 50 ppmvd, or less, at 3 percent oxygen and ROC emissions will be controlled to an average of 10 ppmvd, or less, at 3 percent oxygen through the use of an ultra low-NO_x burner, which is also designed to maintain low CO emissions, and flue-gas recirculation. The standby generator CO and ROC emissions will be limited through use of a CARB-certified diesel engine.

2.2.11.3 Particulate Emissions Control

Particulate emissions will be controlled using combustion air filtration and use of natural gas, which is low in particulates, as the sole fuel for the CTGs and duct burners. Cooling tower drift eliminators will limit the emission of particulate matter from the cooling tower.

2.2.11.4 Continuous Emissions Monitoring

The CEMS will record fuel gas flow rate and sample, analyze, and record the stack emission of NO_x, CO, and O_2 in the exhaust gas from each HRSG stack and the auxiliary boiler stack. This system will generate reports of emissions data in accordance with permit requirements and will send alarm signals to the plant distributed control system (DCS) in the plant control room when the level of emissions approaches or exceeds pre-selected limits. Ammonia slip will be calculated in the CEMs Data Acquisition System from ammonia injected into the SCR and turbine exhaust and stack NO_x CEM measurements.

2.2.12 Fire Protection

The fire protection system will be designed to protect personnel and limit property loss in the event of a fire. Water for fire fighting will stored in an on-site tank that will be supplied with recycled water from the PGWWTP. A large percentage of the volume of this tank will be dedicated solely to fire protection.

All fire hydrants and the fixed suppression systems will be supplied from the plant fire water loop. Electric motor-drive fire pumps will provide water under pressure for the plant fire water loop. A diesel engine-driven fire pump will provide backup to the motor-driven pumps in the event of a power failure. Fixed fire suppression systems will be installed at determined fire risk areas, such as the turbine lubrication oil equipment. Sprinkler systems will also be installed in the administration building and the fire pump enclosure, 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.

Section 8.5, Hazardous Materials Handling, includes additional information on fire and explosion risk, and Section 8.10, Socioeconomics, provides information on city and county 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 will provide personnel with illumination for operation under normal conditions and for egress under emergency conditions. The system will include emergency lighting to perform manual operations during an outage of the normal power source. The system also will provide 120-volt convenience outlets for portable lamps and tools. See Section 8.13, Visual Resources, for additional discussion of project lighting.

2.2.13.2 Grounding

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

The station grounding grid will be designed for a capacity adequate to prevent overheating from ground current under the most severe conditions in areas of high ground fault current concentration. The grid spacing will be adequate to maintain safe voltage gradients. Bare conductors will be installed below grade in a grid pattern. Each junction of the grid will be bonded by an exothermal welding process or mechanical clamps.

Ground resistivity, as determined as part of the final geotechnical study, will be used to establish the necessary number of ground rods and grid spacings to ensure safe step and touch potentials under severe fault conditions. Grounding pigtails will be brought from the ground grid to connect to building steel and non-energized metallic parts of electrical equipment.

2.2.13.3 Distributed Control System

The Distributed Control System (DCS) will provide modulating control, digital control, monitoring, and indicating functions for the plant power block systems. The following functions will be provided:

- Controlling the STG, CTGs, HRSGs, 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 delivering this information to plant operators
- Providing control displays (printed logs, cathode ray tube [CRT]) 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 way
- Providing alarms for out-of-limit parameters or parameter trends, displaying on alarm CRT(s), and recording on an alarm log printer
- Storing and retrieving historical data

The DCS will be a redundant microprocessor-based system consisting of the following major components:

- CRT-based operator consoles
- Engineer work station
- Distributed processing units
- I/O cabinets
- Historical data unit
- Printers
- Data links to the combustion turbine, steam turbine, and ZLD control systems

The DCS will have a functionally distributed architecture comprising a group of similar redundant processing units; these units will be linked to a group of operator consoles and the engineer work station by redundant data highways. Each processor will be programmed to perform specific dedicated tasks for control information, data acquisition, annunciation, and historical purposes. Since they will be redundant, no single processor failure can cause or prevent a unit trip.

The DCS will interface with the control systems furnished by the combustion turbine, steam turbine, and ZLD system suppliers 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 enough 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 and an uninterruptible power source.

As part of the quality control program, daily operator logs will be available for review to determine the status of the operating equipment.

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

The freeze protection system will provide heat to protect various outdoor pipes, gauges, pressure switches, and other devices (as required) from freezing temperatures. Power to the freeze protection circuits will be controlled by an ambient thermostat.

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 will provide 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 building where pneumatic operators and devices will be located.

2.2.14 Interconnection to Electrical Grid

The two CTGs and the STG will each be connected to a separate two-winding, three-phase step-up transformer that will be connected to the 60 kV switchyard. The switchyard will consist of a breaker and a half scheme with airbreak disconnect switches and SF_6 circuit breakers. From the switchyard, the generated power will be transmitted to the 60 kV transmission line. Refer to Chapter 6 for additional information on the switchyard and transmission line.

2.2.15 Project Construction

Construction of the REP is planned to begin in late 2004 or early 2005 and require a total duration of 18 to 20 months. Major milestones are listed in Table 2.2-3.

Table 2.2-3. Project schedule major milestones.

Activity	Date
Begin construction	December 2004
Mechanical completion	March 2006
Commercial operation	June 2006

The REP will be accessed for construction from Phillip Road. During construction, an adjacent area will be used for temporary offices, construction parking, and outdoor material storage (laydown) (see Section 2.2.19 below)

The peak workforce on the project during construction will be approximately 206, including construction craft personnel, and supervisory, support, and construction management personnel (see Section 8.10, Socioeconomics). Average workforce by month will be 114 over the 18 to 20 month construction period.

Construction will typically be scheduled between the hours of 7 am and 7 pm on weekdays, and 8 am and 8 pm on weekends. Additional hours may be necessary to complete critical construction activities. During these periods, some activities will continue 24 hours per day, 7 days per week. Materials and equipment will be delivered by both truck and by rail to a siding located either at the Union Pacific rail yard south of the project site or along Industrial Drive east of the project site. The heavy haul route from the Union Pacific yard would take PFE Road east from Atkinson, turning north on Walerga Road to

Baseline, then turning east on Baseline to Fiddyment, north on Fiddyment to Phillip, then east on Phillip to the project site. The heavy haul route from Industrial Drive would take Industrial Drive to Blue Oaks Boulevard, Blue Oaks east to Fiddyment Road, Fiddyment south to Phillip Road, then Phillip Road east to the REP site.

At the site, the peak construction workforce is expected to last from month 4 through month 12 of the construction period, with months 11 and 12 being the peak months (see Section 8.10, Socioeconomics, Table 8.10-8).

2.2.16 Power Plant Operation

There will be approximately 25 full-time employees working at the plant. The REP plant will be operated by a staff consisting of two operators per 12-hour rotating shift (8 a.m. to 8 p.m.), with two relief operators; there will also be seven supervisors/administrators, six maintenance technicians, and a water treatment specialist during the standard 8-hour workday. The facility will have the capability of operating 7 days per week, 24 hours per day.

The REP plant is expected to have an annual availability of approximately 95 percent. Plant availability may exceed 95 percent for a given 12-month period. The project will implement the following modes of operation:

- **Base Load**—The facility would be operated at maximum continuous output for as many hours per year as scheduled by load dispatch. During high ambient temperature periods or other periods of high demand, HRSG duct firing may be used to increase the plant output at the desired load to meet increased RE system demand.
- **Peak Load**—The facility can provide additional output by duct firing the HRSG to generate additional steam for the steam turbine.
- **Load Following**—The facility would be operated to meet variable RE load requirements. The generation would be adjusted to the load demand periodically by lowering the output of the combustion turbines.
- **Partial Shutdown**—At certain times of any given day and any given year, it may be necessary to shut down one CTG/HRSG. This mode of operation could generally be expected during late evening and early morning hours, when system demand may be low.
- **Full Shutdown**—This would occur due to equipment malfunction, fuel supply interruption, or transmission line disconnect.

In the unlikely event of a situation that causes a longer-term cessation of operations, security of the facilities will be maintained on a 24-hour basis, and the CEC will be notified. Depending on the length of shutdown, a contingency plan for the temporary cessation of operations may be implemented. Such a contingency plan will be in conformance with all applicable LORS and the protection of public health, safety, and the environment. Depending on the expected duration of the shutdown, the plan may include draining all chemicals from storage tanks and other equipment and the safe shutdown of all equipment. All wastes will be disposed of according to applicable LORS. If the cessation of operations becomes permanent, decommissioning will be undertaken (see Chapter 4, Facility Closure).

2.2.17 Facility Safety Design

The REP will be designed to maximize safe operation. Hazards that could affect the plant 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.

2.2.17.1 Natural Hazards

The principal natural hazards associated with the REP site are earthquakes and floods. The site is located in Seismic Risk Zone 3. Structures will be designed to meet the seismic requirements of CCR Title 24 and the 2001 California Building Code (CBC). Section 8.4, Geologic Hazards and Resources, discusses the geological hazards of the area and site. This section includes a review of potential geologic hazards, seismic ground motions, and the potential for soil liquefaction due to ground shaking. Appendix 10 includes the structural seismic design criteria for the buildings and equipment.

The REP site slopes gently to the northeast, with an average elevation of approximately 93 feet above mean sea level (MSL). The top of concrete of the plant's facilities will generally be at 94.5 feet MSL. According to the Federal Emergency Management Agency (see Section 8.15), the site is not within the 100-year floodplain. Section 8.15, Water Resources, includes additional information on the potential for flooding.

2.2.17.2 Emergency Systems and Safety Precautions

This section discusses the fire protection systems, emergency medical services, and safety precautions to be used by project personnel. Section 8.10, Socioeconomics, includes additional information on area medical services, and Section 8.16, Worker Health and Safety, includes additional information on safety for workers. Appendix 10 contains 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.

On-site Fire Protection Systems

CO_2 Fire Protection System

This system will protect certain 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 CO_2. The CO_2 will be discharged at a design concentration adequate to extinguish the fire.

Steam Turbine Lubrication Oil Water Spray System

This system will provide suppression for the steam turbine's lubrication oil skid.

Fire Hydrants/Hose Stations

This system will supplement the plant fire protection system. Water will be supplied from the plant underground fire water system.

Fire Extinguishers

The plant administrative building and other buildings will be equipped with portable fire extinguishers as required by the local fire department.

City of Roseville Fire Protection Systems

In the event of a fire, the City of Roseville Fire Department will provide assistance as needed. The closest fire station to the REP is Fire Station #5, located at 1567 Pleasant Grove Boulevard in Roseville, approximately 3.8 miles from the REP site. The Hazardous Materials Risk Management Plan (see Section 8.5, Hazardous Materials Handling) for the plant will include all information necessary to permit all fire-fighting and other emergency response agencies to plan and implement safe responses to fires, spills, and other emergencies.

Personnel Safety Program

The REP 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 Section 8.16, Worker Health and Safety.

2.2.18 Facility Reliability

This section discusses the expected plant availability, equipment redundancy, fuel availability, water availability, and project quality control measures associated with the REP.

2.2.18.1 Plant Availability

Due to the REP's high efficiency, it is anticipated that the facility will normally be dispatched based on the existing economic conditions of the electrical power market. The facility will be designed to operate between 30 and 100 percent of its unfired baseload electrical output to support dispatch service in response to customers' demands for electricity. Additionally, the plant will operate at loads exceeding 100 percent of baseload capacity when duct firing.

The REP will be designed for an operating life of 30 years. Reliability and availability projections are based on this operating life. Operation and maintenance (O&M) procedures will be consistent with industry standard practices to maintain the useful life status of plant components. The REP will generate up to 1,190 gigawatt hours of energy and burn up to 9,100,000 mmBtus of natural gas each year.

2.2.18.2 Redundancy of Critical Components

The following subsections identify equipment redundancy as it applies to project availability. Specifically, redundancy in the combined cycle power block and in the balance-of-plant systems that serve it is described. The combined cycle power block will be served by the following balance-of-plant systems: fuel supply system, DCS, boiler feedwater system, condensate system, demineralized water system, power cycle makeup and storage, circulating water system, open-cycle cooling water system, and compressed air system. Major equipment redundancy is summarized in Table 2.2-4.

Combined-Cycle Power Block

Two separate combustion turbine/HRSG power generation trains will operate in parallel within the combined-cycle power block. Each train will be powered by a combustion turbine. Each combustion turbine will provide approximately 34 to 39 percent of the total unfired combined-cycle power block output. The heat input from the exhaust gas from each combustion turbine will be used in the steam generation system to produce steam. Heat input to each HRSG can be supplemented by firing the HRSG duct burners, which will increase steam flow from the HRSG. Thermal energy in the steam from the steam generation system will be converted to mechanical energy and then to electrical energy in the STG subsystem. The expanded steam from the steam turbine will be condensed and recycled to the feedwater system. Power from the STG subsystem will contribute approximately 24 to 34 percent of the total

Table 2.2-4. Major equipment redundancy.

Description	Number	Note
Combined-cycle CTGs and HRSGs	Two trains	Steam turbine bypass system allows both CTG trains to operate at base load with the steam turbine out of service
STG	One	See note above pertaining to CTGs and HRSGs
HRSG feedwater pumps	Two per HRSG	Each has 100 percent capacity for unfired operation
Condensate pumps	Three - 50 percent capacity	-
Condenser	One	Condenser must be in operation for plant to operate, however, it will include divided waterboxes
Circulating water pumps	Two - 50 percent capacity	Steam turbine may continue to operate at a higher backpressure with one of two circulating water pumps out of service
Cooling tower	One	Cooling tower is multi-cell mechanical draft design
Demineralizer—Mixed Bed Polisher	Two - 100 percent trains	Rental units, off-site regeneration
Natural Gas Compressors	Three - 50 percent capacity	-
ZLD System	Two - 50 percent capacity	Two brine concentrators and crystallizers, each 50 percent

unfired combined-cycle power block output. The combined-cycle power block comprises the major components described below.

CTG Subsystems

The combustion turbine subsystems will include the combustion turbine, inlet air filtration, chilling/heating system, water injection for NO_x control and SPRINT system (for LM6000), generator and excitation systems, and turbine control and instrumentation. The combustion turbine will produce thermal energy through the combustion of natural gas. The thermal energy will be converted into mechanical energy through rotation of the combustion turbine, which drives the compressor and generator. Exhaust gas from the combustion turbine will be used to produce steam in the associated HRSG. The CTG generators will be air cooled. The generator excitation system will be a solid-state static system. Combustion turbine control and instrumentation (interfaced with the DCS) will cover the turbine governing system, the protective system, and the sequence logic.

HRSG Subsystems

The steam generation system will consist of the HRSG and blowdown systems. The HRSG system will provide for the transfer of heat from the exhaust gas of a combustion turbine and from the supplemental combustion of natural gas in the HRSG duct burner for the production of steam. This heat transfer will produce steam at the pressures and temperatures required by the steam turbine. The HRSG system will consist of ductwork, heat transfer sections, duct burners, an SCR system, and an oxidation catalyst module, as well as safety and auto relief valves and processing of continuous blowdown drains.

STG Subsystems

The steam turbine will convert the thermal energy to mechanical energy to drive the STG shaft to make electrical energy in the generator. The basic subsystems will include the steam turbine and auxiliary systems, turbine lubrication oil system, and generator/exciter system. The steam turbine's generator will be totally enclosed and water/air-cooled.

Distributed Control System

The DCS will be a redundant microprocessor-based system. It will provide the following control, monitoring, and alarm functions for plant systems and equipment:

- Control the HRSGs, STG, 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

The DCS will have a functionally distributed architecture comprising a group of similar redundant processing units; these units will be linked to a group of operator consoles and an engineer work station by redundant data highways. Each processor will be programmed to perform specific dedicated tasks for control information, data acquisition, annunciation, and historical purposes. Since they will be redundant, no single processor failure can cause or prevent a unit trip.

The DCS will interface with the control systems furnished by the combustion turbine, steam turbine, and ZLD system suppliers 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 enough redundancy to preclude a single device failure from significantly affecting overall plant control and operation. Consideration will be given to the action performed by the control and safety devices in the event of control circuit failure. Controls and controlled devices will move to the safest operating condition upon failure.

Plant operation will be controlled from the operator panel in the control room. The operator panel will consist of two or three 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 will not disable more than one CRT/keyboard. The engineering workstation will allow the control system operator interface to be revised by authorized personnel.

Boiler Feedwater System

The boiler feedwater system will transfer feedwater from the LP steam drum to the HP sections of the HRSGs. The system will consist of two 100 percent capacity pumps for supplying each HRSG. Each pump will be multistage, horizontal, and motor-driven and will include regulating control valves, minimum flow recirculation control, and other associated pipes and valves. LP system will receive feedwater directly from the LP economizer using the pressure supplied by the condensate pumps.

Condensate System

The condensate system will provide a flow path from the condenser hotwell to the HRSG LP economizers. The condensate system will include three, 50 percent capacity, multistage, vertical, motor-driven condensate pumps.

Demineralized Water System

The demineralized water system will include offsite-regenerated mixed-bed polishers and a demineralized water storage tank. Under most operating conditions, distillate from the ZLD system will be used as makeup to the demineralized water system. If LM6000 CTGs are used, there are some conditions under which ZLD system distillate will not meet the makeup needs of the demineralized water system due to the additional water needed for injection NO_x control and the SPRINT power boost system. In this case, recycled water will supplement the distillate. This recycled water will be pretreated by filtration and reverse osmosis to remove suspended solids and most of the dissolved solids. The demineralized water will be used for steam cycle makeup, CTG evaporative cooler makeup, CTG water injection and water wash, and chemical cleaning operations.

Power Cycle Makeup and Storage

The power cycle makeup and storage subsystem provides demineralized water storage and pumping capabilities to supply high purity water for system cycle makeup, CTG evaporative cooler makeup, CTG water injection and water wash, and chemical cleaning operations. The major components of the system are two full-capacity, horizontal, centrifugal, cycle makeup water pumps.

Circulating Water System

The circulating water system provides cooling water to condense steam turbine exhaust and steam turbine bypass steam. In addition, the system supplies cooling water to the various equipment coolers, such as lube oil coolers, throughout the plant via the auxiliary cooling water system. Major components of this subsystem are two, 50 percent capacity, vertical, motor-driven circulating water pumps; two, 100 percent capacity, vertical, motor-driven auxiliary cooling water pumps; and associated pipes and valves.

ZLD System

Cooling tower blowdown will be processed by a ZLD system incorporating two, 50 percent capacity, brine concentrators; two, 50 percent capacity crystallizers, and associated auxiliary equipment including a filtration system upstream of the brine concentrators and filter press to dewater the brine slurry exiting the crystallizers.

Compressed Air System

The compressed air system will be designed to supply service and instrument air for the facility. Dry, oil-free instrument air will be provided for pneumatic operators and devices throughout the plant. Compressed service air will be provided to appropriate areas of the plant as utility stations consisting of a ball valve and quick disconnect fittings.

The instrument air system will be given demand priority over the service air system. A pressure control valve will be set at approximately 60 psi to cut off the air supply to the service air header once the system pressure falls below 60 psi.

Two 100 percent capacity, water-cooled, oil free, rotary screw package air compressors will supply compressed air to the service and instrument air systems.

2.2.18.3 Fuel Availability

Fuel will be delivered by Pacific Gas & Electric Company (PG&E) from Line 123, located approximately 6 miles southeast of the REP, (See Chapter 5). PG&E has confirmed that its system has enough capacity to supply the REP from this location.

2.2.18.4 Water Availability

Cooling water and non-cooling process makeup water will be tertiary treated recycled water from the City of Roseville's PGWWTP. Water availability to meet the needs of the REP is discussed in more detail in Chapter 7.0, Water Supply, and Section 8.15, Water Resources (Appendix 7-A includes a copy of the City's will-serve letter).

2.2.18.5 Project Quality Control

The objective of the REP Quality Control Program will be to ensure that all systems and components have the appropriate quality measures applied during design, procurement, fabrication, construction, and 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.

Assurance of the quality required for a system is obtained by applying appropriate controls to various activities. 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 project activities.

Project Stages

For quality assurance planning purposes, project activities have been divided into the following nine stages:

1. **Conceptual Design Criteria**—Activities such as the definition of requirements and engineering analyses
2. **Detail Design**—Activities such as the preparation of calculations, drawings, and lists needed to describe, illustrate, or define systems, structures, or components
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
4. **Manufacturer Control and Surveillance**—Activities necessary to ensure that the manufacturers conform to the provisions of the procurement specifications
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
6. **Receipt Inspection**—Inspection and review of products upon delivery to the construction site
7. **Construction/Installation**—Inspection and review of storage, installation, and cleaning and initial testing of systems or components at the plant site
8. **System/Component Testing**—Actual controlled operation of power plant components in a system to ensure that the performance of systems and components conforms to specified requirements
9. **Plant Operation**—Actual operation of the power plant system

As the project progresses, the design, procurement, fabrication, erection, and checkout of each power plant system will progress through the nine stages defined above.

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 include consideration of suppliers' and subcontractors' personnel, production capability, past performance, and quality assurance program.

During construction, field activities will be accomplished during the last four stages of the project: receipt inspection, construction/installation, system/component testing, and plant operation. 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 the administration of independent testing contracts.

A plant O&M program typical for a project of this size will be implemented to control O&M quality. A specific program for this project will be defined and implemented during initial plant startup.

2.2.19 Construction Laydown and Worker Parking Areas

The construction laydown and worker parking areas will be located in the unused portion of the 40-acre parcel that includes the 12-acre power plant site, and on the adjacent, City-owned parcel to the west, forming a 50-acre construction zone. These parcels and the construction office, parking, and laydown areas are depicted on Figure 2.2-2.

2.3 LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

The applicable laws, ordinances, regulations, and standards for each engineering discipline are included in Appendix 10.

3.0 DEMAND CONFORMANCE

The California Energy Commission is no longer required to determine whether a proposed project conforms with an integrated assessment of electrical demand or need. Senate Bill 110 (California Construction Articles 4, Section 8), which took effect on January 1, 2000, states:

> *Before the California electricity industry was restructured, the regulated cost recovery framework for generating facilities justified requiring the commission to determine the need for new generation, and site only generating facilities for which need was established. Now that generating facility owners are at risk to recover their investments, it is no longer appropriate to make this determination.*

Accordingly, this AFC does not include an assessment of need.

4.0 FACILITY CLOSURE

Facility closure can be temporary or permanent. Temporary closure consists of a cessation of operations for a time greater than that required for normal maintenance, including overhauls or replacements of major equipment. Potential causes for temporary closure include economic conditions or repairable damage to the plant from earthquake, fire, storm, or other such events. Permanent closure consists of a cessation of operations with no intent to restart them. Potential causes for permanent closure include the age of the plant, economic conditions, or irreparable damage to the plant. Section 4.1 discusses temporary closure; Section 4.2 discusses permanent closure.

4.1 TEMPORARY CLOSURE

In the event of a temporary facility closure, where there is no release of hazardous materials, 24-hour security will be maintained at the facility, and the project owner will notify the California Energy Commission (CEC) and other responsible agencies. Actions taken will depend on whether the temporary closure involves a release of hazardous materials.

If there is no release or threatened release of hazardous materials, a contingency plan for the temporary cessation of operations will be implemented. The contingency plan will be conducted to ensure public health and safety, protection of the environment, and conformance with all applicable laws, ordinances, regulations, and standards. Appropriate procedures will depend on the anticipated duration of the shutdown. Accordingly, the contingency plan may include the draining of chemicals, water, and other fluids from storage tanks and plant equipment and various other procedures to ensure worker safety and to protect plant equipment. All hazardous and non-hazardous waste materials will be collected and disposed of as described in Section 8.14, Waste Management.

If there is a release or a threatened release of hazardous materials, procedures set forth in the Risk Management Plan (RMP), Spill Prevention Control and Countermeasure (SPCC) plan, and/or Emergency Action Plan (EAP) will be implemented. These plans are described in Section 8.5, Hazardous Materials Handling and Section 8.16, Worker Health and Safety. Procedures include methods to control releases of hazardous materials, notification of appropriate authorities and the public, training for plant personnel, and other emergency response actions and preparation. Once the release of hazardous materials has been contained and cleaned up, temporary closure will proceed as in the case of a closure where there is no release of hazardous materials.

Under no circumstances will the facilities be left unattended at any time during a temporary closure.

4.2 PERMANENT CLOSURE

The planned operational life of the facility is 30 years. However, if the facility continues to be economically viable, it could be operated for a longer time. Operation beyond 30 years would defer environmental impacts resulting from the construction of replacement facilities. It is also possible that the facility could become economically non-competitive before 30 years have passed, forcing early decommissioning. Whenever the facility is closed, the closure procedure will follow a decommissioning plan to be prepared as described below.

The decommissioning plan will be submitted to the CEC for review before starting permanent facility closure measures. Such measures may range from extensive "mothballing" to removal of all equipment and appurtenances, depending on circumstances at the time. However, future conditions that would affect

decommissioning decisions are largely unknown at this time. It is, therefore, appropriate to present decommissioning details to the CEC, City of Roseville, and other jurisdictional agencies when more information is available and the time for permanent facility closure has drawn closer.

The decommissioning plan will:

- Describe the proposed decommissioning measures for the facility and for all appurtenances constructed as part of the facility.
- Describe the activities necessary to restore the site if the decommissioning plan calls for removal of all equipment and appurtenances.
- Discuss decommissioning alternatives other than restoration of the site.
- Present the costs associated with the proposed decommissioning measures and the source of funds to pay for the decommissioning.
- Discuss conformance with applicable laws, ordinances, regulations, and standards as well as with local and regional plans.

In general, the proposed decommissioning measures will attempt to maximize the recycling of all facility components. Unused chemicals will be sold back to the suppliers or other purchasers. All equipment will be shut down and drained to ensure public health and safety and protection of the environment. All hazardous and non-hazardous waste materials will be collected and disposed of in accordance with all applicable laws, ordinances, regulations, and standards. Until decommissioning activities have been completed, 24-hour security will be maintained for the facility.

5.0 NATURAL GAS SUPPLY

A new 10- to 16-inch diameter pipeline, approximately 6 miles long, will supply natural gas to the Roseville Energy Park (REP). The natural gas pipeline may be designed, constructed, and owned by Pacific Gas & Electric Company (PG&E). Alternatively, the City of Roseville may construct the pipeline and either own and operate it, or deed it back to PG&E. This section describes the alternative routes chosen for the proposed gas supply line, as well as the construction and operating practices.

5.1 PROPOSED ALTERNATIVE NATURAL GAS PIPELINE ROUTES

Three main alternative natural gas pipeline routes are included in this AFC. A small variation on one of these makes a fourth alternative. The reason for this number of alternatives is that Roseville Electric is in still in discussion with PG&E regarding the final route selection. Each of the alternatives connects with PG&E's distribution pipeline, Line 123, near the corner of Baseline Road and Country Club Drive, east of the project site in Roseville (Figure 5.1-1). The alternatives use different routings between this point and the REP. These alternatives are described below, beginning at PG&E Line 123. The variant (Alternative B1) is included as a necessary variation on Alternative B in case the annexation of West Roseville of the West Roseville Specific Plan (WRSP) area is denied or delayed indefinitely.

Alternative A begins just east of the intersection of Baseline Road and Country Club Drive. The route travels west along Baseline Road and then turns north along Fiddyment Road. At the intersection with Blue Oaks Boulevard the route turns west into the WRSP area and continues on the future extension of Blue Oaks Boulevard. It then turns south into the future alignment of Phillip Road. It then turns west on the existing alignment of Phillip Road and into the REP site at the gas metering station. This route is approximately 6.0 miles long. Construction would be primarily by open trench. Where the pipeline crosses busy paved roads, jack and bore techniques may be used for the crossing. The crossing of Kaseberg Creek would likely use horizontal directional drill (HDD) techniques.

Alternative B also begins just east of the intersection of Baseline Road and Country Club Drive. The route follows the same path as Alternative A west along Baseline Road and north on Fiddyment Road. In contrast to Alternative A, however, Alternative B enters the planned West Roseville development at the future Bob Doyle Drive (opposite Del Webb Boulevard) and follows the future Bob Doyle Drive west, then northwest, then north to the current alignment of Phillip Road. The route then follows Phillip Road west, then north, then west again to the gas metering station at the REP site. This route is approximately 5.8 miles long. Construction would be primarily by open trench. Where the pipeline crosses busy paved roads, jack and bore techniques may be used for the crossing.

Alternative B1 is a variant of Alternative B that is identical to Alternative B except that, instead of turning west on the future Bob Doyle Drive, it continues north on Fiddyment Road to the corner of Phillip Road, then turns west on Phillip Road, following Phillip Road west (rejoining Alternative B), north, and then west again to the REP site. This route was chosen because, if the WRSP annexation is denied or delayed indefinitely, the alignment of Bob Doyle Drive would not be available as a future street right-of-way. Under the WRSP, the segment of Phillip Road between Fiddyment Road and Bob Doyle Drive would be removed. This route is approximately the same length as Alternative B.

Alternative C also begins just east of the intersection of Baseline Road and Country Club Drive. In contrast to the other two alternatives, however, Alternative C travels west on Baseline Road for only a short distance, and then turns north along Country Club Drive. At the intersection of Country Club Drive with Pleasant Grove Boulevard, this alternative turns west. At the intersection of Pleasant Grove Boulevard with Fiddyment Road, the route continues west along the future extension of Pleasant Grove Boulevard (under the WRSP). At the intersection of Pleasant Grove Boulevard with the future West Side Drive, the route turns north. At the intersection of West Side Drive and the future extension of Blue Oaks Boulevard, the route turns east. At the future realignment of Phillip Road, the route turns south and runs to the current alignment of Phillip Road. From there, the route turns west and enters the REP site at the gas metering station. This route is 6.4 miles long. Construction would be primarily by open trench. Where the pipeline crosses busy paved roads, jack and bore techniques may be used for the crossing.

5.2 DESIGN CRITERIA

Pipeline new design criteria are found in Table 5.2-1. The pipe material will be welded steel pipeline with epoxy coating on the exterior. Cathodic protection will be provided. A manually operated ball valve will be installed on each end of the pipeline.

Table 5.2-1. Natural gas pipeline design criteria.

Parameter	Unit	Comments
Working pressure	100-375 psig	Min line pressure is 100 psig
Design pressure	~720 psig	PG&E maximum allowable operating pressure (MAOP)
Pipe size	10-16 inches	Based on minimum pressure
Minimum cover	36 inches	-
Minimum vertical clearance between existing utilities	12 inches	-
Minimum horizontal clearance	12 inches	-

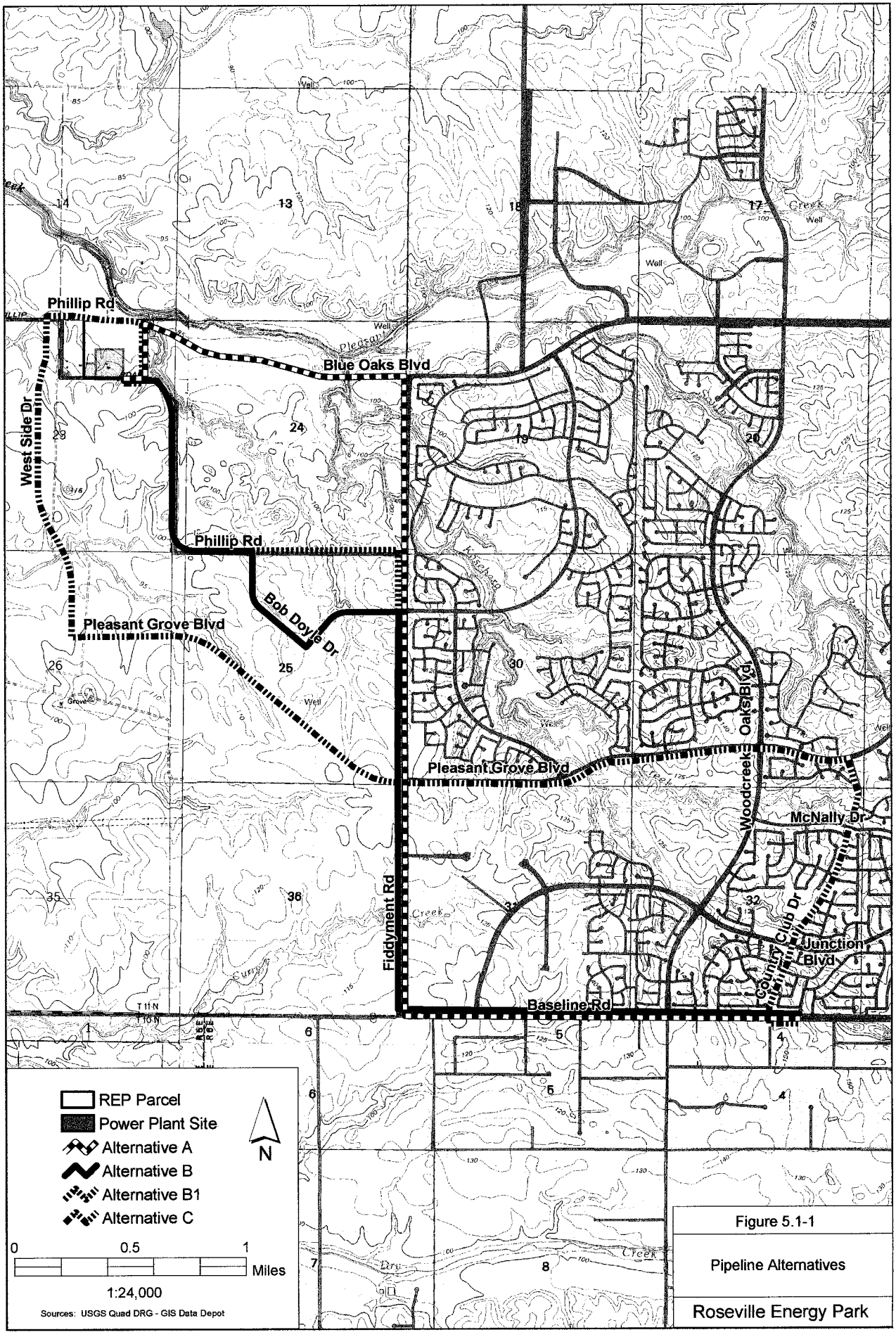
The pipeline will also be designed in accordance standards established by the City of Roseville Engineering Department, PG&E, and applicable California Public Utility Commission (CPUC) General Orders (GO) for design and construction by a publicly held utility, such as GO 112.

5.3 CONSTRUCTION PRACTICES

Most of the natural gas pipeline will be constructed using a backhoe to excavate a trench for the pipe. It will be necessary to close one or two lanes of roadway will be closed while the pipeline is being installed.

5.3.1 Trenching Methods

The preferred installation method for the pipeline is by conventional open trench. The estimated trench width, assuming that the trench is shored, is 2 to 3 feet. If the trench is unshored, then the width could be up to 12 feet wide at the top. Approximately 10 to 50 feet adjacent to the edge of the trench will be required for equipment access. The natural gas pipeline will be constructed with a minimum of at least


Phillip Rd
Blue Oaks Blvd
West Side Dr
Phillip Rd
Bob Doyle Dr
Pleasant Grove Blvd
Pleasant Grove Blvd
Woodcreek Oaks Blvd
McNally Dr
Fiddyment Rd
Country Club Dr
Junction Blvd
Baseline Rd
REP Parcel
Power Plant Site
Alternative A
Alternative B
Alternative B1
Alternative C
N
0
0.5
1
Miles
1:24,000
Sources: USGS Quad DRG - GIS Data Depot
Figure 5.1-1
Pipeline Alternatives
Roseville Energy Park

ROW during the course of construction. In addition to providing worker parking, the laydown area will serve as the primary location for storing pipe and other pipeline construction materials. Any additional storage locations will be in existing paved or graveled areas along the pipeline route. Pipeline construction will take approximately three months and is expected to occur during the summer or fall of 2005. The following are key construction steps:

1. **Trenching**—Trench width will depend on the type of soils encountered and underground obstructions. The trench will be sufficient deep to meet the requirements of the controlling authority. However, the pipeline will be buried to provide a minimum cover of 36 inches. The excavated soil will be piled on one side of the trench and used as backfill after the pipe is installed in the trench. The pipeline will be installed through trenching at all locations.
2. **Stringing**—Stringing will consist of trucking lengths of pipe to the ROW and laying them on wooden skids beside the open trench.
3. **Installation**—Installation will consist of bending, welding, and coating the weld joint areas of the pipe after it has been strung, padding the ditch with sand or fine spoil, and lowering the pipe string into the trench. Bends will be made by a cold bending machine or shop fabricated as required for various changes in bearing and elevation. Welding will meet the applicable API standards and be performed by qualified welders. Welds will be inspected in accordance with API Standard 1104. Welds will undergo 100 percent radiographical inspection by an independent, qualified radiography contractor. All coating will be checked for defects prior to lowering into the trench.
4. **Backfilling**—Backfilling will consist of returning spoil back into the trench around and on top of the pipe, ensuring that the surface is returned to its original grade or level. The backfill will be compacted to protect the stability of the pipe and to minimize subsequent subsidence.
5. **Plating**—Plating will consist of covering any open trench with steel plates at the end of a workday to ensure public safety. Plates will be removed at the start of each workday. Efforts will be made to minimize the length of open trench along the ROW.
6. **Boring**—The boring method will be used for moderately short crossings under roads, highways, canals, etc., where dictated by governmental agency or where it would be too inconvenient or environmentally unsound to use the open cut method. Boring pits will be dug on each side of the crossing. On the inlet side, a boring machine with an auger typically will be used, or a ramming device may be used to jack the pipe into place.
7. **Horizontal Directional Drilling**—Horizontal directional drilling to route the pipeline under Kaseberg Creek (Alternative A) involves specialized construction procedures. The horizontal directional drilling equipment will initially drill a pilot hole, which will be followed by a pilot hole drill string. A reaming device will be attached to the drill string and will be pulled through the pilot hole. The reamer will enlarge the pilot hole to a diameter 35 to 50 percent greater than the final pipeline size. The pipeline will then be welded, radiographed, hydrotested, and pulled through the enlarged borehole.

   Drilling mud will be used as part of the horizontal directional drilling process to lubricate and cool the drill. The mud will be non-toxic bentonite. The drilling mud will be collected at the directional drilling site. It will then be disposed of at a Class III landfill.

8. **Hydrostatic Testing**—Hydrostatic testing will consist of filling the pipeline with water, venting all air, increasing the pressure to the specified code requirements, and holding the pressure for a designated period of time. It is expected that the fresh water required can be drawn from the municipal water supply or the project's domestic water supply well. After hydrostatic testing of the pipeline, the test water will be chemically analyzed for contaminants and discharged into a dewatering structure consisting of hay bales, geotextile fabric, and silt fencing. The discharged water will filter through the hay bales and silt fence onto a jute matting before it is discharged. Temporary approvals for test water use and permits for discharge will be obtained as required.
9. **Cleanup**—Cleanup will consist of restoring the surface of the ROW by removing any construction debris, grading to the original grade and contour, and repairing and repaving where required.
10. **Commissioning**—Commissioning will consist of drying the inside of the pipeline, purging air from the pipeline, and filling the pipeline with natural gas.
11. **Safety**—A construction safety plan will be prepared for the project. This plan will address specific safety issues, such as working in an active railroad right-of-way, traffic control, working along traveled city streets, and other areas as required by permits.

5.4 PIPELINE OPERATIONS

The natural gas supply pipeline will be designed, constructed, and operated in accordance with Title 49, Code of Federal Regulations, Part 192 (49 CFR I92) and the CPUC's GO 112-E. Specifically, the pipeline will be designed in accordance with the standards required for gas pipelines in proximity to populated areas, based on actual population densities along the proposed pipeline route. It will be buried at least 36 inches.

An operations and maintenance plan will be prepared addressing both normal procedures and conditions, and any upset or abnormal conditions that could occur. A cathodic protection system will provide continuous corrosion shielding for the pipeline. Periodic cathodic protection surveys will be performed along the pipeline, as required by 49 CFR 192 and GO112-E.

The proposed pipeline will adopt a proactive damage prevention program. Markers identifying the location of the pipeline will be placed at all road crossings. The markers will identify a toll-free number to call prior to any excavation near the pipeline. Buried warning tape will be placed above the pipeline to warn of its presence.

The transported gas will be odorized as received from PG&E's main pipeline. PG&E (or City of Roseville if the City retains ownership) will develop an emergency plan to provide prompt and effective responses to upset conditions detected along the pipeline or reported by the public.

Isolation block-valves will be installed at both ends of the pipeline. These valves will be manually controlled, lockable, gear-operated ball valves. Only PG&E will have access to the isolation block valve at the mainline tap, and the REP alone will have access to the downstream isolation ball valve at the REP property. A pipeline Supervisory Control and Data Acquisition (SCADA) system will provide flow rate and pressure data to PG&E and the REP.

5.5 ON-SITE FUEL SUPPLY SYSTEM

A description of the fuel supply system within the REP is provided in Section 2.2.

5.6 PERMITS AND PERMITTING SCHEDULE

The natural gas pipeline will occupy utility easements beside and within existing streets and roadways throughout the alignment. Permit requirements for the affected agencies are summarized in Table 5.6-1. Additional permitting information is found in Section 8.6 (Land Use).

Table 5.6-1. Encroachment permits required and responsible agencies.

Location	Agency	Schedule
Rural areas	Placer County (possibly needed for Baseline Road and Fiddyment south of Pleasant Grove Boulevard and for Phillip Road if there is no annexation of West Roseville)	4-6 weeks
All City streets	City of Roseville	4-6 weeks

5.6.1 County of Placer

All of the pipeline alignment alternatives currently cross portions of unincorporated Placer County. With the City of Roseville's planned annexation of West Roseville, most of these areas will lie within the Roseville City limits by the time construction begins. Exceptions to this include portions of Baseline and Fiddyment roads that are currently under Placer County jurisdiction and would remain so. These include the south side of Baseline Road and the west side of Fiddyment Road south of Pleasant Grove Boulevard. These two areas, furthermore, are not located within the WRSP area. Therefore, regardless of the annexation's outcome, portions of the pipeline may be constructed in Placer County, depending on which side of the road right-of-way is used. In addition, if project construction takes place before the West Roseville annexation or if the annexation proposal is denied or delayed indefinitely, then alternative B1 will be chosen, and the project will apply to Placer County for encroachment permits on Phillip Road for this portion of the construction.

5.6.2 City of Roseville

A City of Roseville Encroachment permit will be required for work in City streets, right-of ways, sites, easements and parks. Since much of the pipeline alignment is currently located within City streets and since all of the alignment will be within the City of Roseville if the West Roseville annexation goes forward, this permit will apply to most of the project. The permit is available at the City's Engineering Department. The construction contractor will obtain the permit at the beginning of construction. The permit requires the contractor to have a valid City of Roseville business license. RE will be required to pay any inspection fees imposed by the City.

5.6.3 Cal-OSHA Mining and Tunneling Unit

CAL-OSHA issues underground classifications for bored and jacked casings that are 30 inches in diameter or more. The bore-and-jacked crossings for this project are expected to be less than 30 inches in diameter, so the classification and associated permits will not be required.

6.0 ELECTRICAL TRANSMISSION

This section discusses the transmission interconnection between the Roseville Energy Park (REP) and the existing electrical grid and the anticipated impacts that operation of the facility will have on the flow of electrical power in this region of California. To better understand the impacts of the project on the regional transmission system and power flows, the analysis presented in this section focuses on the following issues: 1) the electrical interconnection between the REP and the electrical grid, and 2) the potential impacts of the electrical interconnection on the existing transmission system. Additional discussions focus on potential nuisances (electrical, magnetic, audible noise, and corona effects), safety of the interconnection, and a description of applicable laws, ordinances, regulations, and standards (LORS).

6.1 TRANSMISSION INTERCONNECTION ENGINEERING

This section summarizes information on the REP's proposed transmission interconnection and briefly describes the transmission system to which the REP will connect. Please refer to the Western Area Power Administration's (WAPA's) System Impacts Study in Appendix 6-A for additional information.

The REP will connect with the future 60 kV double-circuit transmission line that will serve the West Roseville Specific Plan area after the annexation of West Roseville takes place (City of Roseville 2003). This future new transmission line will be permitted under the West Roseville Specific Plan (WRSP) process. The project will connect with this new transmission line along Phillip Road, a few yards south of the REP switchyard (Figure 6.1-1). This double-circuit transmission line will originate at Roseville Electric's Fiddyment Receiving Station, and follow WAPA's existing transmission corridor (located about 2.5 miles south of the REP) approximately 1.5 miles to the west. The transmission line will then run north, approximately 2.1 miles, along the west boundary of the City of Roseville's Pleasant Grove Wastewater Treatment Plant (PGWWTP) to the existing Phillip Road and then turn east running along the south side of the REP site. The line will then turn north, running along the future realignment of Phillip Road to the east of the REP to the future extension of Blue Oaks Boulevard. The line will then turn east along Blue Oaks Boulevard, running approximately 3 miles to Woodcreek Oaks Boulevard, connecting to a future substation. Figure 6.1-2 is a one-line diagram showing the local transmission system, including the new WRSP connection.

The REP project will connect with this new double-circuit transmission line at Phillip Road, immediately south of the REP switchyard (see Figure 6.1-1). The transmission line will be looped into the REP switchyard via very short new transmission lines (less than 100 feet long and confined to the REP site). Figure 6.1-3 is a profile diagram of the 60 kV transmission conductor support structure that will be installed as a corner tower where the 60 kV transmission line enters and leaves the REP switchyard.

If the West Roseville annexation is denied or delayed indefinitely, the new 60 kV transmission line would not be built along Phillip Road. In that case, the REP would construct a new 60 kV double-circuit transmission line to connect with the Roseville Electric and WAPA Fiddyment Substation. This substation is located just south of the corner of Fiddyment Road and Pleasant Grove Boulevard (see Figure 6.1-1). This line would run along the existing alignment of Phillip Road to Fiddyment Road, then south along Fiddyment Road to RE's Fiddyment Receiving Station. Conductor support structures located where the line changes direction would be on metal poles identical to those located where the line enters the REP site (Figure 6.1-3). All other conductor support structures would be as depicted in Figure 6.1-4, on wooden poles. Though it would be necessary for this line to cross under the existing WAPA and Sacramento Municipal Utility District (SMUD) 230 kV transmission lines located just north of the

Fiddyment Substation, it would not be necessary to alter the existing WAPA or SMUD 230 kV towers or conductors to do so.

6.2 SYSTEM IMPACT STUDY

The WAPA has completed a screening level System Impact Study for the REP (see Appendix 6-A). The study looked at the proposed 60 kV interconnection to the City of Roseville's electrical transmission grid at Roseville Electric's Fiddyment Receiving Station as well as an optional 230 kV interconnection to WAPA's 230 kV system through WAPA's Fiddyment Substation. Base case assumptions underlying the study include the following:

- Peak load conditions for the 2006 and 2010 summer seasons
- One-in-ten load forecast for Sacramento Area and PG&E Area 5 (Sierra)
- Load forecast temperature adjusted for the surrounding areas
- Study path included the Pacific AC Intertie (PACI) and California-Oregon Transmission Project
- Planning area load includes 3,171 MW SMUD and 320 MW Roseville (2006)
- Generation includes Calpine Sutter Energy Center, SMUD Hydro and thermal generation, and Central Valley Project hydro generation
- City of Roseville forecasted 2006 load of 320 MW
- City of Roseville forecasted 2010 load of 375 MW

The study shows that the REP would improve the City's existing system by providing voltage support to bring all of the City's bus voltages up to acceptable limits. Under baseline modeled conditions, several busses in the City system may drop below 95 percent of the nominal voltage.

6.2.1 Single Outage (N-1) Contingency

Under a modeling scenario that examines the effects of a single outage in any one element within the study (N-1 contingency), 35 transmission elements in the base case could be overloaded without (prior to) the REP. Adding the REP to the system would reduce the overloading in 32 of those 35 elements, under either the 2006 or 2010 load assumptions. Reductions to overloading with the REP are less than 10 percent in 13 cases (1.6 to 3.89 percent improvements). Table 6.2-1 lists the largest improvements (percentages for 2006 load assumption) under the N-1 contingency. Under each of these N-1 outage scenarios, the addition of the REP would reduce overloading to levels below 90 percent, for the 2006 load case. For the 2010 case, it would do so for nine of these eleven cases.

Adding the REP to the system would increase the potential overloading slightly for the three elements (2006 load) (see Table 6.2-2).

6.2.2 Double Outage (N-2) Contingency

Under a modeling scenario that examines the effects of two simultaneous outages to elements within the study (N-2 contingency), 13 of 13 system elements would experience overloading before the addition of the REP. Adding the REP would reduce the load from greater than 90 percent to less than 80 percent in 7 of these 13 cases and would cause minor improvements in 4 additional cases in 2006. Improvements would be greater than 40 percent for 6 cases and greater than 120 percent for 2 cases. Overloading would increase slightly in two cases (from 114 to 117 percent in one case and from 114 to 118 percent in the other).

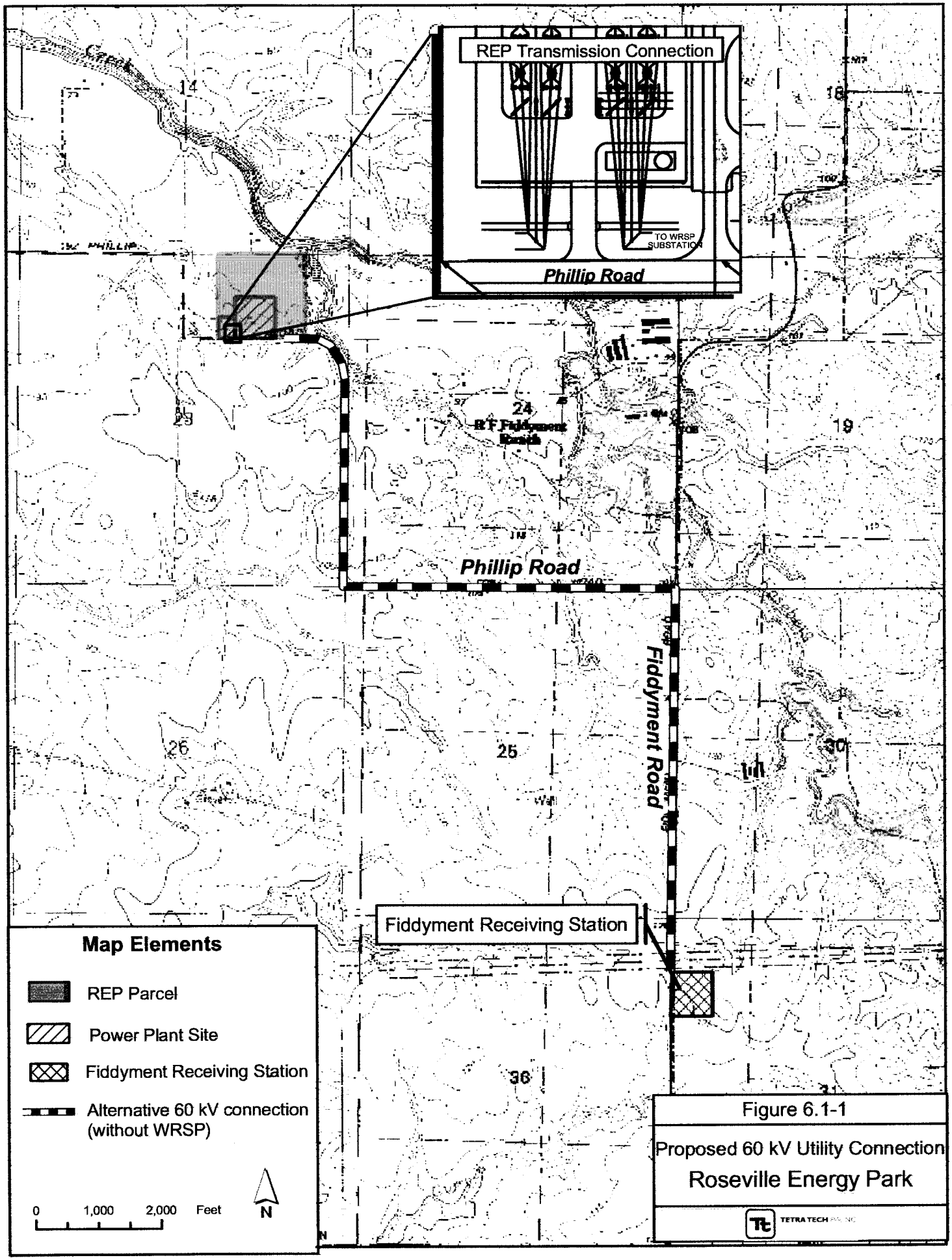


Figure 6.1-1

Proposed 60 kV Utility Connection

Roseville Energy Park

TETRA TECH

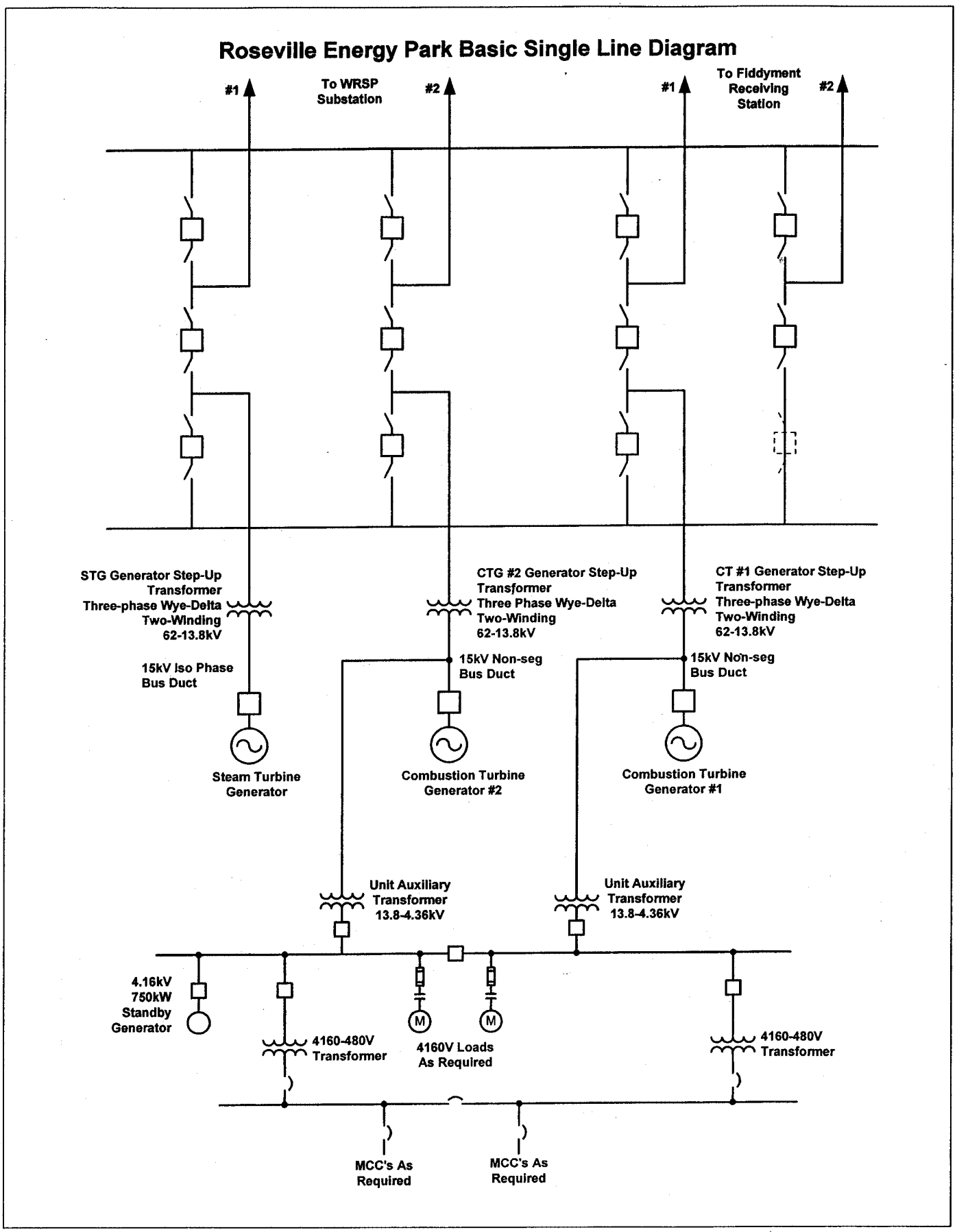


Figure 6.1-2. Proposed 60kV utility connection and local system map.

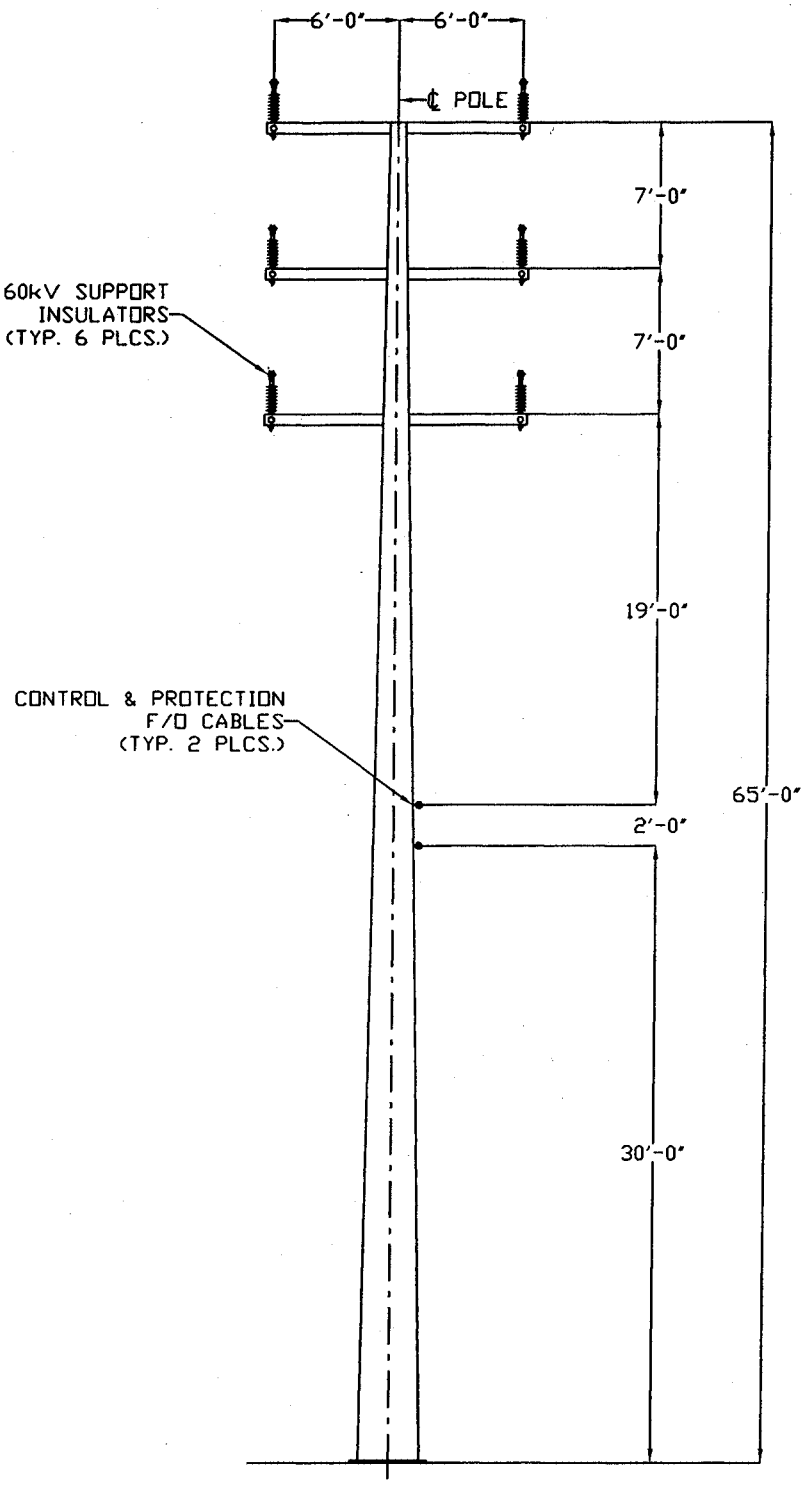


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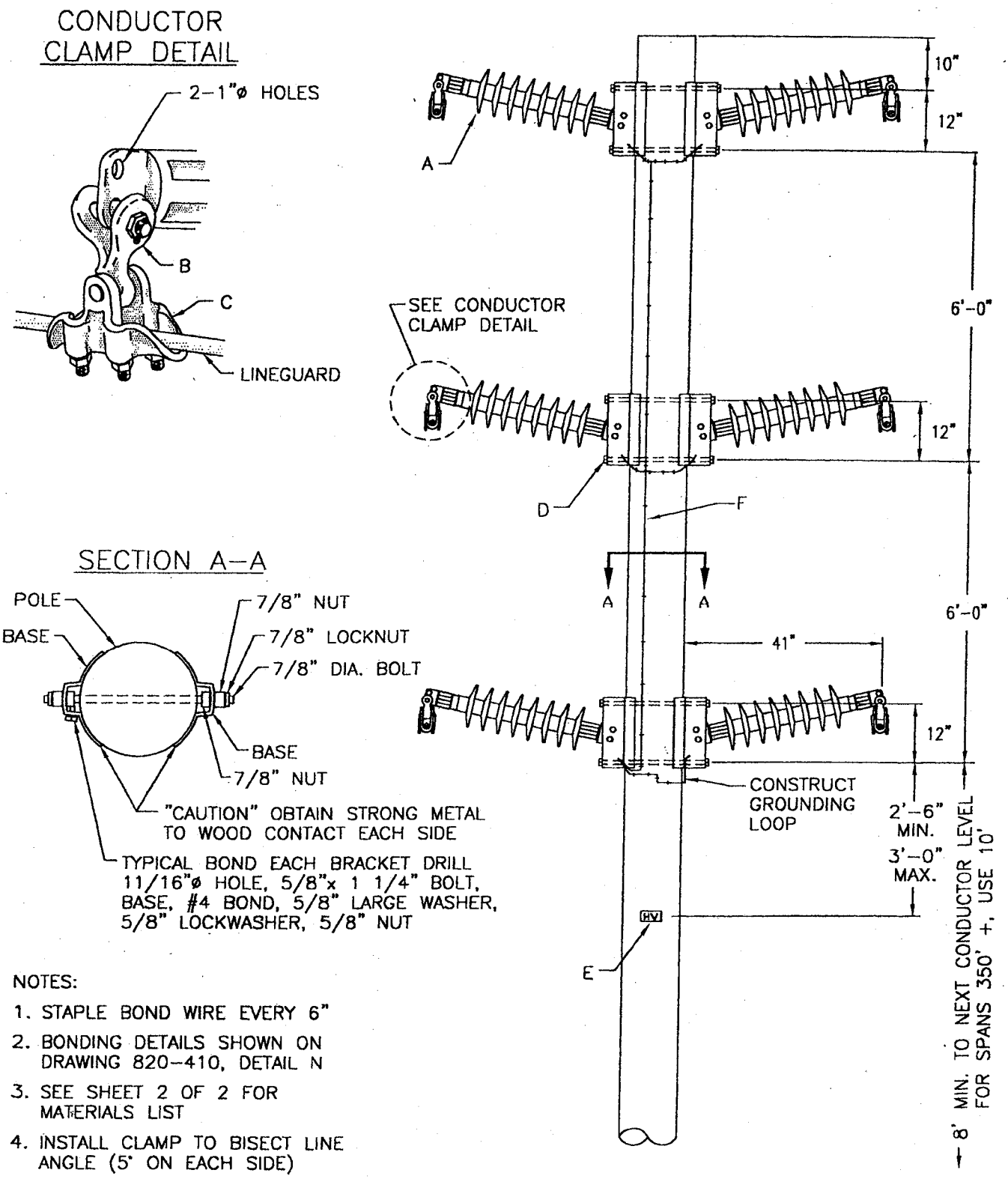
Figure 6.1-3. Transmission pole elevation, turning structure.



NOTES:

1. STAPLE BOND WIRE EVERY 6"
2. BONDING DETAILS SHOWN ON DRAWING 820–410, DETAIL N
3. SEE SHEET 2 OF 2 FOR MATERIALS LIST
4. INSTALL CLAMP TO BISECT LINE ANGLE (5° ON EACH SIDE)

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Figure 6.1-4. Transmission pole design, in-line structure.

Table 6.2-1. Potential significant improvements to local transmission with the REP.

Outage	Overloaded elements From	To	Percent loading w/o REP	Percent loading w/ REP	Percent improvement (2006)
Fiddyment 230/60 kV #1	Fiddyment 60 kV	Foothill 60 kV	172	46	-126
Fiddyment 230/60 kV #1	Foothill 60 kV	Roseville Industrial 60 kV	142	17	-125
Fiddyment 230/60 kV #1	Pleasant Grove-1 60 kV	Roseville-1 60 kV	118	32	-86
Fiddyment 230/60 kV #1	Pleasant Grove-2 60 kV	Pleasant Grove-1 60 kV	102	17	-85
Fiddyment 230/60 kV #1	Pleasant Grove-2 60 kV	Foothill 60 kV	86	7	-79
Fiddyment 230/60 kV #1	Roseville Industrial 60 kV	Roseville-1 60 kV	97	20	-78
Roseville 230/60 kV #1	Fiddyment 230 kV	Fiddyment 60 kV	86	38	-48
Fiddyment 230/60 kV #1	Roseville 230 kV	Roseville-2 60 kV	99	59	-40
Roseville 230/60 kV #1	Roseville 230 kV	Roseville-2 60 kV	103	87	-16
Roseville 230/60 kV #2	Roseville 230 kV	Roseville-1 60 kV	102	86	-16

Source: WAPA System Impact Study, 2003 (see Appendix 6-A), Table II.

Table 6.2-2. Potential increases of local transmission overloading with the REP.

Outage	Overloaded elements From	To	Percent loading w/o REP	Percent loading w/ REP	Percent increase (2006)
Elverta-S to Elverta-W	Elverta West 230 kV	Hurley South 230 kV	140.6	150.0	9.4
Elverta-S to Elverta-W	Elverta West 230 kV	Hurley South 230 kV	135.8	145.0	9.2
Elverta-S to Elverta-W	Hurley South 230 kV	Natomas 230 kV	114.0	114.3	0.3

Source: WAPA System Impact Study, 2003 (see Appendix 6-A), Table II.

6.2.3 Conclusions

The System Impact Study shows that the addition of the REP to the existing system would provide significant benefits to the local electrical system in terms of voltage support in the case of outages to critical system elements. Under the few scenarios for which the addition of the REP would make the overloading worse during outage conditions, the increases are very small. Although these increases would contribute to existing overloads that would be present even under the assumed base case conditions, they would not result in any new overloads. Thus, the addition of the REP will not result in a significant adverse impact to the regional electrical transmission system and, in fact, will provide a significant net benefit. A Detailed Facilities Study (DFS) is currently being performed by WAPA and is scheduled for completion in late 2003. Western is coordinating with the Sacramento Area Transmission Planning Group (SATPG) in preparing the DFS. The DFS will include scenarios both with and without WRSP approval.

6.3 TRANSMISSION LINE SAFETY AND NUISANCES

This section discusses safety and nuisance issues associated with the proposed electrical interconnection of the REP.

6.3.1 Electrical Clearances

Typical high-voltage overhead transmission lines are composed of bare conductors connected to supporting structures by means of porcelain, glass, or plastic insulators. The air surrounding the energized conductor acts as the insulating medium. Maintaining sufficient clearances, or air space, around the conductors to protect the public and utility workers is paramount to the safe operation of the line. The safety clearance required around the conductors is determined by normal operating voltages, conductor temperatures, short-term abnormal voltages, wind-blown swinging conductors, contamination of the insulators, clearances for workers, and clearances for public safety. Minimum clearances are specified in the California Public Utility Commission General Order 95 (GO 95). Electric utilities, state regulators, and local ordinances may specify additional (more restrictive) clearances. Typically, clearances are specified for the following

- Distance between the energized conductors themselves
- Distance between the energized conductors and the supporting structure
- Distance between the energized conductors and other power or communication wires on the same supporting structure, or between other power or communication wires above or below the conductors
- Distance from the energized conductors to the ground and features such as roadways, railroads, driveways, parking lots, navigable waterways, airports, etc.
- Distance from the energized conductors to buildings and signs
- Distance from the energized conductors to other parallel power lines

6.3.2 Electrical Effects

The electrical effects of high-voltage transmission lines fall into two broad categories: corona effects and field effects. Corona is the ionization of the air that occurs at the surface of the energized conductor and suspension hardware due to very high electric field strength at the surface of the metal during certain conditions. Corona may result in radio and television reception interference, audible noise, light, and production of ozone. Field effects are the voltages and currents that may be induced in nearby conducting objects. A transmission line's inherent electric and magnetic fields cause these effects.

6.3.2.1 Electric and Magnetic Fields

Operating power lines, like the energized components of electrical motors, home wiring, lighting, and all other electrical appliances, produce electric and magnetic fields, commonly referred to as electromagnetic field (EMF). The EMF produced by the alternating current electrical power system in the United States has a frequency of 60 Hz, meaning that the intensity and orientation of the field changes 60 times per second.

Electric fields around transmission lines are produced by electrical charges on the energized conductor. Electric field strength is directly proportional to the line's voltage; that is, increased voltage produces a stronger electric field. At a given distance from the transmission line conductor, the electric field is inversely proportional to the distance from the conductors, so that the electric field strength declines as the distance from the conductor increases. The strength of the electric field is measured in units of

kilovolts per meter (kV/m). The electric field around a transmission line remains steady and is not affected by the common daily and seasonal fluctuations in usage of electricity by customers.

Magnetic fields around transmission lines are produced by the level of current flow, measured in terms of amperes, through the conductors. The magnetic field strength is also directly proportional to the current; that is, increased amperes produce a stronger magnetic field. The magnetic field is inversely proportional to the distance from the conductors. Thus, like the electric field, the magnetic field strength declines as the distance from the conductor increases. Magnetic fields are expressed in units of milligauss (mG). The amperes and, therefore the magnetic field around a transmission line, fluctuate daily and seasonally as the usage of electricity varies.

Considerable research has been conducted over the last 30 years on the possible biological effects and human health effects from EMF. This research has produced many studies that offer no uniform conclusions about whether long-term exposure to EMF is harmful or not. In the absence of conclusive or evocative evidence, some states, California in particular, have chosen not to specify maximum acceptable levels of EMF. Instead, these states mandate a program of prudent avoidance whereby EMF exposure to the public would be minimized by encouraging electric utilities to use low-cost techniques to reduce the levels of EMF.

6.3.2.2 Audible Noise

Corona may result in the production of audible noise from a transmission line. Corona is a function of the voltage of the line, the diameter of the conductor, and the condition of the conductor and suspension hardware. The electric field gradient is the rate at which the electric field changes and is directly related to the line voltage.

The electric field gradient is greatest at the surface of the conductor. Large-diameter conductors have lower electric field gradients at the conductor surface and, hence, lower corona than smaller conductors, everything else being equal. Also, irregularities (such as nicks and scrapes on the conductor surface) or sharp edges on suspension hardware concentrate the electric field at these locations and, thus, increase corona at these spots. Similarly, contamination on the conductor surface, such as dust or insects, can cause irregularities that are a source for corona. Raindrops, snow, fog, and condensation are also sources of irregularities. Corona typically becomes a design concern for transmission lines having voltages of 345 kV and above. Since the REP will be connected at 60 kV, it is expected that no corona-related design issues will be encountered.

The construction and operation of the REP will not result in any significant increases in EMF levels or audible noise.

6.3.2.3 Induced Current and Voltages

A conducting object such as a vehicle or person in an electric field will experience induced voltages and currents. The strength of the induced current will depend upon the electric field strength, the size and shape of the conducting object, and the object-to-ground resistance. When a conducting object is isolated from the ground and a grounded person touches the object, a perceptible current or shock may occur as the current flows to ground. The mitigation for hazardous and nuisance shocks is to ensure that metallic objects on or near the right-of-way are grounded and that sufficient clearances are provided at roadways and parking lots to keep electric fields at these locations low enough to prevent vehicle short-circuit currents from exceeding 5 mA.

Magnetic fields can also induce voltages and currents in conducting objects. Typically, this requires a long metallic object, such as a wire fence or above-ground pipeline that is grounded at only one location. A person who closes an electrical loop by grounding the object at a different location will experience a shock similar to that described above for an ungrounded object. Mitigation for this problem is to ensure multiple grounds on fences or pipelines, especially those that are orientated parallel to the transmission line.

The proposed 60 kV transmission interconnection will be constructed in conformance with California Public Utilities Commission (PUC) General Order 95 (GO-95) and Title 8 CCR 2700 requirements. Therefore, hazardous shocks are unlikely to occur as a result of project construction or operation.

6.3.3 Aviation Safety

Federal Aviation Administration (FAA) Regulations, Part 77, establish standards for determining obstructions in navigable airspace and set forth requirements for notification of proposed construction. These regulations require FAA notification for any construction over 200 feet high above ground level. In addition, notification is required if the obstruction is lower than specified heights and falls within any restricted airspace in the approaches to airports. For airports with runways longer than 3,200 feet, the restricted space extends 20,000 feet (3.3 nautical miles) from the runway. For airports with runways measuring 3,200 feet or less, the restricted space extends 10,000 feet (1.7 nautical miles). For heliports, the restricted space extends 5,000 feet (0.8 nautical mile).

Since the new transmission towers will be less than 200 feet tall, and there are no public or military airports or heliports close enough to the project to trigger additional restrictions, an FAA air navigation hazard review will not be necessary. The structures of the preferred electrical transmission interconnection will pose no deterrent to aviation safety as defined in the FAA regulations.

6.3.4 Fire Hazards

The proposed 60-kV transmission interconnection lines will be designed, constructed, and maintained in accordance with GO-95, which establishes clearances from other man-made and natural structures as well as tree-trimming requirements to mitigate fire hazards. RE will maintain the transmission line corridor and immediate area in accordance with existing regulations and accepted industry practices that will include identification and abatement of any fire hazards.

6.4 APPLICABLE LORS

This section provides a list of applicable laws, ordinances, regulations, and standards (LORS) that apply to the proposed transmission line, substations and engineering.

6.4.1 Design and Construction

Table 6.4-1 lists the applicable LORS for the design and construction of the proposed transmission interconnection and substations.

Table 6.4-1. Design and construction LORS.

LORS	Applicability
General Order 95 (GO-95), CPUC, "Rules for Overhead Electric Line Construction"	California Public Utility Commission (CPUC) rule covers required clearances, grounding techniques, maintenance, and inspection requirements.
Title 8 California Code of Regulations (CCR), Section 2700 et seq. "High Voltage Electrical Safety Orders"	Establishes essential requirements and minimum standards for installation, operation, and maintenance of electrical installation and equipment to provide practical safety and freedom from danger.
General Order 52 (GO-52), CPUC, "Construction and Operation of Power and Communication Lines"	Applies to the design of facilities to provide or mitigate inductive interference.
ANSI/IEEE 693 "IEEE Recommended Practices for Seismic Design of Substations"	Provides recommended design and construction practices.
IEEE 1119 "IEEE Guide for Fence Safety Clearances in Electric-Supply Stations"	Provides recommended clearance practices to protect persons outside the facility from electric shock.
IEEE 998 "Direct Lightning Stroke Shielding of Substations"	Provides recommendations to protect electrical system from direct lightning strokes.
IEEE 980 "Containment of Oil Spills for Substations"	Provides recommendations to prevent release of fluids into the environment.

6.4.2 Electric and Magnetic Fields (EMF)

The applicable LORS pertaining to electric and magnetic field interference are tabulated in Table 6.4-2.

Table 6.4-2. Electric and magnetic field LORS.

LORS	Applicability
Decision 93-11-013 of the CPUC	CPUC position on EMF reduction.
General Order 131-D (GO-131), CPUC, Rules for Planning and Construction of Electric Generation, Line, and Substation Facilities in California	CPUC construction-application requirements, including requirements related to EMF reduction.
City of Roseville Electric Department EMF Design Guidelines for Transmission, Distribution, and Substation Facilities	Roseville Electric's guidelines for EMF reduction through structure design, conductor configuration, circuit phasing, and load balancing. (In keeping with CPUC D.93-11-013 and GO-131)
ANSI/IEEE 644-1994 "Standard Procedures for Measurement of Power Frequency Electric and Magnetic Fields from AC Power Lines"	Standard procedure for measuring EMF from an electric line that is in service.

6.4.3 Hazardous Shock

Table 6.4-3 lists the LORS regarding hazardous shock protection for the project.

Table 6.4-3. Hazardous shock LORS.

LORS	Applicability
Title 8 CCR Section 2700 et seq. "High Voltage Electrical Safety Orders"	Establishes essential requirements and minimum standards for installation, operation, and maintenance of electrical equipment to provide practical safety and freedom from danger.
ANSI/IEEE 80 "IEEE Guide for Safety in AC Substation Grounding"	Presents guidelines for assuring safety through proper grounding of AC outdoor substations.
National Electrical Safety Code (NESC), ANSI C2, Section 9, Article 92, Paragraph E; Article 93, Paragraph C.	Covers grounding methods for electrical supply and communications facilities.

6.4.4 Communications Interference

The applicable LORS pertaining to communication interference are presented in Table 6.4-4.

Table 6.4-4. Communications interference LORS.

LORS	Applicability
Title 47 CFR Section 15.25, "Operating Requirements, Incidental Radiation"	Prohibits operations of any device emitting incidental radiation that causes interference to communications. The regulation also requires mitigation for any device that causes interference.
General Order 52 (GO-52), CPUC	Covers all aspects of the construction, operation, and maintenance of power and communication lines and specifically applies to the prevention or mitigation of inductive interference.
CEC staff, Radio Interference and Television Interference (RI-TVI) Criteria (Kern River Cogeneration) Project 82-AFC-2, Final Decision, Compliance Plan 13-7	Prescribes the CEC's RI-TVI mitigation requirements, developed and adopted by the CEC in past siting cases.

6.4.5 Aviation Safety

Table 6.4-5 lists the aviation safety LORS that may apply to the proposed construction and operation of the REP.

Table 6.4-5. Aviation safety LORS.

LORS	Applicability
Title 14 CFR Part 77 "Objects Affecting Navigable Airspace"	Describes the criteria used to determine whether a "Notice of Proposed Construction or Alteration" (NPCA, FAA Form 7460-1) is required for potential obstruction hazards.
FAA Advisory Circular No. 70/7460-1G, "Obstruction Marking and Lighting"	Describes the FAA standards for marking and lighting of obstructions as identified by Federal Aviation Regulations Part 77.
Public Utilities Code (PUC), Sections 21656-21660	Discusses the permit requirements for construction of possible obstructions in the vicinity of aircraft landing areas, in navigable airspace, and near the boundary of airports.

6.4.6 Fire Hazards

Table 6.4-6 tabulates the LORS governing fire hazard protection for the REP project.

Table 6.4-6. Fire hazard LORS.

LORS	Applicability
Title 14 CCR Sections 1250-1258, "Fire Prevention Standards for Electric Utilities"	Provides specific exemptions from electric pole and tower firebreak and electric conductor clearance standards, and specifies when and where standards apply.
ANSI/IEEE 80 "IEEE Guide for Safety in AC Substation Grounding"	Presents guidelines for assuring safety through proper grounding of AC outdoor substations.
General Order 95 (GO-95), CPUC, "Rules for Overhead Electric Line Construction" Section 35	CPUC rule covers all aspects of design, construction, operation, and maintenance of electrical transmission line and fire safety (hazards).

6.4.7 Involved Agencies and Agency Contacts

Table 6.4-7 identifies national, state, and local agencies with jurisdiction to issue permits or approvals, conduct inspections, and/or enforce the above referenced LORS. Table 6.4-7 also identifies the associated responsibilities of these agencies as they relate to the construction and operation of the REP.

Table 6.4-7. Jurisdiction.

Agency or Jurisdiction	Responsibility
California Energy Commission (CEC)	Jurisdiction over new transmission lines associated with thermal power plants that are 50 megawatts (MW) or more (PRC 25500).
CEC	Jurisdiction of lines out of a thermal power plant to the interconnection point to the utility grid (PRC 25107).
CEC	Jurisdiction over modifications of existing facilities that increase peak operating voltage or peak kilowatt capacity 25 percent (PRC 25123).

Table 6.4-7. Jurisdiction.

Agency or Jurisdiction	Responsibility
Federal Aviation Administration (FAA)	Establishes regulations for marking and lighting of obstructions in navigable airspace (AC No. 70/7460-1G).
Local Electrical Inspector	Jurisdiction over safety inspection of electrical installations that connect to the supply of electricity (NFPA 70).
Cal-ISO	Provides Final Interconnection Approval.
City of Roseville	Establishes and enforces zoning regulations for specific land uses. Issues variances in accordance with zoning ordinances. Issues and enforces certain ordinances and regulations concerning fire prevention and electrical inspection.

6.5 REFERENCES

City of Roseville. 2003. Draft West Roseville Specific Plan. Prepared by EIP Associates. Prepared for City of Roseville. September 15, 2003.

Electric Power Research Institute. 1978. 115-138-kV compact line design. In: *Transmission line reference book.* Palo Alto, California.

IEEE Power Engineering Society. 1985. Corona and field effects of AC overhead transmission lines, information for decision makers. July, 1985. New York, NY.

Pacific Gas & Electric (PG&E). 1998. *PG&E Interconnection Handbook.*

7.0 WATER SUPPLY

This chapter describes the quantity and quality of water required, the primary and back-up water supply sources, water quality, and waste water discharges for the Roseville Energy Park (REP).

7.1 WATER SUPPLY AND USE

The City of Roseville will provide the industrial process water supply for the REP from the Pleasant Grove Waste Water Treatment Plant (PGWWTP). The PGWWTP will supply tertiary treated recycled water to meet cooling and process makeup requirements. Cooling and process demands include water for cooling tower evaporation, drift, and blow down; steam cycle makeup, combustion turbine-generator (CTG) air inlet cooling; CTG wash water; CTG water injection for control of oxides of nitrogen (NO_X) and increased power output (GE LM6000 PC SPRINT alternative only). A "will-serve" letter from the City that describes the City's commitment of recycled water supply to the project and to accept sanitary waste water is included in Appendix 7-A. A one-million gallon tank will be constructed on site to store recycled water.

Water required for potable uses (sinks, toilets, showers, drinking fountains, eye wash/safety showers, etc.) will initially be provided from an existing well located on the REP site. Once the West Roseville annexation has taken place, the City of Roseville potable distribution system will eventually be extended to serve the area surrounding the REP site. At this time, the REP potable water system will be connected to the City water main, and the onsite well will be disconnected.

Roseville Electric has chosen to prepare this Application for Certification to allow the flexibility to use either General Electric LM6000 PC SPRINT (GE LM6000) combustion turbines or Alstom GTX100 combustion turbines. In support of this, the following water balances are included:

- Base load operation under average ambient conditions assuming GE LM6000 combustion turbines are used (Figure 7.1-1)
- Peak load operation under summer ambient conditions assuming GE LM6000 combustion turbines are used (Figure 7.1-2)
- Base load operation under average ambient conditions assuming Alstom GTX100 combustion turbines are used (Figure 7.1-3)
- Peak load operation under summer ambient conditions assuming Alstom GTX100 combustion turbines are used (Figure 7.1-4)

As shown in these water balances, the design using GE LM6000 combustion turbines will consume slightly more water than the design using Alstom GTX combustion turbines. In order to represent the worst-case water demands, the following discussion will focus on the GE LM6000 design.

Operation of the REP will require approximately 491 gpm (or 0.71 mgd) of recycled water for operation at base load under average ambient conditions (62° F). Base load operation assumes both CTGs operating at 100 percent load with no heat recovery steam generator (HRSG) duct firing. Under summer ambient conditions (99° F), the REP will require approximately 1,189 gpm (or 1.71 mgd) of recycled water for operation at peak load. Peak load operation assumes both CTGs operating at 100 percent load with maximum HRSG duct firing. On an annual basis, the REP is estimated to require up to 1,247 acre-

feet of recycled water, assuming that the facility operates at its full permitted output. REP potable water demands are estimated to average 0.5 gpm, less than 1 acre-foot annually.

7.2 WATER QUALITY

Table 7.2-1 lists the quality of the PGWWTP recycled water and the potable water from the existing well located on the REP site.

7.3 WATER TREATMENT

The recycled water is suitable for use as cooling tower makeup and as feedwater for the process makeup water treatment system. No additional treatment will be required for the makeup water to the cooling tower. Process water will be demineralized as required by the various uses. As shown in the water balances, most of the makeup to the process-water treatment system will be distillate from the REP's zero liquid discharge (ZLD) system. This distillate will be passed through off-site regenerated mixed-bed demineralizers to produce very high-quality demineralized water to serve the process water demands described above in Section 7.1. When insufficient ZLD distillate exists to provide the necessary makeup to the process-water treatment system, recycled water will be used to supplement the distillate. Because the recycled water is poorer quality than the distillate, it will be pre-treated via a multi-media filter and reverse osmosis system to remove any suspended solids and most of the dissolved solids.

7.4 WASTE WATER COLLECTION, TREATMENT, AND DISPOSAL

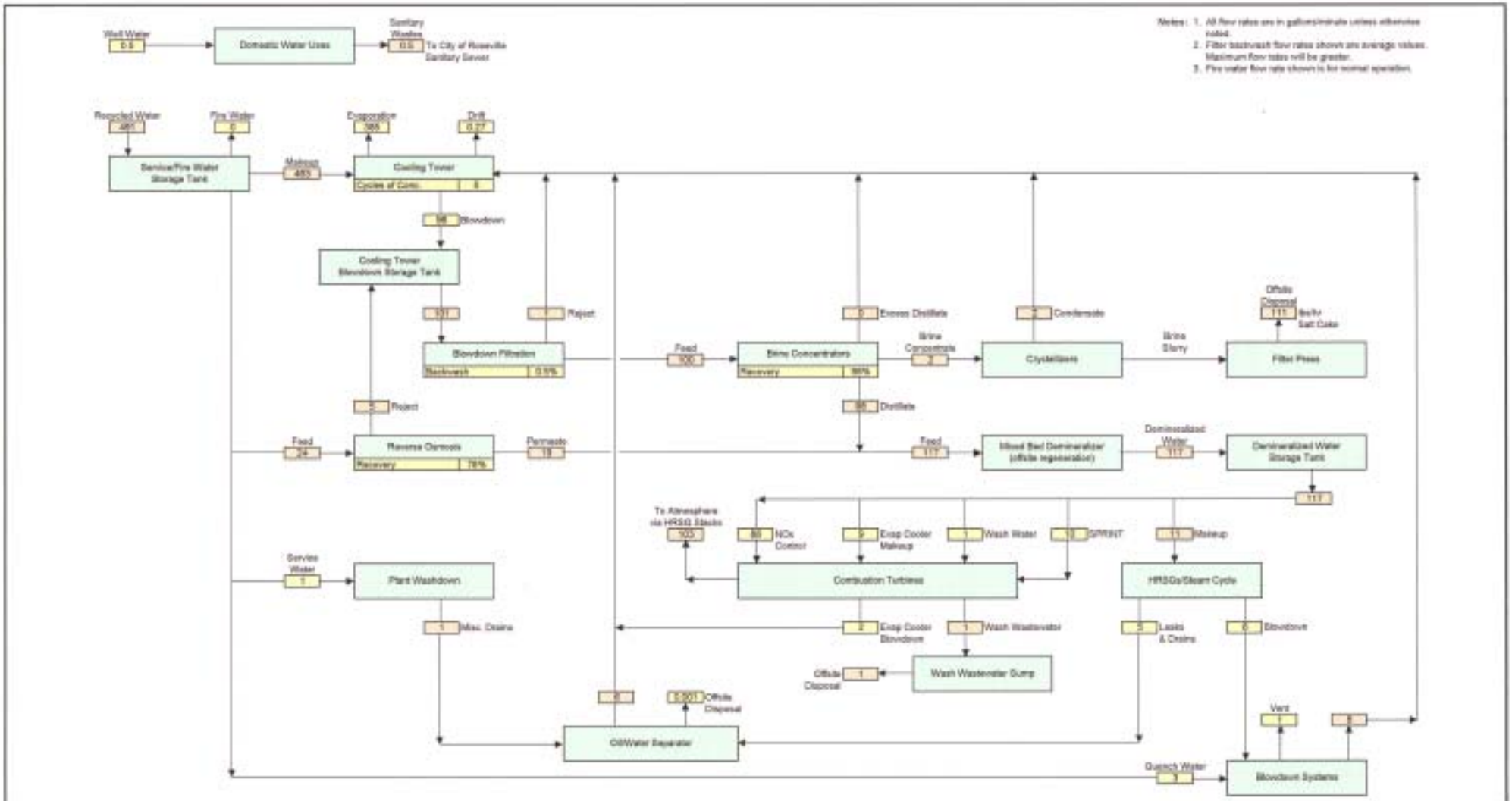
The REP will use a ZLD system to treat cooling tower blowdown and other process waste streams. The offsite discharge of project wastewater will consist solely of sanitary wastewater and the salt cake resulting from the ZLD process.

7.4.1 Cooling Tower Blowdown

Circulating (or cooling) water system blowdown will consist of recycled water that has been concentrated to approximately 5 cycles of concentration, and residues of the chemicals added to the circulating water. These chemicals will control scaling and biological growth in the cooling tower and corrosion of the circulating water piping and condenser tubes. Cooling water treatment will require the addition of a pH control agent (acid), a mineral scale dispersant (i.e., polyacrylate polymer), corrosion inhibitors (phosphate based), and biocide (i.e., sodium hydroxide or equivalent). The estimated quality of the circulating water is listed in Table 7.4-1. Operating at 5 cycles of concentration, the volume of lowdown is expected to be about 96 to 116 gpm under average conditions and about 267 to 278 gpm under peak conditions. This waste stream will be treated by the on-site ZLD system. Because the project incorporates a ZLD system, operating at even lower cycles of concentration will not result in a noticeable increase in the overall recycled water demand, but will result in the need for a larger ZLD system.

7.4.1.1 Zero Liquid Discharge System

The ZLD uses three concentration steps: 1) the cooling tower, 2) brine concentrators, and 3) crystallizers. Process wastewater streams including the oil/water separator effluent, filter backwash, quenched heat recovery steam generator (HRSG) blowdown, crystallizer condensate, and excess brine concentrator distillate will be directed to the cooling tower for initial concentration. The cooling tower concentrates these streams to a point near the mineral solubility



Rev.	Description	By	Date
5.00	Re-issued for AFC	JAM	10/15/03
4.00	Issued for AFC	JAM	10/9/03
3.00	Included makeup RO Train	JAM	8/23/03
2.00	Updated development HR's and Alltech CT's	JAM	8/18/03
1.00	Initial format and calculations	JAM	

Design Case: GE LM6000 Combustion Turbines
Base Load - Average Ambient
Configuration: 2 x 1, HPD Amb. Pressure: 14.64 psia
Dry Bulb Temp.: 62 deg F Wet Bulb Temp. 53 deg F
CTG Inlet Air Cooling On
CTG SPRINT: On
HRSG Duct Firing: Off

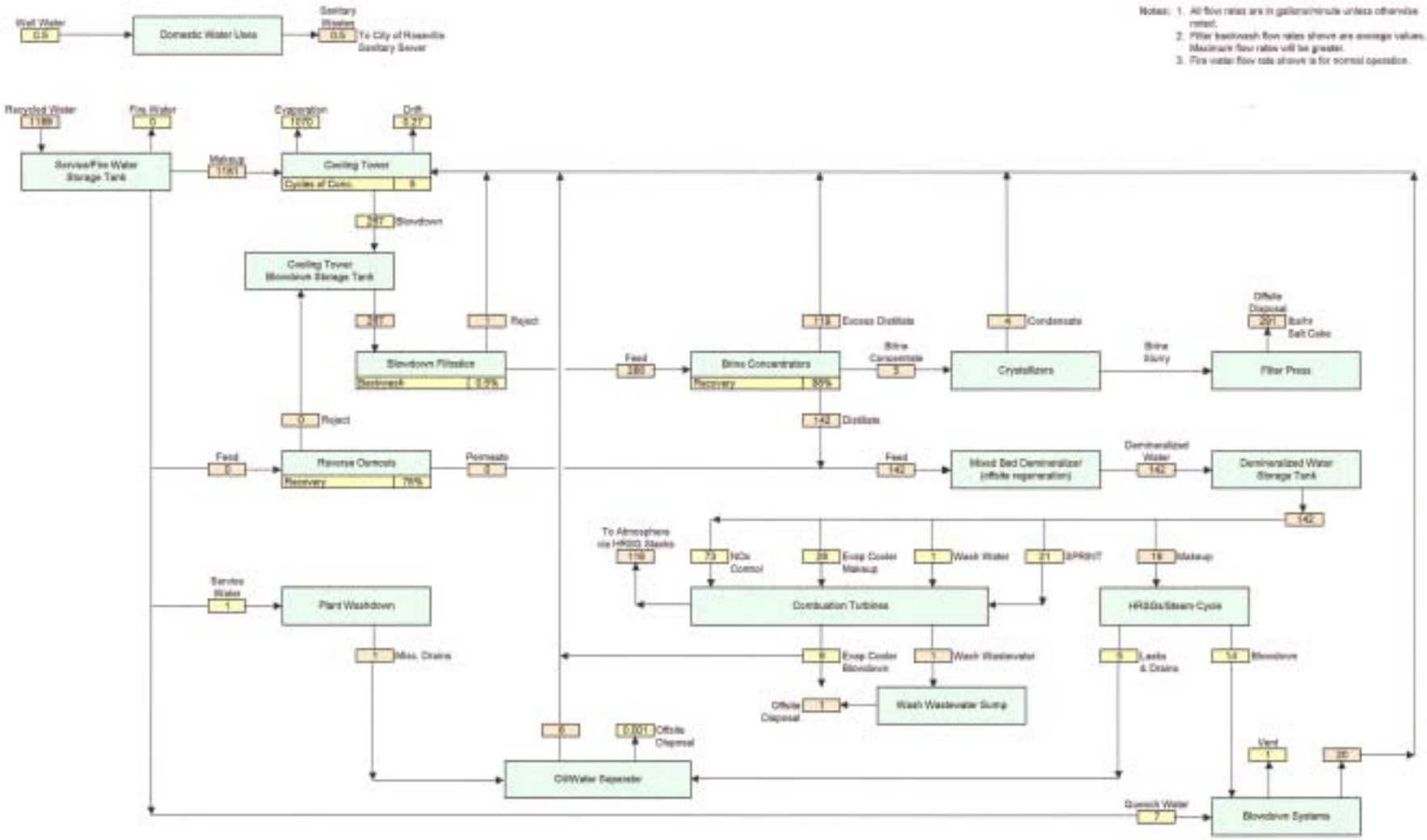
CALPINE

Roseville Energy Park

Water Balance (GE LM6000), Average Ambient

Figure 7.1-1

Rev. 4.00



Rev.	Description	By	Date
5.00	Re-issued for AFC	JAM	10/15/03
4.00	Issued for AFC	JAM	10/9/03
3.00	Included makeup RO Train	JAM	8/23/03
2.00	Updated development HRs and Alstom CTs	JAM	8/18/03
1.00	Initial format and calculations	JAM	

Design Case:	GE LM6000 Combustion Turbines Peak Load - Summer Ambient
Configuration:	2 x 1, HPD Amb. Pressure: 14.64 psia
Dry Bulb Temp.:	99 deg F Wet Bulb Temp 70 deg F
CTG Inlet Air Cooling:	On
CTG SPRINT:	On
HRSG Duct Firing:	On

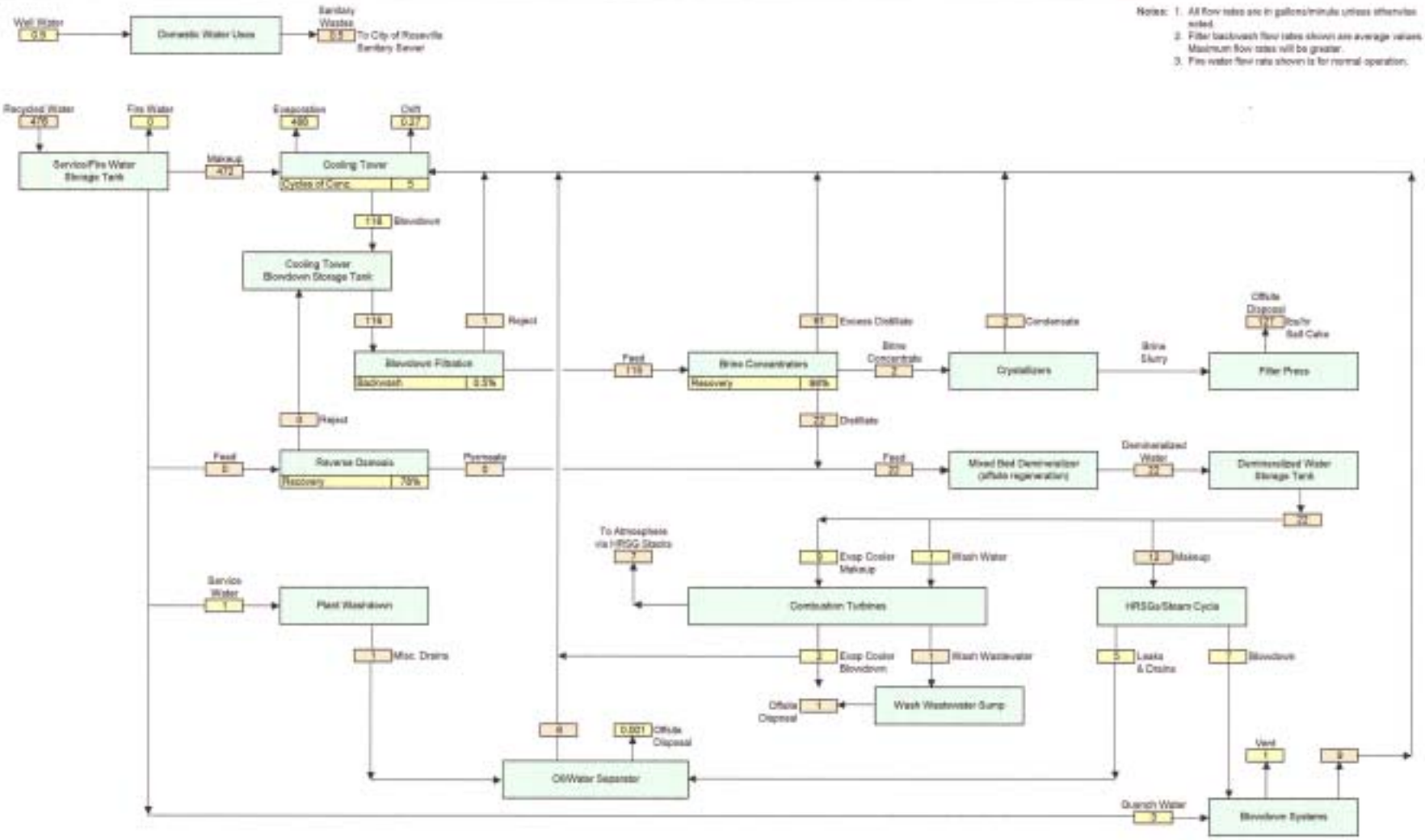
CALPINE

Roseville Energy Park

Water Balance (GE LM6000) Summer Ambient

Figure 7.1-2

Rev. 5.00



Rev.	Description	By	Date
5.00	Re-issued for APC	JAM	10/15/03
4.00	Issued for APC	JAM	10/9/03
3.00	Included makeup RO Train	JAM	9/23/03
2.00	Updated development HB's and Allowin CT's	JAM	8/18/03
1.00	Initial format and calculations	JAM	

Design Case:	Alstom GT13E2 Combustion Turbines
	Base Load - Average Ambient
Configuration:	2 x 1, HFD
Ambient Pressure:	14.64 psia
Dry Bulb Temp.:	62 deg F
Wet Bulb Temp.:	53 deg F
CTG Inlet Air Cooling	On
CTG SPRINT:	N/A
HRSG Duct Firing	Off

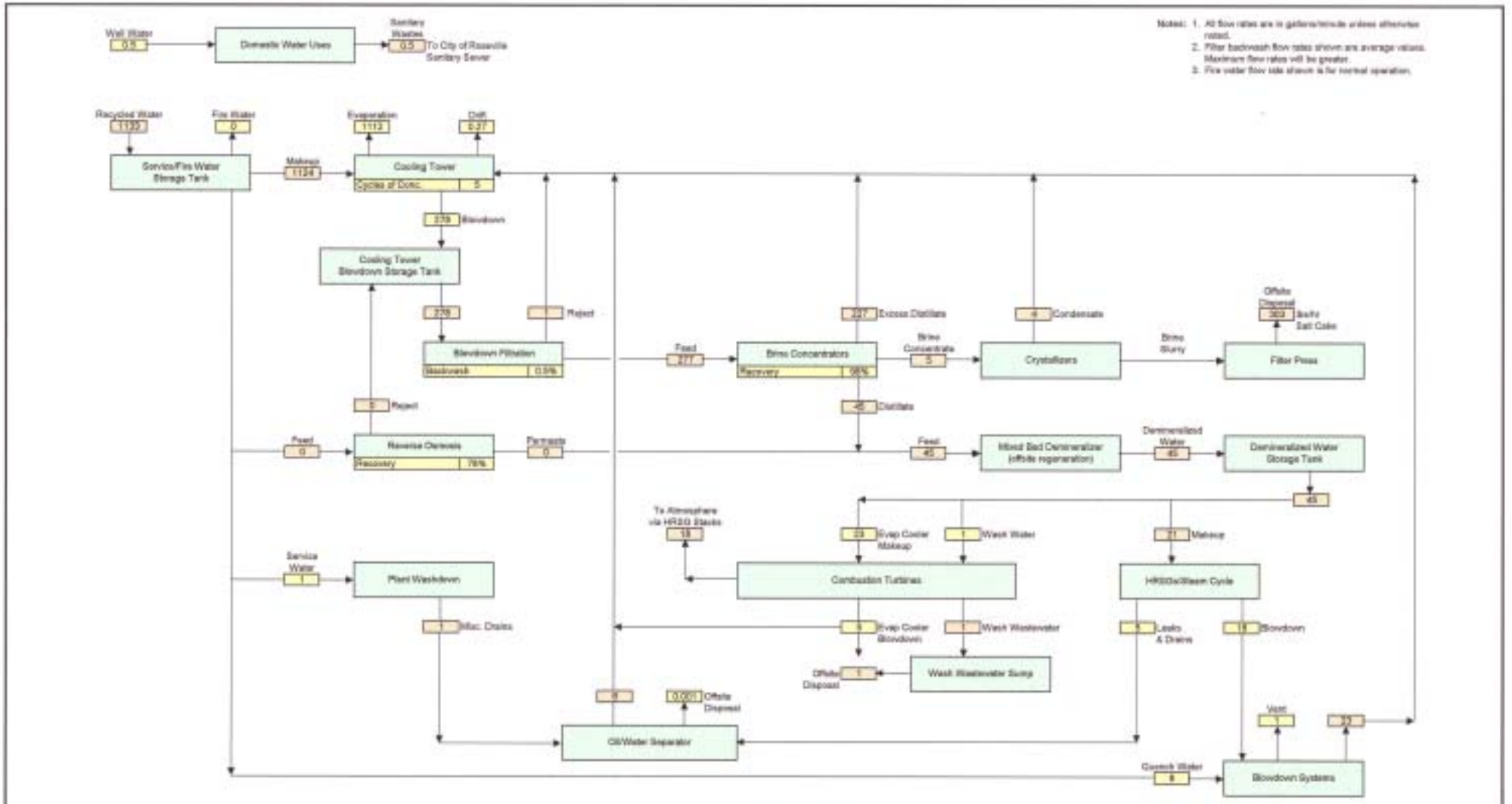
CALPINE

Roseville Energy Park

Water Balance (Alstom GT13E2), Average Ambient

Figure 7.1-3

Rev. 5.00



Rev.	Description	By	Date
5.00	Re-issued for APC	JAM	10/15/03
4.00	Issued for APC	JAM	10/9/03
3.00	Included makeup RO Train	JAM	8/25/03
2.00	Updated development HR's and Allpam CT's	JAM	6/18/03
1.00	Initial format and calculations	JAM	

Design Case:	Alstom GTX100 Combustion Turbines
	Peak Load - Summer Ambient
Configuration:	2 x 1, HPD
Dry Bulb Temp.:	89 deg F
CTG Inlet Air Cooling	On
CTG SPRINT:	N/A
HRSG Duct Firing:	On
Ambt. Pressure:	14.64 psia
Wet Bulb Temp:	72 deg F

CALPINE

Roseville Energy Park

Water Balance (Alstom GTX100), Summer Ambient

Figure 7.1-4

Rev. 5.00

Table 7.2-1. Summary of average water quality characteristics for potential sources of project water.

Water quality parameter	PGWWTP recycled water (cooling and process supply)[a]	Onsite well supply (potable supply)	Drinking water standard
Turbidity	-	0.25	1-5 ntu
Color	-	3	3 ACU
Odor Threshold	-	2	3 units
pH	6.9	8.0	6.0 – 9.0 units
Total Alkalinity (as $CaCO_3$)	65	101	no standard (mg/l)
Bicarbonate (as $CaCO_3$)	65	123	no standard (mg/l)
Total Dissolved Solids	415	250	1,500 mg/l
Nitrate as NO_3	7.6	1.0	45 mg/l
Fluoride	1.4	0.21	2 mg/l
Chloride	120	34	500 mg/l
Hardness (as $CaCO_3$)	140	109	200 mg/l
Arsenic	-	5.1	0.05 mg/l
Calcium	46	19	no standard (mg/l)
Magnesium	6	15	no standard (mg/l)
Sodium	84	24	350 mg/l
Potassium	20	1.3	no standard (mg/l)
Silica (as SiO_2)	25	89	no standard (mg/l)
Sulfate	40	7.1	500 mg/l
Chromium	-	7.5	0.05 mg/l
Iron	0.21	Non-detect	0.30 mg/l
Boron	-	0.17	no standard (mg/l)

[a]Data are from Dry Creek Waste Water Treatment Plant (since PGWWTP is not yet in operation).

limit for the constituents of concern. A portion of this concentrated water will then be removed from the cooling tower via the blowdown to prevent the mineral scale formation on heat transfer surfaces.

Cooling tower blowdown and the reject stream from the reverse osmosis system will be collected in a storage tank that will minimize flow variations in feeding blowdown to the brine concentrators. After the blowdown storage tank, the cooling tower blowdown will pass through a filter to remove suspended solids, as required, to minimize fouling of downstream ZLD equipment.

In the brine concentrators, heat will be applied to evaporate approximately 96 percent of the feed water. The concentrated brine will be sent to crystallizers. The water evaporated by the brine concentrators will be reclaimed using a condenser producing a distillate very low in TDS. This distillate will be stored in a tank from which it will be pumped through off-site-regenerated, mixed-bed ion exchange demineralizers. Demineralized water exiting the mixed-bed demineralizers will be stored in the demineralized water storage tank for use in the combustion turbines and HRSG steam cycle.

The crystallizers will further concentrate the brine solution, producing a salt sludge that will be dewatered using either a filter press or belt press. Condensate from the crystallizers will be recycled to

Table 7.4-1. Estimated circulating water quality.

Contaminant	Units	Cooling Tower Blowdown at 5 Cycles
Alkalinity-bicarbonate	mg/L	140
Alkalinity-carbonate	mg/L	0
Alkalinity-P-$BaCl_2$	mg/L	0
Alkalinity-phenol	mg/L	0
Alkalinity-total	mg/L	140
Ammonia	mg/L	<1
Chloride	mg/L	519
Fluoride	mg/L	6.1
Hardness-calcium	mg/L	199
Hardness-magnesium	mg/L	26
Iron	mg/L	0.9
Nitrate as NO_3	mg/L	33
pH	s.u.	7.6
Phosphate	mg/L	12
Potassium	mg/L	86
Silica	mg/L	108
Sodium	mg/L	364
Sulfate	mg/L	294
Total dissolved solids	mg/L	1800
Temperature	Degrees F	78

the cooling tower basin. The salt cake exiting the press will be discharged to a storage bin. The relatively dry salt cake will be trucked offsite for disposal at an appropriate landfill. Naturally occurring substances, such as trace metals present in the REP source water, will become concentrated in the salt. Table 7.4-2 includes a projected analysis of the salt cake based on the recycled water quality indicated in Table 7.2-1. Operation of the REP will produce approximately 111 lbs/hr of salt cake during operation at base load under average ambient conditions (62° F) and 291 lbs/hr of salt cake during operation at peak load under summer ambient conditions (99° F), with the GE LM6000 combustion turbine. With the Alstom GTX100, the corresponding figures would be 127 lbs/hr during average ambient conditions, and 303 lbs/hr during summer ambient conditions. On an annual basis, the REP is estimated to generate up to 121 tons/yr of salt cake, assuming that the facility operates at its full permitted output.

7.4.1.2 Drift Elimination

Since high efficiency drift eliminators will be used in the cooling towers, the amount of total dissolved solids (TDS) emitted to the atmosphere will be very low. The drift quality is equivalent to the blowdown quality. The drift volume is typically expressed as a percentage of the circulating water rate (in this case 0.0005 percent of 54,400 gpm, or 0.27 gpm). At 5 cycles of concentration, the TDS in the drift is expected to be approximately 1,800 mg/L. The TDS emitted from the cooling tower in the form of drift is treated as a particulate emission (PM_{10}). In order to conservatively estimate the cooling tower particulate emissions, the TDS was assumed to be 5,000 mg/l. At a drift rate of 0.27 gpm, this is equivalent to about 0.7 lbs/hr of particulate emissions (see Section 8.1, Air Quality).

Table 7.4-2. Salt cake constituents.

Constituent	Percent
Alkalinity-Bicarbonate	<0.01%
Alkalinity-Carbonate	0.0%
Alkalinity-P-BaCl2	0.0%
Barium	0.0%
Chloride	29.5%
Fluoride	0.3%
Calcium	11.3%
Magnesium	1.5%
Iron	0.1%
Nitrate	1.9%
Phosphate	0.7%
Potassium	4.9%
Silica	6.1%
Sodium	20.7%
Sulfate	23.0%

7.4.2 Sanitary Waste Water

Sanitary waste water from sinks, toilets, showers and other sanitary facilities will be discharged to the PGWWTP via a pipeline connection to the existing PGWWTP influent junction structure approximately 800 feet east of the REP site. The sanitary waste water flow will average about 0.5 gpm (1,450 gpd).

7.4.3 Plant Drainage

Miscellaneous general plant drainage will consist of sample drainage, equipment leakage, and drainage from facility containment areas. Water from these areas will be collected in systems of floor drains, sumps, and pipes within the REP and discharged to an oil/water separator. The oil-free discharge water will be recycled to the cooling tower basin. An average flow of 1 gpm and a peak flow of 50 gpm are projected. The water will have essentially the same characteristics as the recycled water supplied to REP. The site plan in Appendix 7-B is shows plant drainage after construction and indicates how best management practices would be applied for storm water. Plant drainage and storm water discharge permitting is addressed further in Section 8.15, Water resources. Appendix 7-C contains a description of the sizing criteria for the storm water detention ponds.

8.0 ENVIRONMENTAL INFORMATION

This chapter contains 16 individual sections, each with a divider and tab heading. The sections represent the 16 environmental, public health and safety, and local impact assessment disciplines for which the California Energy Commission Energy (CEC) Facilities Siting Regulations (Title 20, California Code of Regulations, Section 1704, Appendix B) require information in an Application for Certification (AFC). The sections have a standardized format under the following headings:

- Introduction
- Affected Environment
- Environmental Consequences
- Cumulative Impacts
- Mitigation Measures
- Laws, Ordinances, Regulations, and Standards
- Agency Contacts
- Permit Requirements and Permit Schedules

The Introduction briefly describes the subject matter and organization of each section. Affected Environment includes relevant background information about the project's environmental, social, and regulatory settings. Environmental Consequences analyzes the potential environmental consequences of the construction and operation of the Roseville Energy Park (REP). The section begins with a list of the criteria used to determine whether environmental effects of the project qualify as significant adverse environmental impacts. Cumulative Impacts discusses potential effects of the project that are not significant adverse impacts, but that could reach significance cumulatively in combination with other projects. Mitigation Measures describes any mitigation measures necessary to reduce potential impacts below the level of significance. Laws, Ordinances, Regulations, and Standards (LORS) discusses and lists the LORS that pertain to the project for a given discipline and includes a demonstration that the project, as designed, would comply with all applicable LORS. Agency Contacts is a list of federal agencies with permitting authority over the project, and state and local regulatory agencies that would have such permitting authority, but for the exclusive purview of the CEC to license thermal power plants greater than 50 MW in capacity in California. This section also contains a list of regulatory agency staff and their contact information. Permit Requirements and Permit Schedules lists what these permits would be.

Further explanation is helpful in understanding the structure of this AFC. The REP will be located in an area that is a small (about 200 acres), noncontiguous part of the City of Roseville. Along with the Pleasant Grove Waste Water Treatment Plant (PGWWTP), the parcel on which the REP will be located is surrounded by unincorporated Placer County. There is currently a proposal before the City of Roseville, however, to annex 3,162 acres that surround the REP parcel and PGWWTP on three sides and to develop this land in accordance with the West Roseville Specific Plan (WRSP). Though the REP parcel does not lie within the WRSP area proper, the WRSP was developed incorporating the baseline assumption that a power plant would be located at the REP site at some time in the future.

The City of Roseville has recently (September 15, 2003) published the WRSP and a Draft Environmental Impact Report (EIR) for the WRSP as well as a sphere of influence amendment that includes additional land north and south of the WRSP area, also in unincorporated Placer County. At the time this AFC is

being filed, public hearings are underway regarding this proposal, and the City Council is expected to review the proposal on December 3rd and 17th, 2003. It is, therefore, possible that the planning context for the REP will formally change at approximately the same time as the CEC Staff begins evaluating the REP's application, if the WRSP and annexation are approved. It is also possible that the WRSP will be denied or delayed indefinitely, in which case the area surrounding the REP parcel and PGWWTP will remain part of unincorporated Placer County while the REP is constructed.

Though it appears likely that the annexation of West Roseville will take place and that the City of Roseville will approve the WRSP for eventual build-out, it is not possible to foresee the outcome of the WRSP annexation and development proposal. The REP project was, therefore, developed with the WRSP in mind, but also with an alternative plan in case the WRSP and annexation are denied or are not approved in a time period that would allow the REP project to be evaluated in this planning context. Specifically, the denial or delay of the WRSP approval and annexation would require RE to choose a natural gas pipeline alternative that uses existing roadway alignments (Alternative B1), rather than new alignments that are proposed as part of the WRSP. In addition, RE plans to connect the REP to the WRSP's new 60 kV distribution line that will run along the existing alignment of Phillip Road adjacent to the REP, and will loop through the REP switchyard. If the WRSP proposal is unsuccessful, however, or delayed indefinitely, this new transmission line will not be available. In this case, RE will build a new 60 kV, double-circuit transmission line for the REP, extending from the REP site to the RE/Western Area Power Administration Fiddyment Receiving Station/Substation (about 3.2 miles).

The need to plan the REP in conjunction with the WRSP presents some interesting challenges for the preparation of an AFC. A California Environmental Quality Act (CEQA) analysis of the environmental effects of the REP must consider the condition of the project environment and setting at the time the proposal is made. Though a relatively detailed picture of how the development of West Roseville in the areas near the REP may unfold is available through the WRSP development proposal process, it is impossible to predict specific project effects on specific conditions or land uses in any but a general way before those conditions or land uses are in place. In any event, it is still possible that the WRSP proposal will not move forward or will change. CEQA, however, does require an examination of a proposed undertaking's effects in combination with reasonably foreseeable future developments as potential cumulative impacts. The build-out of the WRSP is clearly a reasonably foreseeable future development, even as a proposal. In this document, therefore, there are discussions of the WRSP as planned in the cumulative effect sections. There are also, where appropriate, general discussions of the uses that are planned for West Roseville and their interaction with the REP.

As mentioned above, it is also necessary for RE to plan for the contingency that the WRSP and annexation could be denied or delayed. For this reason, every environmental section that involves an analysis of project effects on the environment contains a section titled "Without West Roseville Annexation." This section is located near the end of the Environmental Consequences Section and is immediately before the Cumulative Effects section. It describes how the REP project's effects would be different if the annexation of West Roseville and build-out of the WRSP were to be denied or delayed indefinitely. For most disciplines, these differences are relatively minor, since they tend to relate to the routing of the natural gas pipeline and the construction of a transmission line. Furthermore, many of the effects of construction along gas Alternative B1 or the transmission line are considered in previous subsections in discussions of other gas pipeline alternative routings. These routings will be implemented in conjunction with the WRSP and cover most of the same ground as gas Alternative B1 and the transmission line.

8.1 AIR QUALITY

8.1.1 Air Quality Setting

This section describes the existing air quality conditions in the Roseville Energy Park (REP) area, the maximum potential impacts from the REP, and the mitigation measures that will be utilized to keep project impacts below applicable thresholds of significance. The Roseville Energy Park (REP) will be a natural gas-fired, combined-cycle electrical generating facility rated at a nominal net generating capacity of 120 to 125 megawatts (MW), with the ability to geneate to 160 MW with duct firing. The REP power train will consist of: 1) two General Electric LM6000 PC SPRINT or Alstom GTX100 combustion turbine-generators (CTGs), equipped with water injection (for the LM6000) or dry low-NO_x combustors (for the GTX100) to control oxides of nitrogen (NO_x) and evaporative coolers for reducing inlet air temperatures; 2) two heat recovery steam generators (HRSGs) with duct burners; 3) selective catalytic reduction (SCR) and oxidation catalyst equipment to control NO_x and carbon monoxide (CO) emissions, respectively; 4) a single condensing steam turbine generator (STG); 5) a deaerating surface condenser; 6) a mechanical draft cooling tower; and, 7) associated support equipment, including an auxiliary boiler, fire-pump, and emergency generator.

Each CTG will generate approximately 43 to 47 MW at annual average ambient conditions. The CTG exhaust gases will be used to generate steam in the HRSGs. The HRSGs will employ a two-steam-pressure design with duct firing equipment. Steam from the HRSGs will be admitted to a condensing STG. The STG will produce a maximum of 75 to 87 MW under average annual ambient conditions with HRSG duct firing. The project is expected to have an overall annual availability of approximately 95 percent.

8.1.1.1 Geography and Topography

The proposed REP project site is situated in a transition zone between the Sierra Nevada Mountains and the Central Valley of California, within the Sacramento Valley. In this area, broad alluvial fans extend from the Sierra Nevada Mountains in the east toward sedimentary deposits in the Sacramento Valley to the west. A regional location map is shown on Figure 1.1-2.

The terrain in the vicinity of the plant site is characterized as generally flat with rolling foothills and the Sierra Nevada Mountains to the east, and the Sacramento Valley extending to the north, west and south. The terrain elevation on the plant site is approximately 95 feet above mean sea level (amsl). Terrain elevations rise to the proposed stack top height at a distance of approximately 9.5 km east of the site. The overall terrain in the vicinity slopes gently downward in a westward direction toward the Sacramento Valley. At present, the area surrounding the site is generally undeveloped with some agricultural land uses.

The site is approximately 4.6 miles from the Sutter County line to the west, and 4.4 miles from the Sacramento County line to the south. The proposed site is located in southwestern Placer County on undeveloped City of Roseville property, approximately 5 miles northwest of downtown Roseville. The site is adjacent to Phillip Road, an existing, publicly maintained, paved roadway. The Pleasant Grove Waste Water Treatment Plant (PGWWTP), currently under construction, is located on the southern side of Phillip Road across the road from the REP site. The center of the north turbine stack location is 640,597 meters Easting and 4,294,856 meters Northing (NAD 27) (UTM Zone 10 coordinates).

Figure 8.1-1 shows the terrain within 6 miles of the project. In addition, Figure 8.9-1 shows terrain features for 10 miles around the site as well as terrain above the stack height.

8.1.1.2 Climate and Meteorology

Climate

The proposed REP is located in Placer County, in the southern part of the Sacramento Valley Air Basin. The overall climate of California and including the Central Valley is characterized as "Mediterranean," with overall moderate annual temperatures and precipitation occurring primarily during the winter months. The meteorology is dominated by a semi-permanent high-pressure system over the eastern Pacific Ocean off the coast of California. The center of the high-pressure system varies northward and southward. Its position strongly influences the weather in the region.

In the summer, the high-pressure center is located further north, often resulting in a strong subsidence inversion and clear skies inland, including the Central Valley. Summer daytime temperatures are typically hot to moderate in the interior valleys of California and little to no precipitation occurs during that time (less than half an inch, on average). Most of the area's precipitation occurs during the winter months, averaging about 12 inches during this period (December through February).

The transitional periods of spring and autumn are characterized with warm, mild temperatures, on average. Some precipitation does occur during the spring and autumn periods.

Temperature

The Sacramento Valley Air Basin climate is characterized by relatively moderate seasonal differences in temperature. Seasonal temperature differences in the region reflect influences of the somewhat more extreme desert and continental climates of inland to the east, with the more moderate effects of maritime weather influences to the west. Winter temperatures range from 15 degrees Fahrenheit (°F) at night to 74°F during the daytime at the extremes. However, winter low and high temperatures average from lows of about 35°F to highs of approximately 55°F. The January mean maximum temperature in Rocklin, for the 28-year period from 1948 to 1976 is 53°F, while the July mean maximum temperature is 97°F. Diurnal temperature differences range on average from 19°F in January to 39°F in July. Summer nighttime and daytime temperature extremes range from as low as 39°F at night to 115°F during the daytime, but more typically are on the order of about 56°F and 94°F, respectively. The transitional periods of spring and autumn are relatively mild.

Precipitation

During the summer, migrating storm systems are blocked by the semi-permanent Pacific high, resulting in low rainfall. During the winter, the offshore high moves southward toward Hawaii. Winter storm systems originating in the Gulf of Alaska then often exert a stronger influence on the meteorology and bring wind and rain. Approximately 80 percent of the rainfall occurs during November through March. Most of the area's precipitation occurs during the winter months, averaging about 12 inches during this period (December through February). The transitional periods of spring and autumn have some precipitation, although not as much as during the winter. The area receives about 5.3 of rain during spring and 4.8 inches in the fall. Hail has been known to fall from time to time in the area. Very rarely, the region may receive a light dusting of snow, but this typically only takes place once every several years and is considered an exceptional event. Annual rainfall totals about 23 inches. Monthly mean values of precipitation at Rocklin range from 4.7 inches in January to 0.06 inch in August.

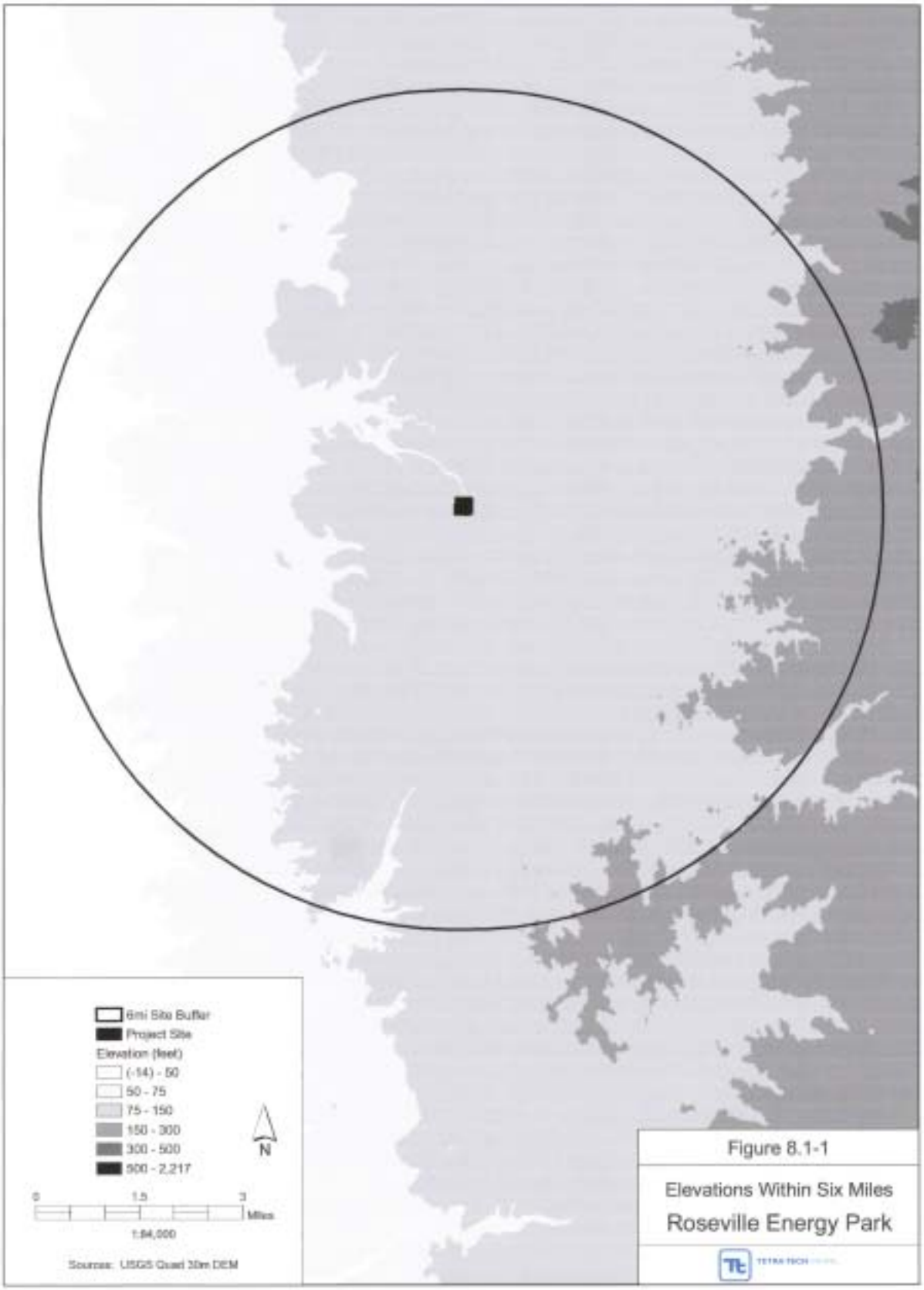


Figure 8.1-1

Elevations Within Six Miles

Roseville Energy Park

Relative Humidity

The relative humidity in summer is moderate, averaging 78 percent in the early morning hours, and about 30 percent during the late afternoon. As might be expected for the season during which most of the annual precipitation occurs, humidity during the winter months ranges between 90 percent, in the early morning hours, and 60 to 70 percent, during late afternoon. Heavy fog sometimes occurs, mostly in midwinter, never in summer and seldom in spring or autumn. Light to moderate fog is more frequent and occurs anytime during the wet, cold season. Occasionally, under stagnant meteorological conditions, a winter fog may persist for several days.

Winds

Wind and mixing height are two key meteorological parameters that govern the potential for air pollution problems. The predominant winds in California are shown in Figures 8.1-2 through 8.1-5 (all of the figures in this section area located at the end of the section). As the figures indicate, winds in California are generally light and easterly in the winter, but strong and westerly in the spring, summer, and fall.

Wind patterns in the project area are presented in Figures 8.1.6a through 8.1-6e, which are cumulative annual and quarterly wind roses for McClellan Air Force Base (AFB) meteorological station (1992 to 1996), approximately 7 miles south of the REP. These data were used in the dispersion modeling analysis and are considered representative of wind patterns in the area of the proposed REP site. A detailed discussion of the McClellan AFB meteorological data used in the ambient air quality impact analysis can be found in Section 8.1.5, Air Quality Modeling Methodology.

Prevailing winds in the local region are south to southeasterly (except during November when the prevailing winds are from the north-northwest). Steep air pressure gradients occasionally form to the north, resulting in airflow to the south. The air warms as it descends higher-altitude mountains to the north of the valley. The warm, drying "norther" winds can result in some of the hottest weather extremes of the summer. These winds occur infrequently. If the wind pattern occurs during the winter season, it usually brings comparatively warm, drying winds. The unstable conditions that lead to these winds typically are followed within a few days by the normal south-southeasterly flows. Wind from the south-southwest to southeast directions—a 60-degree compass sector—occurs approximately 50 percent of the time. Of that 50 percent, the wind speeds are greater than 10.8 meters per second (m/s) only about 1 percent of the time. Overall, calms occur approximately 3 percent of the time on an annual basis. The overall annual average wind speed is approximately 3.5 m/s.

During the winter months, the passage of frontal storm systems will sometimes bring high wind speed conditions. With the exception of November, the prevailing wind direction is predominantly from the south and south-southeast.

8.1.2 Existing Air Quality and Overview of Standards and Health Effects

The U.S. Environmental Protection Agency (USEPA) has established national ambient air quality standards (NAAQS) for ozone, nitrogen dioxide (NO_2), carbon monoxide (CO), sulfur dioxide (SO_2), 10-micron particulate matter (PM_{10}), 2.5-micron particulate matter ($PM_{2.5}$), and airborne lead for the protection of public health and welfare. In general, if these NAAQS are exceeded in an area more than once a year, the area is considered a "nonattainment area" subject to planning and pollution control requirements that are more stringent than normal requirements.

In addition, the California Air Resources Board (CARB) has established standards for ozone, CO, NO_2, SO_2, sulfates, PM_{10}, airborne lead, hydrogen sulfide, and vinyl chloride at levels designed to protect the

most sensitive members of the population, particularly children, the elderly, and people who suffer from lung or heart diseases. CARB carries out control program oversight activities, while local air pollution control districts have primary responsibility for air quality planning and enforcement.

Both state and national air quality standards consist of two parts: an allowable concentration of a pollutant and an averaging time over which the concentration is to be measured. Allowable concentrations are based on the results of studies of the effects of the pollutants on human health, crops and vegetation, and, in some cases, damage to paint and other materials. The averaging times are based on whether the damage caused by the pollutant is more likely to occur during exposures to a high concentration for a short time (one hour, for instance), or to a relatively lower average concentration over a longer period (eight hours, 24 hours, or one year). For some pollutants, there is more than one air quality standard, reflecting both its short-term and long-term effects. Table 8.1-1 presents the state and national ambient air quality standards for selected pollutants. Many of the California ambient air quality standards are more stringent than the federal standards and have shorter averaging periods.

Table 8.1-1. Ambient air quality standards.

Pollutant	Averaging Time	California Standards Concentration	National Standards Concentration
Ozone	1 hour	0.09 ppm	0.12 ppm
	8 hours	-	0.08 ppm (3-year average of annual 4th-highest daily maximum)
Carbon Monoxide	8 hours	9.0 ppm	9 ppm
	1 hour	20 ppm	35 ppm
Nitrogen Dioxide	Annual Average	-	0.053 ppm
	1 hour	0.25 ppm	-
Sulfur Dioxide	Annual Average	-	80 $\mu g/m^3$ (0.03 ppm)
	24 hours	0.04 ppm (105 $\mu g/m^3$)	365 $\mu g/m^3$ (0.14 ppm)
	3 hours	-	1300 $\mu g/m^3$ (0.5 ppm)
	1 hour	0.25 ppm	-
Suspended Particulate Matter (10 micron)	Annual Geometric Mean	30 $\mu g/m^3$	-
	24 hours	50 $\mu g/m^3$	150 $\mu g/m^3$
	Annual Arithmetic Mean	-	50 $\mu g/m^3$
Suspended Particulate Matter (2.5 micron)	Annual Arithmetic Mean	-	15 $\mu g/m^3$ (3-year average)
	24 hours	-	65 $\mu g/m^3$ (3-year average of 98th percentiles)
Particulates Sulfates (TSP Sulfate)	24 hours	25 $\mu g/m^3$	-
Lead	30 days	1.5 $\mu g/m^3$	-
	Calendar Quarter	-	1.5 $\mu g/m^3$

ppm = parts per million
$\mu g/m^3$ = micrograms per cubic meter

USEPA's NAAQS for ozone and fine particulate matter went into effect on September 16, 1997. For ozone, the previous one-hour standard of 0.12 ppm was replaced by an eight-hour average standard at a level of 0.08 ppm. Compliance with this standard is based on the three-year average of the annual fourth-highest daily maximum eight-hour average concentration measured at each monitor within an area.

The NAAQS for particulates were revised in several respects. First, compliance with the current 24-hour PM_{10} standard is now based on the 99th percentile of 24-hour concentrations at each monitor within an area. In addition, two new $PM_{2.5}$ standards were added: a standard of 15 $\mu g/m^3$, based on the three-year average of annual arithmetic means from single or multiple monitors (as available); and a standard of 65 $\mu g/m^3$, based on the three-year average of the 98th percentile of 24-hour average concentrations at each monitor within an area. USEPA is delaying implementation of the new standards for an interim period to allow time to establish $PM_{2.5}$ monitoring networks, designate areas, and develop control strategies. Presently, USEPA has very little data to establish the air quality status of areas with regard to $PM_{2.5}$. Specific monitoring station data used for background is given in Section 8.1.3.

For purposes of state and federal air quality planning, the entire Sacramento Valley Air Basin is a non-attainment area for ozone for both the federal and state ambient air quality standards (AAQS). The area is considered attainment for NO_2; however, because NO_x emissions are precursors to ozone formation, NO_x is regulated as a non-attainment pollutant.

The Sacramento Valley Air Basin is considered attainment/unclassified area with respect to both state and federal ambient standards for CO and SO_2. The Placer County Air Pollution Control District (PCAPCD) is within an area considered to be in attainment/unclassified for the federal 24-hour and annual PM_{10} standards and the state annual standard. The area is in non-attainment with the 24-hour averaging period state PM_{10} standard.

8.1.3 Criteria Pollutants and Air Quality Trends

The following subsections summarize the common sources of individual air pollutants and present recent measurement data on pollution levels in the vicinity of the proposed REP site. For each pollutant, the most recent three years of measurements are presented at three monitoring sites close to the REP site.

8.1.3.1 Ozone

Ozone is generated by a complex series of chemical reactions between precursor organic compounds (POC) and oxides of nitrogen (NO_x) in the presence of ultraviolet radiation. Ambient ozone concentrations follow a seasonal pattern: higher in the summer and lower in the winter. At certain times, the general area can provide ideal conditions for the formation of ozone due to the persistent temperature inversions; clear skies; mountain ranges to trap the air mass; exhaust emissions from motor vehicles; and stationary, area, and biogenic sources. Ozone is an end product of complex reactions between volatile organic compounds (VOCs) and NO_X in the presence of intense ultraviolet radiation. VOC and NO_x emissions from vehicles and stationary sources, in combination with daytime wind flow patterns, mountain barriers, a persistent temperature inversion, and intense sunlight, result in high ozone concentrations. For purposes of state and federal air quality planning, the entire Sacramento Valley Air Basin is a nonattainment area for ozone for both state and federal air quality standards.

Table 8.1-2 shows the maximum 1-hour and 8-hour average ozone levels recorded at the North Highlands, Roseville and Rocklin monitoring stations during the period from 2000 to 2002.

8.1.3.2 Nitrogen Dioxide

NO_2 is formed primarily from reactions in the atmosphere between NO and oxygen or ozone. NO is formed during high-temperature combustion processes, when the nitrogen and oxygen in the combustion air combine. Although NO is much less harmful than NO_2, it can be converted to NO_2 in the atmosphere within a matter of hours, or even minutes, under certain conditions. For purposes of state and federal air quality planning, the Sacramento Valley Air Basin is in attainment for NO_2.

Table 8.1-2. Ambient ozone levels: 2000-2002.

	North Highlands Air Monitoring Station			Roseville Air Monitoring Station			Rocklin Air Monitoring Station		
	2000	2001	2002	2000	2001	2002	2000	2001	2002
Maximum 1-hour average (ppm)	0.120	0.132	0.123	0.128	0.122	0.131	0.118	0.128	0.135
Maximum 1-hour average (ug/m^3)	235.6	259.1	241.4	251.3	239.5	257.2	231.6	251.3	265.0
Maximum 8-hour average (ppm)	0.100	0.094	0.101	0.1	0.102	0.105	0.098	0.097	0.111
Maximum 8-hour average (ug/m^3)	196.3	184.5	198.3	196.3	200.2	206.1	192.4	190.4	217.9

1 – The California 1-hour O_3 ambient air quality standard is 0.09 ppm.
2 – The Federal 1-hour O_3 ambient air quality standard is 0.12 ppm.
ppm = parts per million.
ug/m^3 = micrograms per cubic meter

Table 8.1-3 shows the maximum one-hour NO_2 levels recorded at the North Highlands and Roseville monitoring stations during the period from 2000 to 2002, as well as the annual average level for each of those years. NO_2 is not monitored at the Rocklin air monitoring station.

Table 8.1-3. Ambient nitrogen dioxide levels (ppm): year 2000-2002.

	North Highlands Air Monitoring Station			Roseville Air Monitoring Station			Rocklin Air Monitoring Station		
	2000	2001	2002	2000	2001	2002	2000	2001	2002
Maximum 1-hour average	0.085	0.075	0.067	0.082	0.086	0.075	NA	NA	NA
Annual average	0.014	0.014	0.015	0.017	0.015	0.016	NA	NA	NA

1 – All hourly and annual average concentrations are below the state and federal NO_2 ambient air quality standards.
ppm = parts per million.
NA = Data not available.

8.1.3.3 Carbon Monoxide

Carbon monoxide is a product of inefficient combustion, principally from automobiles and other mobile sources of pollution. In many areas of California, CO emissions from wood-burning stoves and fireplaces can also be measurable contributors. Industrial sources typically contribute less than 10 percent of ambient CO levels. Peak CO levels occur typically during winter months, due to a combination of higher emission rates and calm weather conditions with strong, ground-based inversions. Based upon ambient air quality monitoring, the Sacramento Valley Air Basin is classified as an attainment/unclassified for state and federal standards for CO.

Table 8.1-4 shows the available data on maximum one-hour and eight-hour average CO levels recorded at the North Highlands and Roseville monitoring stations during the period from 2000 to 2002. CO is not monitored at the Rocklin air monitoring station. As indicated by the data in this table, the project area experiences maximum 1-hour and 8-hour average levels of this pollutant that are well below the corresponding state and federal standards at both stations.

8.1.3.4 Sulfur Dioxide

Sulfur dioxide is produced when any sulfur-containing fuel is burned. It is also emitted by chemical plants that treat or refine sulfur or sulfur-containing chemicals. Natural gas contains negligible sulfur, while fuel oils contain larger amounts. Peak concentrations of SO_2 occur at different times of the year in

Table 8.1-4. Ambient carbon monoxide levels (ppm): year 2000-2002.

	North Highlands Air Monitoring Station			Roseville Air Monitoring Station			Rocklin Air Monitoring Station		
	2000	2001	2002	2000	2001	2002	2000	2001	2002
Maximum 1-hour average[1]	4.1	4.4	3.7	3.2	3.1	4.6	NA	NA	NA
Maximum 8-hour average[2]	3.1	3.1	3.1	2.4	1.9	2.8	NA	NA	NA

1 – All 1-hour concentrations are below the California CO ambient air quality standard of 20 ppm and the federal CO ambient air quality standard of 35 ppm.
2 – All 8-hour concentrations are below the California and federal CO ambient air quality standards of 9.0 ppm.
ppm = parts per million.
NA = Data not available.

different parts of California, depending on local fuel characteristics, weather, and topography. The Sacramento Valley Air Basin is considered to be in attainment/unclassified for SO_2 for purposes of state and federal air quality planning. Table 8.1-5 presents the maximum SO_2 levels recorded at the North Highlands monitoring station during the period from 2000 to 2002. None of the other air monitoring sites near the proposed project site measure this pollutant. The federal annual average standard is 0.03 ppm; the annual average SO_2 levels at North Highlands have been well below this standard for several years. The state 24-hour average standard is 0.04 ppm.

Table 8.1-5. Ambient sulfur dioxide levels (ppm): year 2000-2002.

	North Highlands Air Monitoring Station			Roseville Air Monitoring Station			Rocklin Air Monitoring Station		
	2000	2001	2002	2000	2001	2002	2000	2001	2002
Maximum 1-hour average[1]	0.013	0.014	0.019	NA	NA	NA	NA	NA	NA
Maximum 3-hour Average[2]	0.008	0.012	0.011	NA	NA	NA	NA	NA	NA
Maximum 24-hour average[3]	0.005	0.011	0.009	NA	NA	NA	NA	NA	NA
Annual average[4]	0.002	0.002	0.002	NA	NA	NA	NA	NA	NA

1 – All 1-hour average concentrations are below the California SO_2 ambient air quality standard of 0.25 ppm.
2 – All 3-hour average concentrations are below the federal SO_2 ambient air quality standard of 0.5 ppm.
3 – All 24-hr concentrations are below the California SO_2 ambient air quality standard of 0.04 ppm and the federal ambient air quality standard of 0.14 ppm.
4 – All annual average concentrations are below the federal SO_2 ambient air quality standard of 0.03 ppm (80 $\mu g/m^3$).
ppm = parts per million.
NA = Data not available.

8.1.3.5 Fine Particulates (PM_{10})

Particulates in the air are caused by a combination of wind-blown fugitive dust; particles emitted from combustion sources (usually carbon particles); and organic, sulfate, and nitrate aerosols formed in the air from emitted hydrocarbons, sulfur oxides, and nitrogen oxides. In 1984, the CARB adopted standards for PM_{10}, and phased out the total suspended particulate (TSP) standards that had previously been in effect. PM_{10} standards were substituted for TSP standards because PM_{10} corresponds to the size range of inhalable particulates related to human health. In 1987, USEPA also replaced national TSP standards with PM_{10} standards. The PCAPCD is within an area considered to be in attainment/unclassified of the federal PM_{10} standards and state annual standard, and in non-attainment with the 24-hour averaging period state PM_{10} standards.

Table 8.1-6 shows the maximum PM_{10} levels recorded at the North Highlands, Roseville, and Rocklin monitoring stations during the period from 2000 to 2002 and the annual averages for the same period. At all three stations, the maximum 24-hour PM_{10} levels exceed the state standard of 50 $\mu g/m^3$. Annual

average PM_{10} levels are below the federal standard of 50 $\mu g/m^3$ (there is no state standard for annual average PM_{10} levels.

Table 8.1-6. Ambient particulate (<10 μm) levels ($\mu g/m^3$): year 2000-2002

	North Highlands Air Monitoring Station			Roseville Air Monitoring Station			Rocklin Air Monitoring Station		
	2000	2001	2002	2000	2001	2002	2000	2001	2002
Maximum 24-hour average[1]	82	64	53	58	59	58	46	57	93
Annual mean[2]	23	23	25	24	24	25	21	21	22

1 – All 24-hour concentrations are below the federal PM_{10} ambient air quality standard of 150 $\mu g/m^3$ and above the state standard of 50 $\mu g/m^3$.
2 – All annual mean concentrations are below the federal PM_{10} ambient air quality standard of 50 $\mu g/m^3$ (there is no state standard).
$\mu g/m^3$ = micrograms per cubic meter.

8.1.4 Affected Environment

The USEPA has responsibility for enforcing, on a national basis, the requirements of many of the country's environmental and hazardous waste laws. California is under the jurisdiction of USEPA Region IX, which has its offices in San Francisco. Region IX is responsible for the local administration of USEPA programs for California, Arizona, Nevada, Hawaii, and certain Pacific trust territories. USEPA's activities relative to the California air pollution control program focus principally on reviewing California's submittals for the State Implementation Plan (SIP). The SIP is required by the federal Clean Air Act to demonstrate how all areas of the state will meet the national ambient air quality standards within the federally specified deadlines (42 USC §7409, 7411).

The California Air Resources Board was created in 1968. CARB's primary responsibilities are to develop, adopt, implement, and enforce the state's motor vehicle pollution control program; to administer and coordinate the state's air pollution research program; to adopt and update as necessary the state's ambient air quality standards; to review the operations of the local air pollution control districts; and to review and coordinate preparation of the SIP for achievement of the federal ambient air quality standards (California Health & Safety Code (H&SC) §39500 et seq.).

When the state's air pollution statutes were reorganized in the mid-1960s, local air pollution control districts (APCDs) and Air Quality Management Districts (AQMDs) were required to be established in the state (H&SC §4000 et seq.). There are three different types of districts: county, regional, and unified. Air pollution control districts and air quality management districts in California have principal responsibility for developing plans for meeting the state and federal ambient air quality standards; for developing control measures for non-vehicular sources of air pollution necessary to achieve and maintain both state and federal air quality standards; for implementing permit programs established for the construction, modification, and operation of sources of air pollution; for enforcing air pollution statutes and regulations governing non-vehicular sources; and for developing employer-based trip reduction programs.

Each level of government has adopted specific regulations that limit emissions from stationary combustion sources, several of which are applicable to this project. The agencies having permitting or oversight authority for this project are shown in Table 8.1-7. Applicable LORS and compliance with these requirements are discussed in more detail in the following sections. An application for a Determination of Compliance will be filed with the PCAPCD within two weeks after the AFC is filed with the CEC.

Table 8.1-7. Air quality agencies.

Agency	Authority	Contact
USEPA Region IX	Oversight of permit issuance, enforcement	Matt Haber, Chief Permits Officer USEPA Region IX 75 Hawthorne Street San Francisco, CA 94105 (415) 744-1254
Placer County Air Pollution Control District	Permit issuance, enforcement	John Finnell Supervising Engineer Placer County APCD DeWitt Center 11464 "B" Avenue Auburn, CA 95603-2603 (530) 889-7133
California Air Resources Board	Regulatory oversight	Mike Tollstrup, Chief Project Assessment Branch, CARB 2020 L Street Sacramento, CA. 95814 (916) 322-6026

8.1.4.1 Laws, Ordinances, Regulations, and Standards

Federal

Prevention of Significant Deterioration Program

Authority: Clean Air Act §160-169A, 42 USC §7470-7491; 40 CFR Parts 51 and 52

Requirements: Requires prevention of significant deterioration (PSD) review and facility permitting for construction of new or modified major stationary sources of air pollution. PSD review applies with respect to attainment pollutants for which ambient concentrations are lower than the corresponding national ambient air quality standards (NAAQS). The following federal requirements apply on a pollutant-by-pollutant basis, depending on facility emission rates.

- Emissions must be controlled using Best Available Control Technology (BACT).
- Air quality impacts in combination with other increment-consuming sources must not exceed maximum allowable incremental increases for SO_2, PM_{10}, and NO_x.
- Air quality impacts of all sources in the area plus ambient pollutant background levels cannot exceed NAAQS.
- Pre- and/or post-construction air quality monitoring may be required.
- The air quality impacts on soils, vegetation, and nearby PSD Class I areas (specific national parks and wilderness areas) must be evaluated.

Administering Agency: USEPA Region IX.

New Source Review

Authority: Clean Air Act §171-193, 42 USC §7501 et seq.; 40 CFR Parts 51 and 52

Requirement: Requires new source review (NSR) facility permitting for construction or modification of specified stationary sources. New source review applies with respect to nonattainment pollutants for which ambient concentration levels are higher than the corresponding NAAQS. The following federal requirements apply on a pollutant-by-pollutant basis, depending on facility emission rates.

- Emissions must be controlled to the lowest achievable emission rate (LAER).
- Sufficient offsetting emissions reductions must be obtained following the requirements in the regulations to continue reasonable further progress toward attainment of applicable NAAQS.
- The owner or operator of the new facility has demonstrated that major stationary sources owned or operated by the same entity in California are in compliance or on schedule for compliance with applicable emissions limitations in this rule.
- The administrator must find that the implementation plan has been adequately implemented.
- An analysis of alternatives must show that the benefits of the proposed source significantly outweigh any environmental and social costs.

Administering Agency: PCAPCD, with USEPA Region IX oversight.

Acid Rain Program

Authority: Clean Air Act §401 (Title IV), 42 USC §7651

Requirement: Requires the reduction of the adverse effects of acid deposition through reductions in emissions of sulfur dioxide and nitrogen oxides.

Administering Agency: PCAPCD, with USEPA Region IX oversight.

Title V Operating Permits Program

Authority: Clean Air Act §501 (Title V), 42 USC §7661

Requirements: Establishes comprehensive operating permit program for major stationary sources. It should be noted here that EPA published a Notice of Deficiency (NoD) for 34 Clean Air Operating Permits programs in California on May 22, 2002. The NoD was issued based upon California's failure to remedy the agricultural permitting exemption contained in HSC 42310(e). The NoD is a prerequisite for withdrawal of Title V permitting authority for the 34 air districts affected. Presently, the applicant does not believe the NoD will affect the proposed facility. The facility will be required to file for a Title V permit based upon its affected source status under the Title IV and NSPS programs.

Administering Agency: PCAPCD, with USEPA Region IX oversight.

National Standards of Performance for New Stationary Sources

Authority: Clean Air Act §111, 42 USC §7411; 40 CFR Part 60

Requirements: Establishes national standards of performance for new stationary sources. These standards are enforced at the local level with USEPA oversight. Relevant new stationary source performance standards are discussed under local LORS below.

Administering Agency: PCAPCD, with USEPA Region IX oversight.

State

Nuisance Regulation

Authority: CA Health & Safety Code §41700

Requirements: Provides that "no person shall discharge from any source whatsoever such quantities of air contaminants or other material which causes injury, detriment, nuisance, or annoyance to any considerable number of persons or to the public or which endanger the comfort, repose, health, or safety of any such persons or the public, or which cause, or have a natural tendency to cause injury or damage to business or property."

Administering Agency: CARB and PCAAPCD

Toxic "Hot Spots" Act (AB 2588)

Authority: H& SC §44300-44384; 17 CCR §93300-93347

Requirements: Requires preparation and periodic updating of inventory of facility emissions of hazardous substances listed by CARB, in accordance with CARB's regulatory guidelines. Risk assessments are to be prepared by selected facilities based upon local priorities and risk scoring criteria.

Administering Agency: PCAPCD and CARB

CEC and CARB Memorandum of Understanding

Authority: CA Pub. Res. Code §25523(a); 20 CCR §1752, 1752.5, 2300-2309 and Div. 2, Chap. 5, Art. 1, Appendix B, Part (k)

Requirements: Provides for the inclusion of requirements in the CEC's decision on an application for certification to assure protection of environmental quality; application is required to include information concerning air quality protection.

Administering Agency: CEC

Local

Authority: CA Health & Safety Code §40001

Requirements: Prohibit emissions and other discharges (such as smoke and odors) from specific sources of air pollution in excess of specified levels.

Administering Agency: PCAPCD, with CARB oversight.

8.1.4.2 Conformance of Facility

As addressed in this section, the REP is designed, and will be constructed and operated, in accordance with all relevant federal, state, and local requirements and policies concerning protection of air quality.

Federal Prevention of Significant Deterioration Program

USEPA has promulgated PSD regulations for areas that are in compliance with national ambient air quality standards (40 CFR 52.21). The PSD program allows new sources of air pollution to be constructed, or existing sources to be modified, while preserving the existing ambient air quality levels, protecting public health and welfare, and protecting Class I areas (e.g., specific national parks and wilderness areas).

The five principal elements of the federal PSD program are:

- Applicability
- Best available control technology
- Pre-construction monitoring

- Increments analysis
- Air quality impact analysis

The PSD requirements apply on a pollutant-specific basis to any project that is a new major stationary source or a major modification to an existing stationary source. (These terms are defined in federal regulations at 40 CFR 52.21) The determination of applicability is based on evaluating the emissions changes associated with the proposed project in addition to all other emissions changes at the same location since the applicable PSD baseline dates (40 CFR 52.21).

The PSD program applies, on a pollutant-specific basis, only to a new major stationary source or to a major modification of an existing major stationary source that meets the following criteria:

- A new facility that will emit 100 tons per year (tpy) or more, and is one of the 28 PSD source categories in the federal Clean Air Act or any new facility that will emit 250 tpy or more; or
- A major modification to an existing major facility that will result in net emissions increases in excess of the PSD significant emission thresholds

The project area is classified as federal attainment for CO, SO_2, PM_{10}, and NO_2. If a new source will have potential emissions greater than 250 tpy of at least one pollutant, it will be required to undergo PSD review for that pollutant and for any others that will be emitted in amounts greater than specified PSD Significant Emission Rates. The REP combined-cycle electrical geneating project is one of the 28 PSD source categories; however, it does not exceed the 100 tpy major source threshold. Projected annual REP emissions are shown below in Table 8.1-8 for both turbine models. The table shows that operation of the REP will not trigger PSD.

Table 8.1-8. Expected total annual emission rate (tons/yr).

	NO_X	SO_2	CO	VOC	PM_{10}
LM 6000 PC SPRINT	36.33	6.91	44.42	11.58	35.62
Alstom GTX100	40.08	6.91	82.34	35.62	36.04

Federal New Source Performance Standards

The Standards of Performance for New Stationary Sources are source-specific federal regulations, limiting the allowable emissions of criteria pollutants (i.e., those that have a national ambient air quality standard). These regulations apply to certain sources depending on the equipment size, process rate, and/or the date of construction, modification, or preconstruction of the affected facility. Record-keeping, reporting, and monitoring requirements are usually necessary for the regulated pollutants from each subject source; the reports must be regularly submitted to the reviewing agency (40 CFR 60.4). A summary of the PCAPCD New Source Performance Standards applicable to the project is provided in Section 8.1.4.2.9.

National Emissions Standards for Hazardous Air Pollutants

The National Emissions Standards for Hazardous Air Pollutants (NESHAPs) are either source-specific or pollutant-specific regulations, limiting the allowable emissions of hazardous air pollutants from the affected sources (40 CFR 61). Unlike criteria air pollutants, hazardous air pollutants do not have a national ambient air quality standard but have been identified by USEPA as causing or contributing to the adverse health effects of air pollution.

Federal Clean Air Act Amendments of 1990

In November 1990, substantial revisions and updates to the federal Clean Air Act were signed into law. This complex enactment addresses a number of areas that could be relevant to the REP, such as SIP requirements for nonattainment areas that set new compliance deadlines and annual progress increments, more extensive permitting requirements, new USEPA mandates and deadlines for developing rules to control air toxic emissions, and acid deposition control. Following is a summary of the provisions applicable to this project.

Title IV - Acid Deposition Control

This title requires the reduction of emissions of acidic compounds and their precursors (42 USC §7651 et seq.). The principal source of these compounds is the combustion of fossil fuels. Other requirements include monitoring and recordkeeping for emissions of SO_2 and NO_x and for opacity and volumetric flow.

Title V - Operating Permits

This title establishes a comprehensive operating permit program for major stationary sources (42 USC §7661 et seq.). Under the Title V program, a single permit that includes a listing of all the stationary sources, applicable regulations, requirements, and compliance determination is required.

The PCAPCD's Operating Permit Program (Regulation 2, Rule 6) has been approved by USEPA and includes the acid rain program. Consequently, the PCAPCD has received delegation to implement the Title IV and V programs.

California Clean Air Act

AB 2595, the California Clean Air Act (Act), was enacted by the California Legislature and became law in January 1989. The Act requires the local air pollution control districts to attain and maintain both the federal and state ambient air quality standards at the "earliest practicable date." The Act contains several milestones for local districts and the California Air Resources Board.

Air quality plans must demonstrate attainment of the state ambient air quality standards and must result in a five percent annual reduction in emissions of nonattainment pollutants (ozone, CO, NO_x, SO_2, and their precursors) in a given district (H&SC §40914). A local district may adopt additional stationary source control measures or transportation control measures, revise existing source-specific or new source review rules, or expand its vehicle inspection and maintenance program (H&SC §40918) as part of the plan. District air quality plans specify the development and adoption of more stringent regulations to achieve the requirements of the Act. The applicable regulations that will apply to the REP are included in the discussion of PCAPCD prohibitory rules in the following section.

PCAPCD New Source Review Requirements

PCAPCD, Rule 502, New Source Review, requires that a pre-construction review be conducted for all proposed new or modified sources of air pollution. New Source Review contains three principal elements:

- Best available control technology (BACT)
- Emissions offsets
- Air quality impact analysis

BACT is required for all new sources or modifications of existing sources. BACT is defined by PCAPCD Rule 502, New Source Review, as the most stringent of:

a. *The most effective emission control device, emission limit, or technique, singly or in combination, which has been required or used for the type of equipment comprising such an emissions unit unless the applicant demonstrates to the satisfaction of the Air Pollution Control Officer that such limitations required on other sources have not been demonstrated to be achievable.*

b. *Any alternative basic equipment, fuel, process, emission control device or technique, singly or in combination, determined to be technologically feasible and cost-effective by the Air Pollution Control Officer.*

c. *For replacement equipment only, the emission limitation that is based on the maximum degree of reduction achievable, taking into account environmental, energy, and economic impacts by each class or category of the source.*

d. *In making a BACT determination for nonattainment pollutant the Air Pollution Control Officer may consider the overall effect on other nonattainment pollutants. In some cases the lowest emission rates may be required for one or more nonattainment pollutants at the cost of not achieving the lowest emission rate for other nonattainment pollutants. The Air Pollution Control Officer shall discuss these considerations in the Preliminary Decision prepared pursuant to Section 403.*

Under no circumstances shall BACT be determined to be less stringent than the emission control required by an applicable provision of district, state or federal laws or regulations unless the applicant demonstrates to the satisfaction of the Air Pollution Control Officer that such limitations are not achievable.

The PCAPCD regulation further requires emission offsets to be federally enforceable, surplus quantifiable, verifiable and contemporaneous. Emission offsets must be provided for project's maximum quarterly emissions. Rule 502, Section 303 specifies emissions offset ratios for criteria pollutants as a function of distance from the proposed project to the source of the emissions reduction credits, as shown below (Table 8.1-9).

Table 8.1-9. PCAPCD offset ratios.

Location of Offset	Ratio
Same source	1.0 to 1.0
Within 15 miles and within the District	1.2 to 1.0
Within 15 miles and outside the District, but within the same air basin	1.3 to 1.0
Greater than 15 miles, but within 50 miles and within the District	2.0 to 1.0
Greater than 15-miles, but within 50 miles; outside the District, but within the same air basin	2.1 to 1.0
Greater than 50 miles and within the same air basin	2.1 to 1.0

In addition, an air quality impact analysis is required to estimate incremental impacts that may occur due to emissions from the proposed REP sources. Projects must not cause a violation or interfere with the maintenance of any ambient air quality standards or applicable increments.

District Regulation 2, Rule 3 specifies procedures for review and standards for approval of Authorities to Construct power plants within the District. The applicant must obtain a Determination of Compliance and an Authority to Construct from the District prior to commencing construction. An application for a

Determination of Compliance and an Authority to Construct is expected to be filed with the PCAPCD within two weeks of the filing of the AFC with the CEC.

Other PCAPCD Regulatory Requirements

As required by the federal Clean Air Act and the California Clean Air Act, plans that demonstrate attainment must be developed for those areas that have not attained the national and state air quality standards (42 USC §7401; H&SC §40912). As part of its plan, the PCAPCD has developed regulations limiting emissions from specific sources. These regulations are collectively known as "prohibitory rules," because they prohibit the construction or operation of a source of pollution that would violate specific emission limits.

The general prohibitory rules of the PCAPCD that can be applicable to the REP are taken from a recent PDOC issued by the district and are summarized as follows:

Rule 102—Definitions

Rule 102, Definitions, contains the definitions of terms used in the Placer County APCD Rules and Regulations. For example, included are the definitions of volatile organic compounds and exempt compounds (exempt from the definition of VOC) and standard conditions (60 °F and 14.7 pounds per square inch absolute [psia]). These definitions apply unless specific definitions are contained in the individual rules.

Rule 205—Nuisance

Rule 205, Nuisance, generally prohibits discharge of air contaminants which cause a nuisance to a considerable number of persons or to the public, or which endanger the health and safety of those persons or the public.

Rule 210—Specific Contaminants

Rule 210, Specific Contaminants, limits the emission rates of sulfur compounds calculated as sulfur dioxide to 0.2 percent by volume for the Sacramento Valley and Mountain Counties Air Basin portions of the Placer County Air Pollution Control District. Combustion contaminants are limited to 0.1 grains per cubic foot of gas, calculated at 12 percent carbon dioxide (CO_2) at standard conditions. Combustion contaminants are defined in Rule 102, Definitions, as any particulate matter.

Rule 218—Architectural Coatings

Rule 218, Architectural Coatings, limits the VOC content of architectural coating sold or used in Placer County.

Rule 221—Compliance Tests

Rule 221, Compliance Tests, except as otherwise stated, performance tests undertaken to determine compliance of sources with Regulation II must comply with the provisions of CFR 40, Part 60, Appendix A except that Method 5 shall be modified to include the impinger train catch.

Rule 250—Gas Turbines

Rule 250, Gas Turbines, requires the CTGs to emit NO_x at levels, excluding the thermal stabilization period (i.e. startup period which is not to exceed 2 hours), of no greater than the following under load conditions, averaged over 15 minutes:

9 x EFF/25 ppm, @ 15% O_2

Where: EFF (efficiency) is the higher of the following:

$$EFF1 = \frac{3412 \times 100\%}{AHR}$$

AHR = Actual Heat Rate at HHV of Fuel (BTU/KW-HR)]

Rule 410—Recordkeeping for Volatile Organic Compound Emissions

This rule applies to any source when records are required to determine rule applicability or rule compliance. Daily records of operations for the most recent five (5) years are required of the REP facility because it is subject to Rule 507, Federal Operating Permit Program.

The records are to include the following: 1) the operating parameters of basic process equipment and air pollution control system, 2) a list of applicable PCAPCD rules pertinent to the operation, 3) a list of permit units which involve using fuels, adhesives, coatings and solvents, 4) the type and amount of fuels, adhesives, coatings and solvents used, 5) the VOC content of adhesives, coatings and solvents used, and 6) a record of the fuel specification which may include a constituent analysis, ultimate analysis and physical properties.

Rule 502—New Source Review

This rule establishes requirements for BACT, modeling and offsets.

Rule 503—Emission Statement

Rule 503, Emission Statement, is applicable to stationary sources with the actual or potential to emit more than ten (10) tons per year of NO_x or VOCs.

Rule 504—Emission Reduction Credits

Rule 504, Emission Reduction Credits, specifies the procedures for quantifying, adjusting and certifying surplus emissions for later use as offsets at a source. This rule is not directly applicable to the REP facility itself at this time because there are no emissions or emission reductions. The rule does apply to the emission reduction credits purchased by REP to be used as offsets.

Rule 507—Federal Operating Permit Program

Rule 507, Federal Operating Permit Program, establishes the requirements for a Title V operating permit. Major stationary sources and other sources shown in Section 102, Applicability, are subject to this rule.

PCAPCD New Source Performance Standards

The PCAPCD has not been delegated authority for the federal New Source Performance Standard (NSPS) (40 CFR 60 subpart GG - Standards of Performance for Stationary Gas Turbines). This regulation requires monitoring of sulfur and nitrogen in the fuel; limits emissions of NO_x and SO_2 emissions; requires source testing of emissions; requires emissions monitoring; and requires recordkeeping for the collected data.

PCAPCD Hazardous Air Pollutants

Although none of the NESHAPs apply to the proposed project, gas turbines are included in the Maximum Achievable Control Technology (MACT) Standards List affected by the federal Clean Air Act Section 112(g), MACT provisions. The facility will work closely with the PCAPCD on any required application filings.

PCAPCD Title IV and Title V Programs

This rule implements the operating permit requirements of Title V of the federal Clean Air Act. The rule applies to major facilities, Phase II acid rain facilities, subject solid waste incinerator facilities, and any facility listed by USEPA as requiring a Title V permit. As a Phase II acid rain and NSPS affected facility, the REP will be required to submit a permit application to undergo a major facility review within 12 months of commencement of facility operation.

Under Title IV, a project must comply with maximum operating emissions levels for SO_2 and NO_x and is required monitor for SO_2, NO_x, and CO_2 emissions. Extensive recordkeeping and reporting requirements are also part of the acid rain program.

8.1.5 Environmental Consequences

8.1.5.1 Overview of the Analytical Approach to Estimating Facility Impacts

The emissions sources at the REP include two gas turbines with heat recovery steam generators equipped with supplemental burners (duct burners), an auxiliary boiler, an emergency generator, fire pump, and a wet, mechanical-draft cooling tower. The combustion turbine load and duct burners will be modulated as needed to achieve the required power generation level. Emission control systems will be fully operational during all operations except during startups and shutdowns. Maximum quarterly and annual emissions are based on operation of the REP at maximum firing rates and include the expected maximum number of startups that may occur each quarter. Each turbine startup will result in transient emission rates until steady-state operation for the gas turbine and emission control systems is achieved. Table 8.1-10 shows the plant dispatch schedule for each quarter and the year. This table identifies the number of startups and the hours for base load and peak load operation. These data are used to estimate the project's emissions as shown later in this section.

Ambient air quality impact analyses for the site have been conducted to satisfy the CEC requirements for criteria pollutants (NO_2, CO, PM_{10}, and SO_2) and noncriteria pollutants, and construction impacts have been addressed on a pollutant-specific basis. Note that the operational scenarios having the highest emissions rates do not necessarily produce the highest ambient impacts. The following sections describe the emission sources that have been evaluated for the REP, the ambient impact analyses results, and the evaluation of facility compliance with the applicable air quality regulations.

Facility Emissions

The REP will be a new source. As discussed earlier, the new equipment will consist of two GE LM6000 PC SPRINT or Alstom GTX100 combustion turbines, rated at 43 to 47 MW (nominal net, at site design conditions); two heat recovery steam generators (HRSGs) equipped with duct burners rated at 255 MMBtu/hr (GE LM6000 design) and 225 MMBtu/hr (Alstom GTX 100 design); a 75 to 87 MW condensing steam turbine-generator; a 750 kW standby generator, a 300 horse power fire pump, an auxiliary boiler rated at 40,000 lbs/hr; and a 4-cell cooling tower. Natural gas will be the only fuel consumed by the combustion turbines, HRSG duct burners, and auxiliary boiler during operation of the REP. The fire pump and standby generator will use low-sulphur fuel. Typical characteristics for the natural gas fuel are shown in Table 8.1-11. Performance specifications for both kinds of turbines, and the cooling tower, auxiliary boiler, emergency generator and fire pump are provided in Appendices 8.1-A through 8.1-C. Appendix 8.1-D shows the design fuel gas analysis.

Natural gas combustion results in the formation of NO_x, SO_2, volatile organic compounds (VOC), PM_{10}, and CO. Because natural gas is a clean burning fuel, there will be minimal formation of combustion PM_{10}

Table 8.1-10. Plant dispatch schedule.

Element/Operation	Quarter 1st	2nd	3rd	4th	Total Annual
Power Plant:					
Base load only hours	1,123	1,188	751	852	3,914
Peaking hours (duct firing)	929	559	1,347	1,246	4,081
Total base and peak hours	2,052	1,747	2,098	2,098	7,995
Total startup hours	44	127	34	47	252
Total operating hours	2,096	1,874	2,132	2,145	8,247
Offline hours	64	310	76	63	513
Total hours in period	2,160	2,184	2,208	2,208	8,760
Capacity factor:					
Base load	95%	80%	95%	95%	91%
Peaking	43%	26%	61%	56%	47%
Weighted (approximately)	81%	65%	86%	85%	79%
Number of starts (each CTG):					
Hot	25	71	29	42	167
Warm	8	25	1	1	35
Cold	1	2	1	1	5
Total number of starts	34	98	31	44	207
Hours per start					
Hot	1				
Warm	2				
Cold	3				
Auxiliary boiler:					
Margin	30%				
Operating hours	140	568	143	143	995
Standby generator:					
Number of Tests	25	25	25	25	100
Fire pump:					
Number of Tests	25	25	25	25	100

Table 8.1-11. Typical chemical characteristics and heating value of natural gas.

Constituent	Mole %
Nitrogen	1.35
CO_2	0.69
Methane	94.01
Ethane	3.52
Propane	0.19
C4+	0.24
Sulfur, maximum	0.5 grains/100 scf
Specific gravity	0.5922
Higher heating value	22,794 Btu/lbm; 1,026 Btu/scf

and SO_2. The combustion turbines will be equipped with standard combustors with water injection (LM6000 design) that minimize the formation of NO_x and CO. To further reduce NO_x and CO emissions, selective catalytic reduction (SCR) and oxidation catalyst control systems will be used. Similarly, the duct burners will be equipped with a low-NO_x burner design that minimizes NO_x formation.

Various noncriteria pollutants will also be emitted by the facility, including ammonia (NH_3), which is used as a reactant by the SCR system to control NO_x, and sulfate (or secondary particulate matter) due to the oxidation of the SO_2 emitted by the facility. Emissions of all of the criteria and noncriteria pollutants have been characterized and quantified in this application.

Criteria Pollutant Emissions

Emissions will vary based on operating conditions and the turbine vendor. The gas turbines and duct burner emission rates have been estimated from vendor data, REP design criteria, and established emission calculation procedures. The emission rates for the combustion turbines under peak load and base load operations are shown in Table 8.1-12.

Table 8.1-12. Hourly emission rates for each turbine (lb/hr)[1].

Constituent	GE LM 6000 PC SPRINT		Alstom GTX100		ppmvd @15% O_2
	Peak lb/hr	Base lb/hr	Peak lb/hr	Base lb/hr	
NO_x	5	3.4	5.1	3.5	2
CO	6.1	4.2	6.2	4.2	4
VOC	1.7	1.2	1.8	0.7	--
PM_{10}	4.6	3.2	4.7	3.2	--
SO_2	1.0	0.7	1.0	0.7	--
NH_3	9.2	6.3	9.5	6.4	10

1 – Values correspond to the maximum hourly rates, and are based on an ambient temperature of 34°F; data shown in Appendix 8.1-A.

The maximum firing rates, daily and annual fuel consumption rates, and operating restrictions define the allowable operations that determine the maximum potential hourly, daily, quarterly and annual emissions for each pollutant. These allowable operations are typically referred to as "the operating envelope" for a facility. The maximum heat input rates (fuel consumption rates) for the gas turbines, and gas turbines with duct burners are taken from Appendix 8.1-A and shown in Table 8.1-13.

Table 8.1-13. Maximum device heat input rates (HHV) (mmBtu).

	Gas Turbine w/ Duct Burners[1]		Gas Turbine w/o Duct Burners[2]	
	LM6000	Alstom	LM6000	Alstom
Per hour	689.2	705.3	472.5	480.8

1 – Based on maximum heat input for peak load operation plus duct burner.
2 – Based on maximum heat input for base load turbine operation.
See Appendix 8.1-A.

During startup conditions, the emissions rates of certain pollutants will temporarily be higher than during normal operations. Maximum emission rates are expected to occur during a startup or shutdown event and are shown in Table 8.1-14. This table shows startup emissions for hot, warm, and cold starts.

Table 8.1-14. Startup emissions summary.

	General Electric LM6000 PC Sprint	Alstom GTX100
Hot Start:		
Maximum hour (worst-case turbine)		
NO_x lb/hr	8.8	24.0
CO lb/hr	9.2	176.8
VOC lb/hr	1.4	115.9
PM_{10} lb/hr	3.2	3.2
SO_2 lb/hr	0.7	0.7
Total per start (both turbines combined)[1]		
NO_x lbs	15.9	36.8
CO lbs	16.3	347.5
VOC lbs	2.3	231.2
PM_{10} lbs	6.3	6.4
SO_2 lb/hr	1.3	1.3
Warm Start:		
Maximum hour (worst-case turbine)		
NO_x lb/hr	12.2	37.2
CO lb/hr	10.8	240.8
VOC lb/hr	1.4	143.9
PM_{10} lb/hr	3.2	3.2
SO_2 lb/hr	0.7	0.7
Total per start (both turbines combined)[1]		
NO_x lbs	29.2	87.4
CO lbs	27.6	491.2
VOC lbs	4.5	289.2
PM_{10} lbs	12.7	12.9
SO_2 lb/hr	2.6	2.6
Cold Start:		
Maximum hour (worst-case turbine)		
NO_x lb/hr	19.3	37.4
CO lb/hr	14.3	355.8
VOC lb/hr	1.4	199.3
PM_{10} lb/hr	3.2	3.2
SO_2 lb/hr	0.7	0.7
Total per start (both turbines combined) [1]		
NO_x lbs	49.7	124.1
CO lbs	42.2	737.4
VOC lbs	6.6	402.4
PM_{10} lbs	19.0	19.3
SO_2 lb/hr	3.9	4.0

1 – Values correspond to the emissions for each startup event.
See Appendix 8.1-A for details.

The analysis of maximum facility emission levels was based on the plant dispatch schedule and pollutant emission factors shown in Tables 8.1-10, 8.1-12, and 8.1-14. Projected total maximum annual, quarterly, daily, and hourly emissions for the REP are calculated from the dispatch schedule and the worst-case

emissions, and shown in Table 8.1-15. Detailed emission calculations appear in Appendix 8.1-E. Emissions from the cooling tower were calculated from the predicted cooling water total dissolved solids (TDS) level (see Appendix 8.1-B). Emissions for the fire pump and standby generator are shown in Appendix 8.1-C. These emissions are included in the maximum emission rates of Table 8.1-15 as are the emissions for the combustion turbine starts.

Table 8.1-15. Maximum operation emission rates.

	NO_X		SO_2		CO		VOC		PM_{10}	
	LM6000	GTX100	LM6000	GTX100	LM6000	GTX100	LM6000	GTX100	LM6000	GTX100
Maximum hourly[1] pounds per hour	43.5	79.9	2.22	2.22	31.7	714.7	3.9	399.1	10.6	10.8
Maximum daily pounds per day[2]	285.7	422.1	49.92	49.92	354.4	1,517.0	88.8	767.2	235.2	240.0
Maximum quarterly[3] tons/quarter	9.69	10.34	1.89	1.89	11.81	28.31	3.25	14.15	9.55	9.68
Maximum annual[3] tons/yr	36.33	40.08	6.91	6.93	44.42	82.34	11.58	35.62	35.62	36.04

1 – See Appendix 8.1-E10 for details.
2 – See Appendix 8.1-E11 for details.
3 – See Appendix 8.1-E12 for details.

Construction Emissions

Emissions due to the construction phase of the project have been estimated, including an assessment of emissions from vehicle and equipment exhaust and the fugitive dust generated from material handling. A detailed analysis of the emissions and ambient impacts is included in Appendix 8.1-F. Construction emission mitigation and/or control techniques proposed for use at the REP site, include, but are not limited to the following:

- Operational measures, such as limiting time spent with the engine idling by shutting down equipment when not in use
- Regular preventive maintenance to prevent emission increases due to engine problems
- Use of low sulfur and low aromatic fuel meeting California standards for motor vehicle diesel fuel
- Use of low-emitting gas and diesel engines meeting state and federal emissions standards for construction equipment, including, but not limited to catalytic converter systems and particulate filter systems

The following mitigation measures are proposed to control fugitive dust emissions during construction of the project:

- Use either water application or chemical dust suppressant application to control dust emissions from on-site unpaved road travel and unpaved parking areas
- Use vacuum sweeping and/or water flushing of paved road surface to remove buildup of loose material to control dust emissions from travel on the paved access road (including adjacent public streets impacted by construction activities) and paved parking areas
- Cover all trucks hauling soil, sand, and other loose materials or require all trucks to maintain at least two feet of freeboard

- Install sandbags or other erosion control measures to prevent silt runoff to roadways
- Replant vegetation in disturbed areas as quickly as possible
- Use wheel washers or wash off tires of all trucks exiting construction site
- Mitigate fugitive dust emissions from wind erosion of areas disturbed from construction activities (including storage piles) by application of either water or chemical dust suppressant.

The REP construction site impacts are not unusual in comparison to most construction sites. Construction sites that use good dust suppression techniques and low-emitting vehicles typically do not cause violations of air quality standards.

Noncriteria Pollutant Emissions

Noncriteria pollutants are compounds that have been identified as pollutants that pose a significant health hazard. Nine of these pollutants are regulated under the federal New Source Review program; they are lead, asbestos, beryllium, mercury, fluorides, sulfuric acid mist, hydrogen sulfide, total reduced sulfur, and reduced sulfur compounds.[1] In addition to these nine compounds, the federal Clean Air Act lists 189 substances as potential hazardous air pollutants (Clean Air Act Sec. 112(b)(1)). Any pollutant that may be emitted from the REP and is on the federal New Source Review list, the federal Clean Air Act list, and/or the District toxic air contaminant list has been evaluated as part of the AFC. Emission factors were determined by reviewing the available technical data, determining the products of combustion, and/or using material balance calculations.

Noncriteria pollutant emission factors were taken from data compiled by the Ventura County APCD and from the California Air Toxics Emission Factors (CATEF) database. Noncriteria pollutant emissions from the cooling tower were calculated from an analysis of the proposed reclaim water as delivered to the cooling tower system (assuming five cycles of concentration).

The noncriteria pollutants that may be emitted from the REP, and their respective emission factors, are shown in Table 8.1-16. Appendix 8.1-G, Tables 8.1-G1, 8.1-G2(a), 8.1-G2(b), and 8.1-G3 provides the detailed emission calculations for noncriteria pollutants.

Air Quality Impact Analysis

Site Representation

USEPA defines the term "on-site data" to mean data that would be representative of atmospheric dispersion conditions at the source and at locations where the source may have a significant impact on air quality. Specifically, the meteorological data requirement originates in the Clean Air Act at section 165(e)(1). Section 165(e)(1) defines on-site meteorology as the collection "of the ambient air quality at the proposed site and in areas which may be affected by emissions from such facility for each pollutant subject to regulation under [the Act] which will be emitted from such facility."

This definition and USEPA's guidance on the use of on-site monitoring data are also outlined in the "*On-Site Meteorological Program Guidance for Regulatory Modeling Applications*" (1987). The representativeness of the data is dependent upon the following: 1) the proximity of the meteorological monitoring site to the area under consideration, 2) the complexity of the topography of the area, 3) the

[1] These pollutants are regulated under federal and state air quality programs; however, they are evaluated as noncriteria pollutants by the CEC.

exposure of the meteorological sensors, and 4) the period of time during which the data are collected. As discussed below, the meteorological data from McClellan Air Force Base satisfies the definition of on-site data.

Table 8.1-16. Noncriteria pollutant emissions for the REP.[1]

Pollutant	Emission Factor (lb/MMscf)	LM6000 PC Sprint Emissions		Alstom GTX100 Emissions		Auxiliary Boiler	
		lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr
Power Plant							
Acetaldehyde	$4.08x10^{-2}$	2.76E-02	9.49E-02	2.83E-02	9.70E-02	2.32E-03	1.16E-03
Acrolein	$3.69x10^{-3}$	2.50E-03	8.58E-03	2.56E-03	8.77E-03	2.10E-04	1.05E-04
Ammonia	(2)	9.20E+00	3.68E+01	9.50E+00	3.80E+01	--	--
Benzene	$3.33x10^{-3}$	2.25E-03	7.74E-03	2.31E-03	7.92E-03	1.90E-04	9.44E-05
1,3-Butadiene	$1.27x10^{-4}$	8.60E-05	2.95E-04	8.80E-05	3.02E-04	7.24E-06	3.60E-06
Ethylbenzene	$1.79x10^{-2}$	1.21E-02	4.16E-02	1.24E-02	4.26E-02	1.02E-03	5.08E-04
Formaldehyde	$1.10x10^{-1}$	7.45E-02	2.56E-01	7.62E-02	2.62E-01	6.27E-03	3.12E-03
Hexane	$2.59x10^{-1}$	1.75E-01	6.02E-01	1.79E-01	6.16E-01	1.48E-02	7.34E-03
Naphthalene	$1.33x10^{-3}$	9.00E-04	3.09E-03	9.21E-04	3.16E-03	7.58E-05	3.77E-05
Polycyclic Aromatics	$1.65x10^{-4}$	1.12E-04	3.83E-04	1.14E-04	3.92E-04	9.39E-06	4.67E-06
Propylene	$7.70x10^{-1}$	5.21E-01	1.79E+00	5.33E-01	1.83E+00	4.39E-02	2.18E-02
Propylene oxide	$2.96x10^{-2}$	2.00E-02	6.88E-02	2.05E-02	7.04E-02	1.69E-03	8.39E-04
Toluene	$7.10x10^{-2}$	4.81E-02	1.65E-01	4.92E-02	1.69E-01	4.05E-03	2.01E-03
Xylene	$2.61x10^{-2}$	1.77E-02	6.07E-02	1.81E-02	6.21E-02	1.49E-03	7.40E-04
Cooling Tower[3]	**ppm**	**lb/hr**		**ton/yr**			
Arsenic	0.025	1.75E-08		7.67E-08			
Cadmium	0.001	7.00E-10		3.07E-09			
Chromium (total)	0.006	4.20E-09		1.84E-08			
Copper	0.0245	1.72E-08		7.51E-08			
Lead	0.005	3.50E-09		1.53E-08			
Nickel	0.0115	8.05E-09		3.53E-08			
Silver	0.00007	4.90E-11		2.15E-10			
Zinc	0.23	1.61E-07		7.05E-07			

1 – Emissions are per turbine including duct burner.
2 – Ammonia emissions calculated from ammonia slip rate of 10 ppm. See Appendix 8.1-A.
3 – Assumes 5 cycles of concentration.

The annual average distribution of wind speed and direction near the site of the proposed REP project is shown in Figures 8.1-6a to 8.1-6f. The wind rose figures are based on meteorological data collected during the period from 1992 to 1996 at McClellan Air Force Base (AFB) in Sacramento. The overall predominant wind patterns for this portion of the Sacramento Valley is consistent with the wind patterns shown in the data for McClellan AFB.

Prevailing winds in the local region are south to southeasterly (except during November when the prevailing winds are from the north-northwest). Steep air pressure gradients occasionally form to the north, resulting in airflow to the south. As the air descends higher-altitude mountains to the north of the valley, the air warms. The warm, drying northerly winds can result in some of the hottest weather extremes of the summer. These winds occur infrequently. If the wind pattern occurs during the winter

season, it usually brings comparatively warm, drying winds. The unstable conditions that lead to these winds typically are followed within a few days by the normal south-southeasterly flows.

During the winter months the passage of frontal storm systems will sometimes bring high wind speed conditions. With the exception of November, the prevailing wind direction is predominantly from the south and south-southeast.

The windrose data for McClellan AFB indicates a good level of consistency of southerly winds as well as reinforcing the general seasonal wind patterns discussed earlier. Thus, use of the McClellan AFB to represent the project site wind speed, wind direction, and temperature would be considered representative with respect to the calculation of potential impacts from the project.

The area surrounding the project site can be characterized as rural. Areas within 3 kilometers of the project site are predominately undeveloped agricultural areas. In accordance with the Auer land use classification methodology (USEPA's "*Guideline on Air Quality Models*"), land use within the area circumscribed by a 3 km radius around the modified facility is greater than 50 percent rural. Therefore, in the modeling analyses supporting the permitting of the facility, rural coefficients were assigned.

Representativeness has also been defined in the "*Workshop on the Representativeness of Meteorological Observations*" (Nappo et. al., 1982) as "the extent to which a set of measurements taken in a space-time domain reflects the actual conditions in the same or different space-time domain taken on a scale appropriate for a specific application." Judgments of representativeness should be made only when sites are climatologically similar, as the project site and McClellan AFB clearly are. Representativeness has also been defined in the PSD Monitoring Guideline as data that characterize the air quality for the general area in which the proposed project would construct and operate. The same large-scale topographic features that influence McClellan AFB monitoring station also influence the proposed project site in the same manner.

In determining the representativeness of McClellan AFB relative to the project site, the following considerations were addressed:

- **Aspect ratio of terrain**—The aspect ratio of the terrain is the ratio of the height to the width of a hill at its base. There are no major terrain features either near the proposed project site or McClellan AFB that would influence the prevailing wind pattern that is characteristic of this region of the Valley. The elevations of the project site and McClellan AFB are essentially the same.
- **Terrain Slope**—Terrain in the immediate vicinity of the project site and McClellan AFB is relatively flat.
- **Ratio of terrain height to stack/plume height**—Terrain above the stack height is located at least 7.5 miles or more from the project site towards the east and southeast.

Final plume height (stack height plus plume rise) was calculated for D stability and a wind speed of 5 meter/second (m/s) to be about 210 meters. While complex and/or intermediate terrain occurs at significant distances from the project site, impacts in these areas are expected to be minimal. Based upon the flat terrain surrounding the project site, along with most maximum impact(s) being driven by downwash, terrain will not drive the final modeling results. Thus, it is expected that no impacts in complex or intermediate terrain will be identified.

Correlation of terrain features to prevailing meteorological conditions—As discussed earlier, the orientation and aspect of terrain in the project area correlates well with the prevailing wind fields as

identified by the McClellan AFB windrose, with little to no apparent influence by local terrain perturbations (such as small land outcroppings). Wind flow at McClellan AFB would therefore be nearly identical to the project site.

Thus, it is our assessment that the meteorological data collected at McClellan AFB are identical to the dispersion conditions at the project site and to the regional area. The windroses do not indicate any overwhelming effects on the potential dispersion of pollutants from the project site on a regional scale from influences other than the general influence of the large-scale valley orientation. Because of the distances to the complex terrain features, the dispersion modeling indicated that all short-term and annual impacts occur in the immediate vicinity of the project site. Thus, the data set satisfies the definition of on-site data, as defined in the PSD Monitoring Guidelines (1990) and the On-site Meteorological Program Guidance for Regulatory Modeling Applications (1987).

The five years of meteorological data for McClellan AFB were obtained from the Placer County APCD for the years 1992-1996. The data set includes all the necessary parameters required for the ISCST3 dispersion modeling analyses (i.e., wind speed and direction, temperature, stability, and mixing height). The data were used without any modifications.

Air Quality Modeling Methodology

An assessment of impacts from the REP on ambient air quality has been conducted using USEPA-approved air quality dispersion models. These models are based on various mathematical descriptions of atmospheric diffusion and dispersion processes in which a pollutant source impact can be calculated over a given area.

The impact analysis was used to determine the worst-case ground-level impacts of the REP. It should be noted that the operational scenarios having the highest emissions rates do not necessarily produce the highest ambient impacts. The results were compared with established state and federal ambient air quality standards and PSD significance levels. If the standards are not exceeded then it is assumed that, in the operation of the facility, no exceedances are expected under any conditions. In accordance with the air quality impact analysis guidelines developed by USEPA (40 CFR Part 51, Appendix W: *Guideline on Air Quality Models) and CARB (Reference Document for California Statewide Modeling Guideline* (USEPA 1989), the ground-level impact analysis includes the following assessments:

- Impacts in simple, intermediate, and complex terrain
- Aerodynamic effects (downwash) due to nearby building(s) and structures
- Impacts from inversion breakup (fumigation)

Simple, intermediate and complex terrain impacts were assessed for all meteorological conditions that would limit the amount of final plume rise. Plume impaction on elevated terrain, such as on the slope of a nearby hill, can cause high ground-level concentrations, especially under stable atmospheric conditions. Another dispersion condition that can cause high ground-level pollutant concentrations is caused by building downwash. Building downwash can occur when wind speeds are high and a building or structure is in close proximity to the emission stack. This can result in building wake effects where the plume is drawn down toward the ground by the lower pressure region that exists in the lee side (downwind) of the building or structure.

Fumigation conditions occur when the plume is emitted into a low lying layer of stable air (inversion) that then becomes unstable, resulting in a rapid mixing of pollutants towards the ground. The low mixing height that results from this condition allows little diffusion of the stack plume before it is carried

downwind to the ground. Although fumigation conditions rarely last as long as an hour, relatively high ground-level concentrations may be reached during that period. Fumigation tends to occur under clear skies and light winds. Such conditions are more prevalent in the summer.

The basic model equation used in this analysis assumes that the concentrations of emissions within a plume can be characterized by a Gaussian distribution about the centerline of the plume (see Figure 8.1-7). Concentrations at any location downwind of a point source such as a stack can be determined from the following equation:

$$C(x,y,z,H) = \left(\frac{Q}{2\pi\sigma_y\sigma_z u}\right) * \left(e^{-1/2(y/\sigma_y)^2}\right) * \left[\left\{e^{-1/2(z-H/\sigma_z)^2}\right\} + \left\{e^{-1/2(z+H/\sigma_z)^2}\right\}\right]$$

where:

C	=	the concentration in the air of the substance or pollutant in question
Q	=	the pollutant emission rate
$\sigma_y\sigma_z$	=	the horizontal and vertical dispersion coefficients, respectively, at downwind distance x
u	=	the wind speed at the height of the plume center
x,y,z	=	the variables that define the 3-dimensional Cartesian coordinate system used; the downwind, crosswind, and vertical distances from the base of the stack (see Figure 8.1-7)
H	=	the height of the plume above the stack base (the sum of the height of the stack and the vertical distance that the plume rises due to the momentum and/or buoyancy of the plume)

Gaussian dispersion models are approved by USEPA for regulatory use and are based on conservative assumptions (i.e., the models tend to over-predict actual impacts by assuming steady state conditions, no pollutant loss through conservation of mass, no chemical reactions, etc.). The USEPA models were used to determine if ambient air quality standards would be exceeded, and whether a more accurate and sophisticated modeling procedure would be warranted to make the impact determination. The following sections describe:

- Screening modeling procedures
- Refined air quality impact analysis
- Existing ambient pollutant concentrations and preconstruction monitoring
- Results of the ambient air quality modeling analyses

The screening and refined air quality impact analyses were performed using the Industrial Source Complex, Short-Term Model ISCST3 (Version 02035). ISCST3 is a Gaussian dispersion model capable of assessing impacts from a variety of source types in areas of simple, intermediate, and complex terrain. The model can account for settling and dry deposition of particulates; area, line, and volume source types; downwash effects, and gradual plume rise as a function of downwind distance. The model is capable of estimating concentrations for a wide range of averaging times (from one hour to one year).

Inputs required by the ISCST3 model include the following:

- Model options
- Meteorological data

- Source data
- Receptor data

Model options refer to user selections that account for conditions specific to the area being modeled or to the emissions source that needs to be examined. Examples of model options include use of site-specific vertical profiles of wind speed and temperature; consideration of stack and building wake effects; and time-dependent exponential decay of pollutants. The model supplies recommended default options for the user. Except where explicitly stated, such as for building downwash, as described in more detail below, default values were used. A number of these default values are required for USEPA and local District approval of model results and are listed below:

- Urban dispersion coefficients
- Stack tip downwash
- HE>ZI adjustment for vertical term
- Buoyancy induced dispersion
- Calm processing
- Default rural wind profile exponents = 0.15, 0.15, 0.20, 0.25, 0.30, 0.30
- Default rural vertical temperature gradients = 0.0, 0.0, 0.0, 0.0, 0.02, 0.035
- 10 meter anemometer height

ISCST3 uses hourly meteorological data to characterize plume dispersion. The representativeness of the data is dependent on the proximity of the meteorological monitoring site to the area under consideration; the complexity of the terrain, the exposure of the meteorological monitoring site, and the period of time during which the data are collected. The meteorological data set used in this analysis was determined to be representative of meteorological conditions at the REP site and to meet the requirements of the USEPA "On-Site Meteorological Program Guidance for Regulatory Model Applications" (EPA-450/4-87-013, USEPA 1995).

The required emission source data inputs to ISCST3 include source locations, source elevations, stack heights, stack diameters, stack exit temperatures and velocities, and emission rates. The source locations are specified for a Cartesian (x,y) coordinate system where x and y are distances east and north in meters, respectively. The Cartesian coordinate system used is the Universal Transverse Mercator (UTM) Projection, North American Datum (NAD) 27. The stack height that can be used in the model is limited by federal and the District Good Engineering Practice (GEP) stack height restrictions, discussed in more detail below. In addition, ISCST3 requires nearby building dimension data to calculate the impacts of building downwash.

For the purposes of modeling, a stack height beyond what is required by Good Engineering Practice is not allowed. However, this requirement does not place a limit on the actual constructed height of a stack. GEP as used in modeling analyses is the height necessary to ensure that emissions from the stack do not result in excessive concentrations of any air pollutant in the immediate vicinity of the source as a result of atmospheric downwash, eddies, or wakes that may be created by the source itself, nearby structures, or nearby terrain obstacles. In addition, the GEP modeling restriction assures that any required regulatory control measure is not compromised by the effect of that portion of the stack that exceeds the GEP. The USEPA guidance ("Guideline for Determination of Good Engineering Practice Stack Height," Revised 6/85) for determining GEP stack height is as follows:

$H_g = H + 1.5L$

where

H_g = Good Engineering Practice stack height, measured from the ground-level elevation at the base of the stack

H = height of nearby structure(s) measured from the ground-level elevation at the base of the stack

L = lesser dimension, height or maximum projected width, of nearby structure(s)

In using this equation, the guidance document indicates that both the height and width of the structure are determined from the frontal area of the structure, projected onto a plane perpendicular to the direction of the wind.

GEP stack height was calculated at 220 feet based on HRSG dimensions of 88 feet height, 93 feet length, and 15 feet width. The proposed stack height of 120 feet exceed GEP stack height.

For regulatory applications, a building is considered sufficiently close to a stack to cause wake effects when the downwind distance between the stack and the nearest part of the building is less than or equal to five times the lesser of the height or the projected width of the building. The building dimensions were analyzed using the Building Profile Input Program (BPIP) to calculate 36 wind-direction-specific building heights and projected building widths for use in building wake calculations. The building dimensions used in the GEP analysis are shown in Appendix 8.1-H and Figure 8.1-H1.

Screening Procedures

To ensure the impacts analyzed were for maximum emission levels and worst-case dispersion conditions, a screening procedure was used to determine the inputs to the short-term (24 hours or less) dispersion modeling analysis. The screening procedure analyzed the turbine operating conditions that would result in the maximum short-term impacts on a pollutant-specific basis. The operating conditions examined in this screening analysis, along with their exhaust and emission characteristics, are shown in Appendix 8.1-H, Tables 8.1-H2 and H3. These operating conditions represent maximum and minimum turbine loads (100 percent down to 50 percent) at average, maximum, and minimum ambient operating temperatures (62°F, 99°F, and 34°F). The screening procedure was not used to determine annual concentrations. Instead, the annual average site and turbine stack conditions were used.

The operating conditions were screened for worst-case ambient impacts using USEPA's ISCST3 model and five years of meteorological data collected at McClellan Air Force Base, as described above for both turbine types. The results of the screening procedure are presented in Appendix 8.1-H, Table 8.1-H6. The screening results are presented below for the GE LM6000 and Alstom GTX100 turbines.

GE LM6000—The screening analysis showed that all maximum impacts, except for the 1-hour impacts, occurred under Case 1 (turbine operating at 100 percent load with evaporative cooling and duct burning with ambient temperature at 99°F) and were the highest for each pollutant and averaging period. The stack parameters for this turbine operating condition were then used in the refined modeling analyses to evaluate the modeled impacts of the entire project for each pollutant and the aforementioned averaging periods. Case 7 (full load w/duct burners and without evaporative cooling at 34°F) per the screening modeling showed the highest impacts for the 1-hour averaging periods for NOx, CO, and SO_2.

Alstom GTX100—The screening analysis showed that all maximum impacts, except for the 24-hour PM_{10} and SO_2 concentrations, occurred under Case 7 (turbine operating at 100 percent load without evaporative cooling and duct burning with ambient temperature at 34 °F) and were the highest for each pollutant and averaging period. The stack parameters for this turbine operating condition were then used in the refined modeling analyses to evaluate the modeled impacts of the entire project for each pollutant and the aforementioned averaging periods. Case 1 (full load w/duct burners and with evaporative cooling at 99°F), per the screening modeling, showed the highest impacts for the 24-hour averaging periods for PM_{10} and SO_2.

In addition to screening the turbines for worst-case stack parameters, the emergency equipment was also analyzed to determine which piece of equipment (fire-pump or generator) would produce the highest concentrations on a pollutant-specific basis. The screening procedure was necessary as both pieces of emergency equipment will not be tested during the same hour and the source with the highest emissions does not always produce the greatest concentrations. Results of the emergency equipment screening analysis determined that the emergency generator produced the highest impacts, except for 1- and 3-hour SO_2 where the fire-pump produced the highest concentrations. For all annual averaging periods, both pieces of equipment were assumed to operate. The summary of the screening results for the emergency equipment is shown in Appendix 8.1-H, Table 8.1-H4

The screening analysis included flat, simple, intermediate, and complex terrain. Terrain features were taken from one-second USGS DEM data and 7.5-minute quadrangle maps of the area. For the screening analysis, a coarse Cartesian grid of receptors spaced at 180 meters was used with a finer downwash grid, spaced at 10 meters, beginning at the REP fenceline. The coarse grid extended over ten kilometers from the REP in all directions; the downwash grid extended to between 400 and 500 meters from the fenceline.

Refined Air Quality Impact Analysis

The operating conditions and emission rates used to model the REP are summarized in Tables 8.1-17 (GE LM6000) and 8.1-18 (Alstom GTX100). As discussed above, the turbine stack parameters for Cases 10 and 11 were used in modeling the impacts for each pollutant and averaging period. The complete modeling input for each pollutant and averaging period is shown in Appendix 8.1-H, Tables 8.1-H5 and 8.1-H6.

The model receptor grids were derived from one-second DEM data. Initially, a 180-meter coarse grid was extended to ten kilometers from the REP in all directions. A 30-meter resolution downwash receptor grid was used as described above.

Thirty-meter refined receptor grids were used in areas where the coarse grid analyses indicated modeled maxima for each site plan would be located. A map showing the layout of each modeling grid around the site plan is presented in Figure 8.1-8.

Receptors for the refined modeling analysis were taken from one-second USGS DEM data for four 7.5-minute quadrangles and included Pleasant Grove, Roseville, Citrus Heights, and Rio Linda. The coarse and refined grids contained a total of approximately 24,303 receptors. The evaluation of compliance with District and CEC's requirements includes the cooling tower for both emissions calculation and modeling purposes.

The evaluation of compliance with the District and CEC's requirements includes the cooling tower and emergency equipment for both emissions calculation and modeling purposes.

Table 8.1-17. Emission rates and stack parameters for modeling, GE LM6000.

	Stack diameter, meters	Temp, deg K	Exhaust Velocity, m/s	Emission Rates, g/s			
				NO_x	SO_2	CO	PM_{10}
Averaging Period: One hour							
Turbine 1/HRSG	3.3528	342.04	15.85	0.630	0.126	0.769	n/a
Turbine 2/HRSG	3.3528	342.04	15.85	0.630	0.126	0.769	n/a
Auxiliary Boiler	0.9144	399.82	12.01	0.088	0.010	0.277	n/a
Emergency Generator	0.2540	787.59	60.05	0.564	(1)	0.105	n/a
Fire Pump	0.1524	665.37	53.25	(1)	0.0063	(1)	n/a
Cooling Tower (each cell)	9.6378	294.48	8.47	n/a	n/a	n/a	n/a
Averaging Period: Three hours							
Turbine 1/HRSG	3.3528	344.15	14.63	n/a	0.126	n/a	n/a
Turbine 2/HRSG	3.3528	344.15	14.63	n/a	0.126	n/a	n/a
Auxiliary Boiler	0.9144	399.82	12.01	n/a	0.010	n/a	n/a
Emergency Generator	0.2540	787.59	60.05	n/a	(1)	n/a	n/a
Fire Pump	0.1524	665.37	53.25	n/a	2.096E-03	n/a	n/a
Cooling Tower (each cell)	9.6378	294.48	8.47	n/a	n/a	n/a	n/a
Averaging Period: Eight hours							
Turbine 1/HRSG	3.3528	344.15	14.63	n/a	n/a	1.156	n/a
Turbine 2/HRSG	3.3528	344.15	14.63	n/a	n/a	1.156	n/a
Auxiliary Boiler	0.9144	399.82	12.01	n/a	n/a	0.277	n/a
Emergency Generator	0.2540	787.59	60.05	n/a	n/a	1.318E-02	n/a
Fire Pump	0.1524	665.37	53.25	n/a	n/a	(1)	n/a
Cooling Tower (each cell)	9.6378	294.48	8.47	n/a	n/a	n/a	n/a
Averaging Period: 24 hours							
Turbine 1/HRSG	3.3528	344.15	14.63	n/a	0.126	n/a	0.580
Turbine 2/HRSG	3.3528	344.15	14.63	n/a	0.126	n/a	0.580
Auxiliary Boiler	0.9144	399.82	12.01	n/a	0.010	n/a	0.0736
Emergency Generator	0.2540	787.59	60.05	n/a	4.951E-04	n/a	7.193E-04
Fire Pump	0.1524	665.37	53.25	n/a	(1)	n/a	(1)
Cooling Tower (each cell)	9.6378	294.48	8.47	n/a	n/a	n/a	2.205E-02
Averaging Period: Annual							
Turbine 1/HRSG	3.3528	342.15	15.19	0.513	0.099	n/a	0.462
Turbine 2/HRSG	3.3528	342.15	15.19	0.513	0.099	n/a	0.462
Auxiliary Boiler	0.9144	399.82	12.01	0.010	0.001	n/a	0.0084
Emergency Generator	0.2540	787.59	60.05	6.440E-03	1.356E-04	n/a	1.971E-04
Fire Pump	0.1524	665.37	53.25	2.474E-03	7.177E-05	n/a	4.281E-05
Cooling Tower (each cell)	9.6378	294.48	8.47	n/a	n/a	n/a	2.076E-02

Note: 1. Emergency generator and fire pump will not operate during the same 24-hour period.
Higher concentration from screening assessment used for each pollutant and averaging period.

Table 8.1-18. Emission rates and stack parameters for modeling, Alstom GTX100.

	Stack diameter, meters	Temp, deg K	Exhaust Velocity, m/s	Emission Rates, g/s NO_x	SO_2	CO	PM_{10}
Averaging Period: One hour							
Turbine 1/HRSG	3.3528	341.58	15.22	0.643	0.126	0.781	n/a
Turbine 2/HRSG	3.3528	341.58	15.22	0.643	0.126	0.781	n/a
Auxiliary Boiler	0.9144	399.82	12.01	0.088	0.010	0.277	n/a
Emergency Generator	0.2540	787.59	60.05	0.564	(1)	0.105	n/a
Fire Pump	0.1524	665.37	53.25	(1)	0.0063	(1)	n/a
Cooling Tower (each cell)	9.6378	294.48	8.47	n/a	n/a	n/a	n/a
Averaging Period: Three hours							
Turbine 1/HRSG	3.3528	341.58	15.22	n/a	0.126	n/a	n/a
Turbine 2/HRSG	3.3528	341.58	15.22	n/a	0.126	n/a	n/a
Auxiliary Boiler	0.9144	399.82	12.01	n/a	0.010	n/a	n/a
Emergency Generator	0.2540	787.59	60.05	n/a	(1)	n/a	n/a
Fire Pump	0.1524	665.37	53.25	n/a	2.096E-03	n/a	n/a
Cooling Tower (each cell)	9.6378	294.48	8.47	n/a	n/a	n/a	n/a
Averaging Period: Eight hours							
Turbine 1/HRSG	3.3528	341.58	15.22	n/a	n/a	17.300	n/a
Turbine 2/HRSG	3.3528	341.58	15.22	n/a	n/a	17.300	n/a
Auxiliary Boiler	0.9144	399.82	12.01	n/a	n/a	0.277	n/a
Emergency Generator	0.2540	787.59	60.05	n/a	n/a	1.318E-02	n/a
Fire Pump	0.1524	665.37	53.25	n/a	n/a	(1)	n/a
Cooling Tower (each cell)	9.6378	294.48	8.47	n/a	n/a	n/a	n/a
Averaging Period: 24 hours							
Turbine 1/HRSG	3.3528	342.80	14.28	n/a	0.126	n/a	0.592
Turbine 2/HRSG	3.3528	342.80	14.28	n/a	0.126	n/a	0.592
Auxiliary Boiler	0.9144	399.82	12.01	n/a	0.010	n/a	0.074
Emergency Generator	0.2540	787.59	60.05	n/a	4.951E-04	n/a	7.193E-04
Fire Pump	0.1524	665.37	53.25	n/a	(1)	n/a	(1)
Cooling Tower (each cell)	9.6378	294.48	8.47	n/a	n/a	n/a	2.205E-02
Averaging Period: Annual							
Turbine 1/HRSG	3.3528	342.36	14.81	0.568	0.099	n/a	0.468
Turbine 2/HRSG	3.3528	342.36	14.81	0.568	0.099	n/a	0.468
Auxiliary Boiler	0.9144	399.82	12.01	0.010	0.001	n/a	0.008
Emergency Generator	0.2540	787.59	60.05	6.440E-	1.356E-04	n/a	1.971E-04
Fire Pump	0.1524	665.37	53.25	2.474E-	7.177E-05	n/a	4.281E-05
Cooling Tower (each cell)	9.6378	294.48	8.47	n/a	n/a	n/a	2.076E-02

Note: 1. Emergency generator and fire pump will not operate during the same 24-hour period.
Higher concentration from screening assessment used for each pollutant and averaging period.

Specialized Modeling Analyses

Fumigation Modeling

Fumigation occurs when a plume that was originally emitted into a stable layer is mixed rapidly to ground-level when unstable air below the plume reaches plume level. Fumigation can cause very high ground-level concentrations for short time periods, typically less than one hour. Fumigation impacts for the turbines were predicted to occur at a distance of 9,304 meters from the turbine stacks (the ISCST3 maximum 1-hour impact occurs occurs about 100 meters from the turbine stacks) The SCREEN3 1hour fumigation impacts for both types of turbines, as shown in Tables 8.1-19 and 8.1-20), are only 10 percent of the modeled ISCST3 maxima. Therefore, fumigation will not significantly affect the overall results of the modeling analyses.

Table 8.1-19. SCREEN3 1-hour fumigation impacts, GE LM6000.

Pollutant	Fumigation impacts ($\mu g/m^3$)	Maximum ISCST3 Impact ($\mu g/m^3$)	Fumigation Percent of ISCST3 Maxima
NO_x	24.3	275.76	8.8%
SO_2	1.40	49.88	2.8%
CO	16.5	377.12	4.4%

Table 8.1-20. SCREEN3 1-hour fumigation impacts, Alstom GTX100.

Pollutant	Fumigation impacts ($\mu g/m^3$)	Maximum ISCST3 Impact ($\mu g/m^3$)	Fumigation Percent of ISCST3 Maxima
NO_x	25.0	275.77	9.1%
SO_2	1.45	49.88	2.9%
CO	17.1	377.12	4.5%

Turbine Startup

Facility impacts were also modeled during the startup of two turbines within a one hour timeframe to evaluate short-term impacts under startup conditions. Emission rates used for these scenarios were based on an engineering analysis of available vendor data, as supplied by General Electric and Alstom. A summary of the data evaluated in developing these emission rates was shown in Appendix 8.1-A for both turbine models. Turbine exhaust parameters for 50 percent operating load point were used to characterize turbine exhaust during startup. Startup impacts were evaluated for both the one- and eight-hour averaging periods using ISCST3. Emission rates and stack parameters used in the startup modeling analysis are shown in Table 8.1-21 and 8.1-22.

Table 8.1-21. Emission rates and stack parameters used in modeling analysis for startup emissions impacts, GE LM6000.

Parameter	Value
Turbine stack temperature	357.43 deg. K
Turbine exhaust velocity	9.8 m/s
One-hour average emissions[1]	
NO_x emission rate	2.432 g/s
CO emission rate	1.802 g/s

1 – PM_{10} and SO_2 emissions are less during startup than normal base load operations

Ozone Limiting

One-hour and annual NO_2 impacts were modeled using ISC3_OLM (Industrial Source Complex, Version 3, Ozone Limiting Method) Model (version 96113). While this version of ISCST3 is not based on the latest model ISCST3 update, this modeling analysis does not include any features (such as area sources or pit retention) that were affected by recent model updates. Both versions of ISCST3 were run without the ozone-limiting feature to verify that the modeled results would not be affected by using the OLM version of the model.

Table 8.1-22. Emmission rates and stack parameters used in modeling analysis for startup emissions impacts, Alstom GTX100.

Parameter	Value
Turbine stack temperature	340.93 deg. K
Turbine exhaust velocity	11.68 m/s
One-hour average emissions[1]	
NO_x emission rate	4.712 g/s
CO emission rate	44.831g/s

1 – PM_{10} and SO_2 emissions are less during startup than normal base load operations

ISC3_OLM uses hourly ozone data to perform ozone-limiting calculations on individual plumes on an hour-by-hour basis. Hourly ozone data from the North Highlands monitoring site for 2001 was used for all meteorological years in the analysis. This year was the most recent year available in an hourly format for use in ISC3_OLM.

Missing hours in the ozone data set were filled in using linear interpolation if the period of missing data was four hours or less. If the data were missing for five or more hours, ozone data from Roseville was used to fill in the missing hours.

Turbine Commissioning

There is only one high emission scenario possible during commissioning, i.e., 50 percent load. This scenario would be characterized as the period prior to SCR and CO control system commissioning, when the combustor is being tuned. Under this scenario, NO_x and CO emissions control systems (SCR and CO catalyst) would not be functioning and the combustor would not be tuned for optimum performance. Notwithstanding the above, the water injection system for NO_x would be operational resulting in a partially controlled situation for NO_x.

A facility may, with the District's approval, rely on air quality monitoring data collected at District monitoring stations to satisfy the requirement for preconstruction monitoring. In such a case, in accordance with Section 2.4 of the USEPA PSD guideline, the last three years of ambient monitoring data may be used if they are representative of the area's air quality where the maximum impacts occur due to the proposed source.

Results of the Ambient Air Quality Modeling Analyses

The maximum facility impacts calculated from each of the modeling analyses described above are summarized in Tables 8.1-23 and 8.1-24, below. The results of the fumigation modeling analysis are summarized in Appendix 8.1-H, Table 8.1-H-7.

Impacts During Turbine Commissioning

GE LM6000—As discussed above, there is a single potential scenario under which NO_x impacts could be higher than under other operating conditions already evaluated. Under this scenario, called turbine commissioning, the GE LM6000 NO_x emissions can be conservatively estimated to be equivalent to the guaranteed turbine-out level of 25 ppmvd at 15 percent O_2. If operation under this condition were to continue for one hour, maximum hourly NO_x emissions at 50 percent load would be (25 ppm) or 28.9 lbs/hr. CO emissions during commissioning periods would be equivalent to the uncontrolled startup value of 24 lbs/hr.

Table 8.1-23. Summary of results from refined modeling analyses, GE LM6000.

Pollutant	Averaging Time	Modeled Concentration (µg/m^3)		
		ISCST3	Fumigation	Startup
NO_x	1-hour	275.76	24.3	117.21
	Annual[1]	0.99	N/A	N/A
SO_2	1-hour	49.88	1.40	N/A
	3-hour	9.30	(2)	N/A
	24-hour	2.33	(2)	N/A
	Annual	0.733	N/A	N/A
CO	1-hour	377.12	16.5	139.85
	8-hour	126.06	(2)	N/A
PM_{10}	24-hour	16.68	(2)	N/A
	Annual	0.481		N/A

1 – Using Ambient Ratio Method
2 – Since the estimated 1-hour fumigation concentration is less than the maximum 1-hour concentration modeled using ISCST3, the effects of fumigation may be ignored (EPA-454/R-92-019, Section 4.5.3).

Table 8.1-24. Summary of results from refined modeling analyses, Alstom GTX100.

Pollutant	Averaging Time	Modeled Concentration (µg/m^3)		
		ISCST3	Fumigation	Startup
NO_x	1-hour	275.77	25.00	129.81
	Annual[1]	1.00	N/A	N/A
SO_2	1-hour	49.88	1.45	N/A
	3-hour	9.30	(2)	N/A
	24-hour	2.33	(2)	N/A
	Annual	0.733	N/A	N/A
CO	1-hour	377.12	17.1	1168.20
	8-hour	134.13	(2)	N/A
PM_{10}[1]	24-hour	16.68	(2)	N/A
	Annual	0.484	N/A	N/A

1 – Using Ambient Ratio Method.
2 – Since the estimated 1-hour fumigation concentration is less than the maximum 1-hour concentration modeled using ISCST3, the effects of fumigation may be ignored (EPA-454/R-92-019, Section 4.5.3).

Alstom GTX100—For the Alstom GTX100, NO_x emissions can be conservatively estimated to be equivalent to the guaranteed turbine-out level of 25 ppmvd at 15 percent O_2. If operation under this condition were to continue for one hour, maximum hourly NO_x emissions at 50 percent load would be (25 ppm) or 40.0 lbs/hr. CO emissions during commissioning periods would be equivalent to 1000 lbs/hr.

GE LM6000—An ISCST3 modeling analysis for the GE LM6000 turbine using a NO_x emission rate of 28.9.0 lb/hr and the appropriate stack parameters indicates that the maximum modeled one-hour NO_2 impact during commissioning is 48.79 $\mu g/m^3$. With the maximum background NO_2 one-hour concentration of 161.8 $\mu g/m^3$, the maximum total impact would be 210.6 $\mu g/m^3$, which is well below the state one-hour NO_2 standard of 470 $\mu g/m^3$. Modeling of turbine commissioning for CO emissions wasalso performed, with 1-hour impacts calculated at 42.21 $\mu g/m^3$.

Alstom GTX100—An ISCST3 modeling analysis for the Alstom GTX100 turbine using a NO_x emission rate of 40.0 lb/hr and the appropriate stack parameters indicates that the maximum modeled one-hour NO_2 impact during commissioning is 70.83 $\mu g/m^3$. With the maximum background NO_2 one-hour concentration of 161.8 $\mu g/m^3$, the maximum total impact would be 232.63 $\mu g/m^3$, which is well below the state one-hour NO_2 standard of 470 $\mu g/m^3$. Modeling of turbine commissioning for CO emissions was also performed, with 1-hour impacts calculated at 1770.87 $\mu g/m^3$ and 8-hour impacts at 603.02 $\mu g/m^3$

Ambient Air Quality Impacts

To determine a project's air quality impacts, the modeled concentrations are added to the maximum background ambient air concentrations and then compared to the applicable ambient air quality standards. The modeled concentrations have already been presented in earlier tables. The ambient air quality concentrations are measured at several sites within the regional vicinity of the proposed plant site. The maximum background ambient concentrations are listed in the following text and tables.

Table 8.1-25 presents the maximum established background concentrations used in the impacts analysis as derived from data collected at the monitoring sites. Data on the specific monitoring sites is presented in Section 8.1.3.

Table 8.1-25. Maximum background concentrations (Year 2000-2002)[1].

Pollutant	Averaging Time	2000	2001	2002
North Highlands, Roseville, and Rocklin Air Monitoring Stations				
NO_2 pphm	1-Hour	13	11	11
	Annual	2.6	2.5	ND
CO ppm	1-Hour	9.0	8.9	7.6
	8-Hour	6.28	7.03	5.10
PM^{10} $\mu g/m^3$	24-Hour	114	76	77
	Annual AM	28.7	26.7	28.0
	Annual GM	25.3	23.8	25.0
Rocklin Air Monitoring Station				
Ozone ppm	Max 1-Hour	.176	.096	.095
	Max 1-Hour Values	.132	.083	.092
North Highlands Air Monitoring Station				
SO_2 ppm	1-Hour	.03	.02	0.025
	3 Hour	.017	.016	.017
	24-hour	.007	.008	.008
	Annual	.002	.002	.002

1 – Highest value from all stations for each year

The maximum ground-level impacts due to operation of either the GE LM6000 or Alstom GTX100 turbines are shown with the ambient air quality standards in Tables 8.1-26. Using the conservative assumptions described earlier, the results indicate that the REP will not cause or contribute to violations of any state or federal air quality standards, with the exception of the state PM_{10} standard.

PSD Increment Consumption

The Prevention of Significant Deterioration (PSD) program was established to allow emission increases (increments of consumption) that do not result in significant deterioration of ambient air quality in areas

Table 8.1-26. Modeled maximum project impacts.

Pollutant	Averaging Time	Maximum Facility Impact ($\mu g/m^3$)	Background ($\mu g/m^3$)	Total Impact ($\mu g/m^3$)	State Standard ($\mu g/m^3$)	Federal Standard ($\mu g/m^3$)
NO_2	1-hour	275.77	161.8	437.57	470	-
	Annual	1.00	32.0	33.0	-	100
SO_2	1-hour	49.88	49.8	99.68	650	-
	3-hour	9.30	31.4	40.70	-	1300
	24-hour	2.33	28.8	31.13	109	365
	Annual	0.733	5.2	5.93	-	80
CO	1-hour	377.12	5269.8	5646.92	23,000	40,000
	8-hour	134.13	3551.4	3685.53	10,000	10,000
PM_{10}[1]	24-hour	16.68	93.0	109.68	50	150
	Annual[2]	0.484	25.0	25.48	30	-
	Annual[3]	0.484	25.0	25.48	-	50

1 – Including cooling tower
2 – Annual Arithmetic Mean
3 – Annual Geometric Mean
Worst-case one-hour NO_x impacts are dominated by emergency generator while 24-hour PM_{10} impacts due to auxiliary boiler.

where criteria pollutants have not exceeded the National Ambient Air Quality Standards (NAAQS). For the purposes of determining applicability of the PSD program requirements, the following regulatory procedure is used:

- REP emissions are evaluated to determine whether the potential increase in emissions will be significant. For new facilities that include steam generators, EPA considers a potential increase of 100 tons per year of any of the criteria pollutants to be significant. In this specific case, the REP is not considered a new source because potential emissions increases are below the threshold of 100 tons per year for all the pollutants as shown in Table 8.1-27.

Table 8.1-27. Comparison of emissions increase with PSD significance emissions levels.

Pollutant	Emissions (tons per year)		Significant emission levels (tons per year)	Significant?
	GE LM6000	Alstom GTX100		
NO_x	36.33	40.08	100	no
SO_2	6.91	6.93	100	no
VOC	11.58	35.62	100	no
CO	44.42	82.34	100	no
PM_{10}[1]	35.62	36.04	100	no

1 – Including cooling tower.

- If an ambient impact analysis is required, the analysis is first used to determine if the impact levels are significant. The determination of significance is based on whether the impacts exceed established significance levels shown in Table 8.1-28. If the significance levels are not exceeded, no further analysis is required.

Table 8.1-28. PSD levels of significance.

Pollutant	Averaging Time	Significant Impact Levels	Maximum Allowable Increments
NO_2	1-Hour	N/A	N/A
	Annual	1 $\mu g/m^3$	25 $\mu g/m^3$
SO_2	3-hour	25 $\mu g/m^3$	512 $\mu g/m^3$
	24-Hour	5 $\mu g/m^3$	91 $\mu g/m^3$
	Annual	1 $\mu g/m^3$	20 $\mu g/m^3$
CO	1-Hour	2000 $\mu g/m^3$	N/A
	8-Hour	500 $\mu g/m^3$	N/A
PM_{10}	24-Hour	5 $\mu g/m^3$	30 $\mu g/m^3$
	Annual	1 $\mu g/m^3$	17 $\mu g/m^3$

- If the significance levels are exceeded, an analysis is required to demonstrate that the allowable increments will not be exceeded, on a pollutant-specific basis. Increments are the maximum increases in concentration that are allowed to occur above the baseline concentration. These PSD increments are also shown in Table 8.1-28.

Table 8.1-27 shows that the REP will not be a major new source of any pollutant. Emissions of all pollutants from the REP will be below the 100 ton per year major new source threshold. Because the REP is not considered major for at least one criteria pollutant, PSD review and an increment analysis is not required for the proposed project.

Notwithstanding the above, the maximum modeled impacts from the REP may be compared with the significance levels in Table 8.1-27 for informational purposes. Review of Tables 8.1-26 with 8.1-28 shows that the REP does not exceed any of the PSD significance levels except for the 24-hour PM_{10}.

8.1.5.2 Screening Health Risk Assessment

A screening health risk assessment (SHRA) was conducted to determine expected impacts on public health of the noncriteria pollutant emissions from the facility. The SHRA was conducted in accordance with the CAPCOA Air Toxics "Hot Spots' Program Revised 1992, Risk Assessment Guidelines" (CAPCOA 1993). The SHRA estimated the offsite cancer risk at the maximum impact receptor (MIR) location. If impacts at the MIR are below the significance thresholds with respect to cancer risk and acute and chronic health effects, then the impacts at all other identified receptors will also be insignificant. The CARB/OEHHA Health Risk Assessment computer program was used to evaluate multipathway exposure to toxic substances. Because of the conservatism (overprediction) built into the established risk analysis methodology, the actual risks will be lower than those calculated. See also Section 8.9 (Public Health) for a detailed discussion of the SHRA and other public health issues.

A health risk assessment requires the following information:

- Unit risk factors (or carcinogenic potency values) for any carcinogenic substances that may be emitted
- Noncancer Reference Exposure levels (RELs) for determining non-carcinogenic health impacts

- The modeled maximum offsite concentration of each of the pollutants emitted

Pollutant-specific unit risk factors are the estimated probability of a person contracting cancer as a result of constant exposure to an ambient concentration of 1 $\mu g/m^3$ over a 70-year lifetime. The SHRA uses unit risk factors specified by the California Office of Environmental Health Hazard Assessment (OEHHA). The cancer risk for each pollutant emitted is the product of the unit risk factor and the modeled concentration. All of the pollutant cancer risks are assumed to be additive.

An evaluation of the potential noncancer health effects from long-term (chronic) and short-term (acute) exposures has also been included in the SHRA. Many of the carcinogenic compounds are also associated with noncancer health effects and are therefore included in the determination of both cancer and noncancer effects. RELs are used as indicators of potential adverse health effects. RELs are generally based on the most sensitive adverse health effect reported and are designed to protect the most sensitive individuals. However, exceeding the REL does not automatically indicate a health impact. The OEHHA RELs were used to determine any adverse health effects from noncarcinogenic compounds. A hazard index for each noncancer pollutant is then determined by the ratio of the pollutant annual average concentration to its respective REL for a chronic evaluation. Each of the individual indices are summed to determine the overall hazard index for the project. Because noncancer compounds do not target the same system or organ, this sum is considered conservative. The same procedure is used for the acute evaluation.

The REP SHRA results are compared with the established risk management procedures for the determination of acceptability. The established risk management criteria include those listed below:

- If the potential increased cancer risk is less than one in one million, the facility risk is considered not significant.
- If the potential increased cancer risk is greater than one in one million but less than ten in a million and Toxics-Best Available Control Technology (TBACT) has been applied to reduce risks, the facility risk is considered acceptable.
- If the potential increased cancer risk is greater than ten in one million and there are mitigating circumstances that, in the judgment of a regulatory agency, outweigh the risk, the risk is considered acceptable.
- For noncancer effects, total hazard indices of one or less are considered not significant.
- For a hazard index greater than one, OEHHA and the reviewing agency conduct a more refined review of the analysis and determine whether the impact is acceptable.

The SHRA includes the noncriteria pollutants listed above in Table 8.1-16. The receptor grid described earlier for criteria pollutant modeling was used for the SHRA. Receptors were also placed at each sensitive receptor identified in Appendix 8.1-G, Table 8.1-G8 and shown in Figure 8.9-2.

The SHRA results for the REP are presented in Table 8.1-29, and the detailed calculations are provided in Appendix 8.1-G.

The screening HRA results indicate that the acute and chronic hazard indices are well below 1.0, and are therefore not significant for either turbine type. The maximum chronic noninhalation exposure was not established due to the lack of REL data for the specified substances and is therefore considered insignificant. The cancer risk to a maximally exposed individual at the maximum impact receptor location (for either the GE LM6000 or the Alstom GTX100 turbine) is 0.0743 in one million, well below the

TBACT 10 in one million level. The screening HRA results indicate that, overall, the REP will not pose a significant health risk.

Table 8.1-29. Screening health risk assessment results.

Risk type	Value
Cancer risk at maximum impact receptor	0.0743 per million
Acute inhalation hazard index	0.468
Chronic inhalation hazard index	0.0108
Chronic noninhalation exposure	No value calculated

8.1.5.3 Construction Emissions and Impacts Analysis

Emissions due to the construction phase of the project have been estimated, including an assessment of emissions from vehicle and equipment exhaust and the fugitive dust generated from material handling. A dispersion modeling analysis was conducted based on these emissions. A detailed analysis of the emissions and ambient impacts is included in Appendix 8.1-F. With the exception of the 24-hour PM_{10} concentrations, the results of the analysis indicate that the maximum construction impacts will be below the state and federal standards for all the criteria pollutants emitted. Exclusion of the background values results in construction impacts that will not exceed state and federal air quality standards. The best available emission control techniques will be used. The REP construction site impacts are not unusual in comparison to most construction sites, i.e., construction sites that use good dust suppression techniques and low-emitting vehicles typically do not cause violations of air quality standards.

The USEPA has the exclusive authority to issue PSD permits in Placer County. As shown in Section 8.1.5, the project is not subject to PSD regulation.

8.1.5.4 West Roseville Not Annexed

The REP's emissions would be the same, whether or not the annexation of West Roseville and the build-out of the WRSP take place. Without the build-out of the WRSP, however, there would be fewer sensitive receptors within 1 mile of the project site and there would be no schools, day care centers, or senior centers within 1.25 miles.

8.1.6 Consistency with Laws, Ordinances, Regulations and Standards

8.1.6.1 Consistency with Federal Requirements

The PCAPCD has been delegated authority by the USEPA to implement and enforce most federal requirements that are applicable to the REP, including the new source performance standards and Title V program. The PCAPCD does not have PSD review delegation from the USEPA and the project is not subject to PSD review. Compliance with the District regulations ensures compliance and consistency with other corresponding federal requirements as well. The REP will also be required to comply with the Federal Acid Rain requirements (Title IV). Since the District has received delegation for implementing Title IV through its Title V permit program, the REP will secure a District Title V permit that imposes the necessary requirements for compliance with the Title IV Acid Rain provisions.

8.1.6.2 Consistency with State Requirements

State law sets up local air pollution control districts and air quality management districts with the principal responsibility for regulating emissions from stationary sources. As discussed above, the REP

project is under the local jurisdiction of the PCAPCD, and compliance with District regulations will ensure compliance with state air quality requirements.

8.1.6.3 Consistency with Local Requirements: Placer County Air Pollution Control

The REP project is subject to District regulations that apply to new sources of emissions, to the prohibitory regulations that specify emission standards for individual equipment categories, and to the requirements for evaluation of impacts from toxic air pollutants. The following sections include the evaluation of facility compliance with the applicable District requirements.

Under the regulations that govern new sources of emissions, the REP is required to secure a preconstruction Determination of Compliance from the District, as well as demonstrate continued compliance with regulatory limits when the REP becomes operational. The preconstruction review includes demonstrating that the REP will use best available control technology (BACT) and will provide any necessary emission offsets.

BACT for the applicable pollutants was determined by reviewing the most recent Compilation of California BACT Determinations, CAPCOA (2nd Ed., November 1993) and USEPA's BACT/LAER Clearinghouse. For the gas turbines and duct burners, the District considers BACT to be the most stringent level of demonstrated emission control that is feasible. The REP will use the BACT measures discussed below.

As a BACT measure, the REP will limit the combustion turbine fuels burned to natural gas, a clean burning fuel. Liquid fuels will not be fired at the REP. Burning of liquid fuels in the gas turbine combustors and duct burners would result in greater criteria pollutant emissions than if the units burned only gaseous fuels. This measure acts to minimize the formation of all criteria air pollutants.

BACT for NO_x emissions will be the use of low NO_x emitting equipment and add-on controls. The REP has selected the GE gas turbine equipped with water injection or the Alstom turbine with a dry, low-NO_X burner for NO_x control. The gas turbine will generate a maximum of 25 ppmvd NO_x and 15 ppmvd NO_X, corrected to 15 percent O_2, based on water injection and dry, low-NO_X burner combustors, respectively. In addition, the REP will use a selective catalytic reduction (SCR) system to further reduce NO_x emissions to 2.0 ppmvd NO_x, corrected to 15 percent O_2 (1-hour average). The District BACT guidelines indicate that BACT from large gas turbines (>23 MMBtu/hr heat input) is an exhaust concentration not to exceed 2-3 ppmvd NO_x, corrected to 15 percent O_2; therefore, the REP will meet the necessary BACT requirements for NO_x. The duct burner will also be exhausted to the SCR system; therefore, BACT for the duct burner is also the stringent 2-3 ppmvd NO_x level, corrected to 15 percent O_2.

BACT for CO emissions will be achieved by use of duct burners with low CO production characteristics. In addition, the REP units will be equipped with oxidation catalysts for further control of CO. The REP has specified a CO limit of 4 ppmvd, corrected to 15 percent O_2, for all load conditions in each combustion turbine. CO emissions from the REP HRSG stacks will meet the District BACT requirements. The CO emission rate from the gas turbines and duct burners, as measured at the HRSG exhaust stacks, will not exceed 4 ppmvd, corrected to 15 percent O_2 during base load and duct firing operations.

BACT for VOC emissions from combustion devices has historically been the use of best combustion practices. In addition, VOC emissions are expected to be further reduced as a result of the proposed CO oxidation catalyst. The amount of reduction is not estimated herein, but recent data indicates that POC reductions on the order of 25-50 percent are routinely seen. With the use of the water injection, CO

catalyst, and advanced duct burner design, VOC emissions leaving the HRSG stacks will not exceed 2.0 ppmvd, corrected to 15 percent oxygen. This level of emissions meets the BACT requirements.

BACT for PM_{10} and SO_2 is best combustion practices and the use of gaseous fuels. As mentioned above, use of clean burning natural gas fuel will result in minimal particulate and sulfur dioxide emissions.

Emissions Offsetting

In addition to the BACT requirements, District requires the REP to provide emission offsets before the facility commences operations and a permit is issued by the PCAPCD.

PCAPCD Rule 502, New Source Review, specifies the quantity of emissions offsets required by a new source based upon its potential to emit criteria pollutants. The scenario resulting in the maximum emissions is used to determine the amount of offsets that must be obtained. The project's maximum annual potential to emit criteria pollutants is shown in Table 8.1-30. PCAPCD Rule 502 specifies that emission increases for the purposes of estimating offsets must be on quarterly basis, therefore maximum quarterly emissions are also shown in Table 8.1-30.

Table 8.1-30. Maximum potential to emit

	NO_X		SO_2		CO		VOC		PM_{10}	
	LM6000	Alstom	LM6000	Alstom	LM6000	Alstom	LM6000	Alstom	LM6000	Alstom
Quarterly[1]	19,371.9	20,685.4	3,772.84	3,772.84	23,622.15	56,610.96	6,508.14	28,301.25	19,091.75	19,364.655
Annual	72,666.8	80,165.1	13,818.32	13,818.32	88,844.7	164,673.3	23,162.8	71,234.8	71,230	72,071.4

1 – Values are taken from the highest total quarterly values shown in Appendix 8.1-E. This is a copy of Table 8.1-E12.

Sources of ERCs—Credits will be obtained from PCAPCD emission credit registry, other air districts, and air basins surrounding the proposed project. REP is in the process of acquiring some ERCs in the Sacramento Air Basin and the Mountain Air Basin and is also presently negotiating the purchase of additional ERCs. Appendix 8.1-I lists the sources of emissions reduction credits for the REP (filed separately under a request for confidentiality).

Emission offsets must be provided for project's maximum quarterly emissions. Rule 502, Section 303 specifies emissions offset ratios for criteria pollutants as a function of distance from the proposed project to the source of the emissions reduction credits, as shown in Table 8.1-9.

8.1.7 Cumulative Air Quality Impacts Analysis

An analysis of potential cumulative air quality impacts that may result from the REP and other reasonably foreseeable projects is generally required only when project impacts are significant.

To ensure that potential cumulative impacts of the REP and other nearby projects are adequately considered, a cumulative impacts analysis will be conducted in accordance with the protocol included as Appendix 8.1-H. This procedure is similar to that used to evaluate increment consumption, although no increment consumption analysis is required for the REP project.

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Table 8.1-31. Laws, ordinances, regulations, standards (LORS), and permits for protection of air quality.

LORS	Purpose	Regulating Agency	Permit or Approval	Schedule and Status of Permit	Conformance (Section)
Federal					
Clean Air Act (CAA) §160-169A and implementing regulations, Title 42 United States Code (USC) §7470-7491 (42 USC 7470-7491), Title 40 Code of Federal Regulations (CFR) Parts 51 & 52 (40 CFR 51 & 52). (Prevention of Significant Deterioration Program)	Requires prevention of significant deterioration (PSD) review and facility permitting for construction of new or modified major stationary sources of air pollution. PSD review applies to pollutants for which ambient concentrations are lower than NAAQS.	PCAPCD with USEPA oversight	After project review, issues Authority to Construct (ATC) with conditions limiting emissions.	Agency approval to be obtained before start of construction.	8.1.4.1, 8.1.4.2
CAA §171-193, 42 USC §7501 et seq. (New Source Review)	Requires new source review (NSR) facility permitting for construction or modification of specified stationary sources. NSR applies to pollutants for which ambient concentration levels are higher than NAAQS.	PCAPCD with USEPA oversight	After project review, issues ATC with conditions limiting emissions.	Agency approval to be obtained before start of construction.	8.1.4.1, Tables 8.1-10,11,26,27,28, Appendix 8.1C and F
CAA §401 (Title IV), 42 USC §7651 (Acid Rain Program)	Requires reductions in NO_x and SO_2 emissions.	PCAPCD with USEPA oversight	Issues Acid Rain permit after review of application.	Application to be made within 12 months of start of facility operation.	8.1.4.1
CAA §501 (Title V), 42 USC §7661 (Federal Operating Permits Program)	Establishes comprehensive permit program for major stationary sources.	PCAPCD with USEPA oversight	Issues Title V permit after review of application.	Application to be made within 12 months of start of facility operation.	8.1.4.1
CAA §111, 42 USC §7411, 40 CFR Part 60 (New Source Performance Standards - NSPS)	Establishes national standards of performance for new stationary sources.	PCAPCD with USEPA oversight	After project review, issues ATC with conditions limiting emissions.	Agency approval to be obtained before start of construction.	8.1.4.1, 8.1.4.2
CAA §112, 42 USC §7412, 40 CFR Part 63 (National Emission Standards for Hazardous Air Pollutants - NESHAPs)	Establishes national emission standards for hazardous air pollutants.	PCAPCD with USEPA oversight	After project review, issues ATC with conditions limiting emissions.	Agency approval to be obtained before start of construction.	8.1.4.1, 8.1.4.2
State					
California Health & Safety Code (H&SC) §41700 (Nuisance Regulation)	Outlaws discharge of such quantities of air contaminants that cause injury, detriment, nuisance, or annoyance.	PCAPCD with CARB oversight	After project review, issues ATC with conditions limiting emissions.	Agency approval to be obtained before start of construction.	8.1.4.1
H&SC §44300-44384; California Code of Regulations (CCR) §93300-93347 (Toxic "Hot Spots" Act)	Requires preparation and biennial updating of facility emission inventory of hazardous substances; risk assessments.	PCAPCD with CARB oversight	After project review, issues ATC with conditions limiting emissions.	Screening HRA submitted before start of construction.	8.1.4.1, 8.1.5.2

Table 8.1-32 (continued).

LORS	Purpose	Regulating Agency	Permit or Approval	Schedule and Status of Permit	Conformance (Section)
California Public Resources Code §25523(a); 20 CCR §1752, 2300-2309 (CEC & CARB Memorandum of Understanding)	Requires that CEC's decision on AFC include requirements to assure protection of environmental quality; AFC required to address air quality protection.	CEC	After project review, issues Final Determination of Compliance (FDOC) with conditions limiting emissions.	CEC approval of AFC, i.e., FDOC, to be obtained before start of construction.	8.1.4.1, Appendix 8.1A thru I
Local					
PCAPCD General Regulation II, Section 205, §301(Public Nuisance)	Prohibits emissions in quantities that adversely affect public health, other businesses, or property.	PCAPCD with CARB oversight	After project review, issues ATC with conditions limiting emissions.	Agency approval to be obtained before start of construction.	8.1.4.2
PCAPCD Regulation V, Section 502 (Permits), (New Source Review)	NSR: Requires that preconstruction review be conducted for all proposed new or modified sources of air pollution, including BACT, emissions offsets, and air quality impact analysis.	PCAPCD with CARB oversight	After project review, issues ATC with conditions limiting emissions.	Agency approval to be obtained before start of construction.	8.1.4.1, 8.1.4.2
PCAPCD Regulation V, Section 507 (Major Facility Review)	Implements operating permits requirements of CAA Title V and acid rain regulations of CAA Title IV.	PCAPCD	Issues Title V permit after review of application.	Application to be made within 12 months of start of facility operation.	8.1.4.1, 8.1.4.2
PCAPCD Regulation II, Section 210 (Particulate Matter and Visible Emissions)	Limits visible emissions for stationary sources.	PCAPCD with CARB oversight	After project review, issues ATC with conditions limiting emissions.	Agency approval to be obtained before start of construction.	8.1.4.2
PCAPCD Regulation II, Section 209 (Heat Transfer Operation NO_x Emissions Limits)	Limits NO_x and CO from industrial, institutional, and commercial steam generating units.	PCAPCD with CARB oversight	After project review, issues ATC with conditions limiting emissions.	Agency approval to be obtained before start of construction.	8.1.4.2
PCAPCD Regulation II, Section 250 (Nitrogen Oxides from Stationary Gas Turbines)	Limits NO_x emissions from gas turbines.	PCAPCD with CARB oversight	After project review, issues ATC with conditions limiting emissions.	Agency approval to be obtained before start of construction.	8.1.4.2

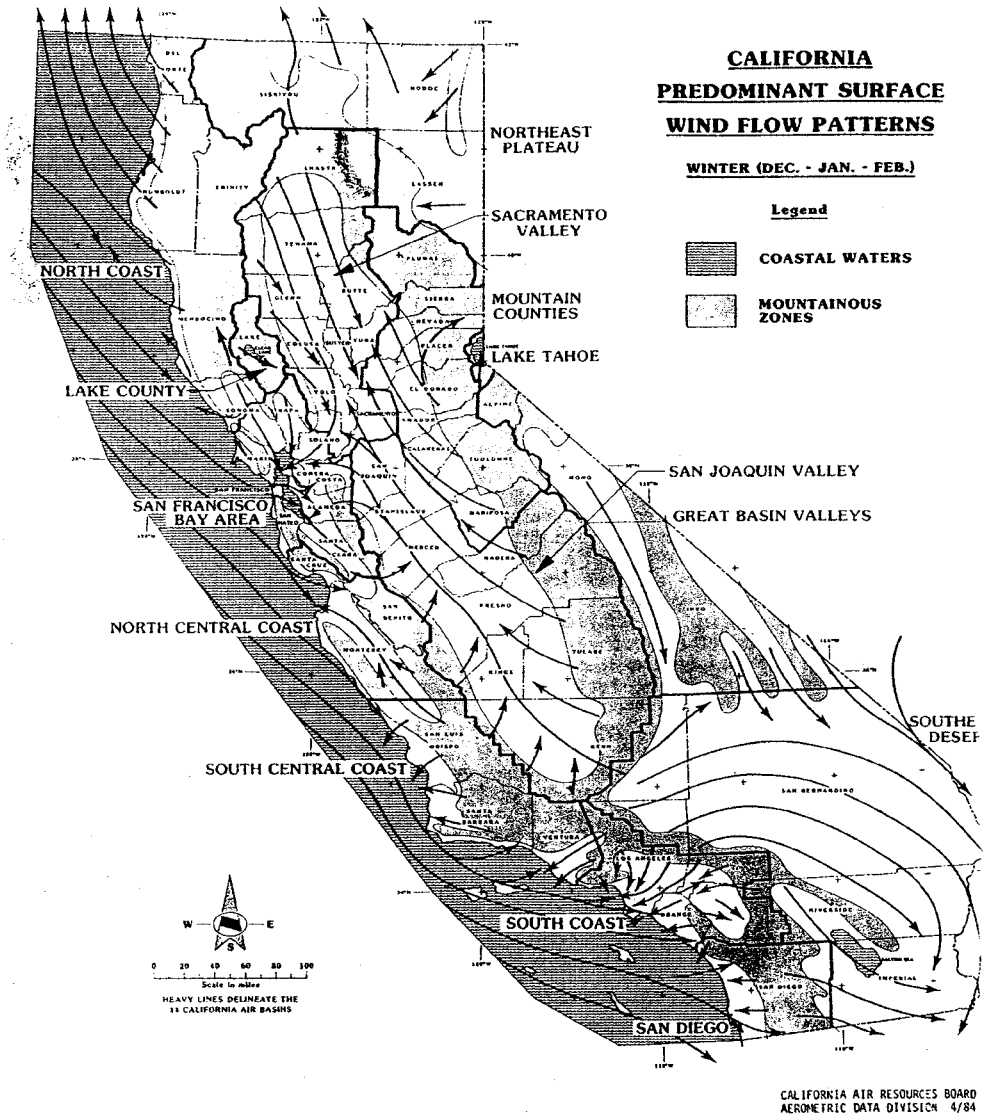


Figure 8.1-2

Surface Wind Flow Patterns
Winter

TETRA TECH FW, INC.

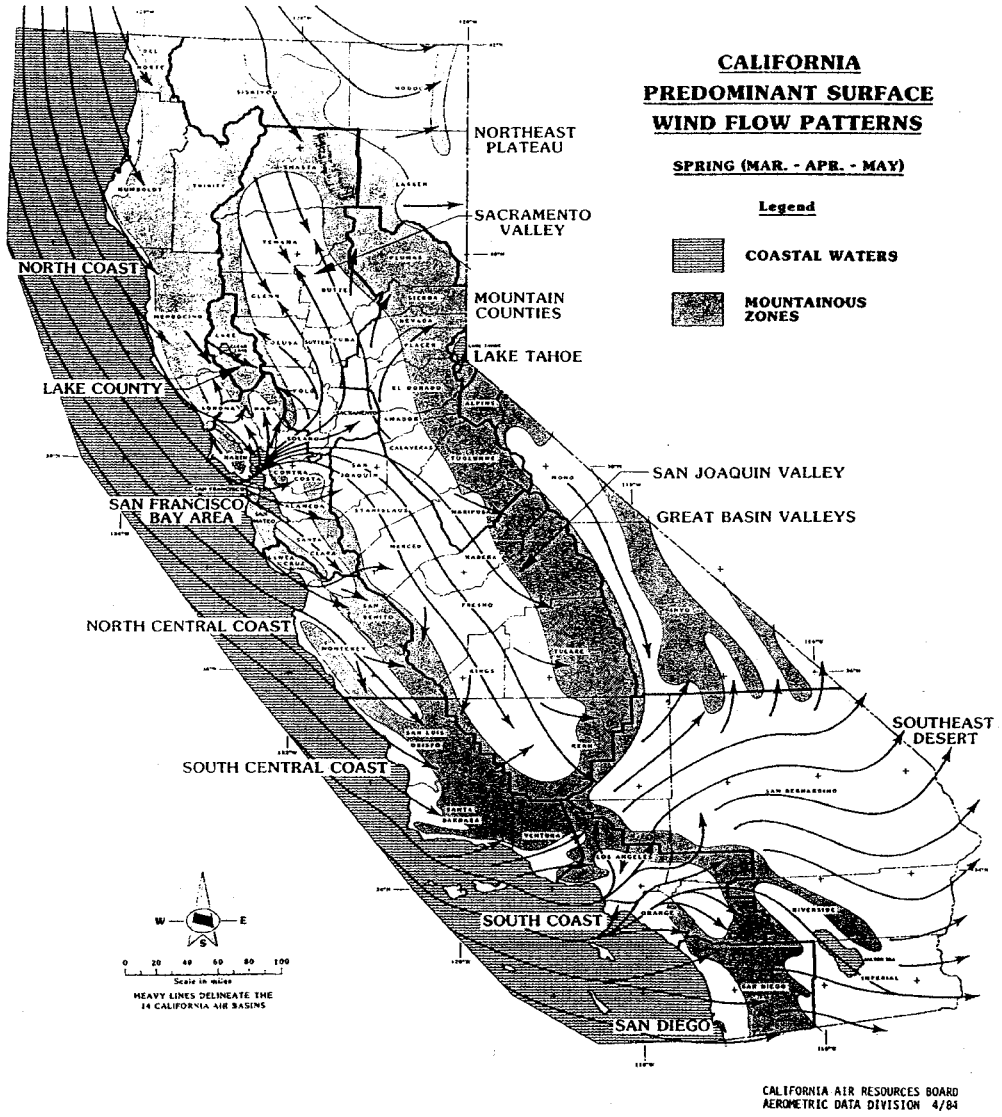


Figure 8.1-3

Surface Wind Flow Patterns
Spring

TETRA TECH FW, INC.

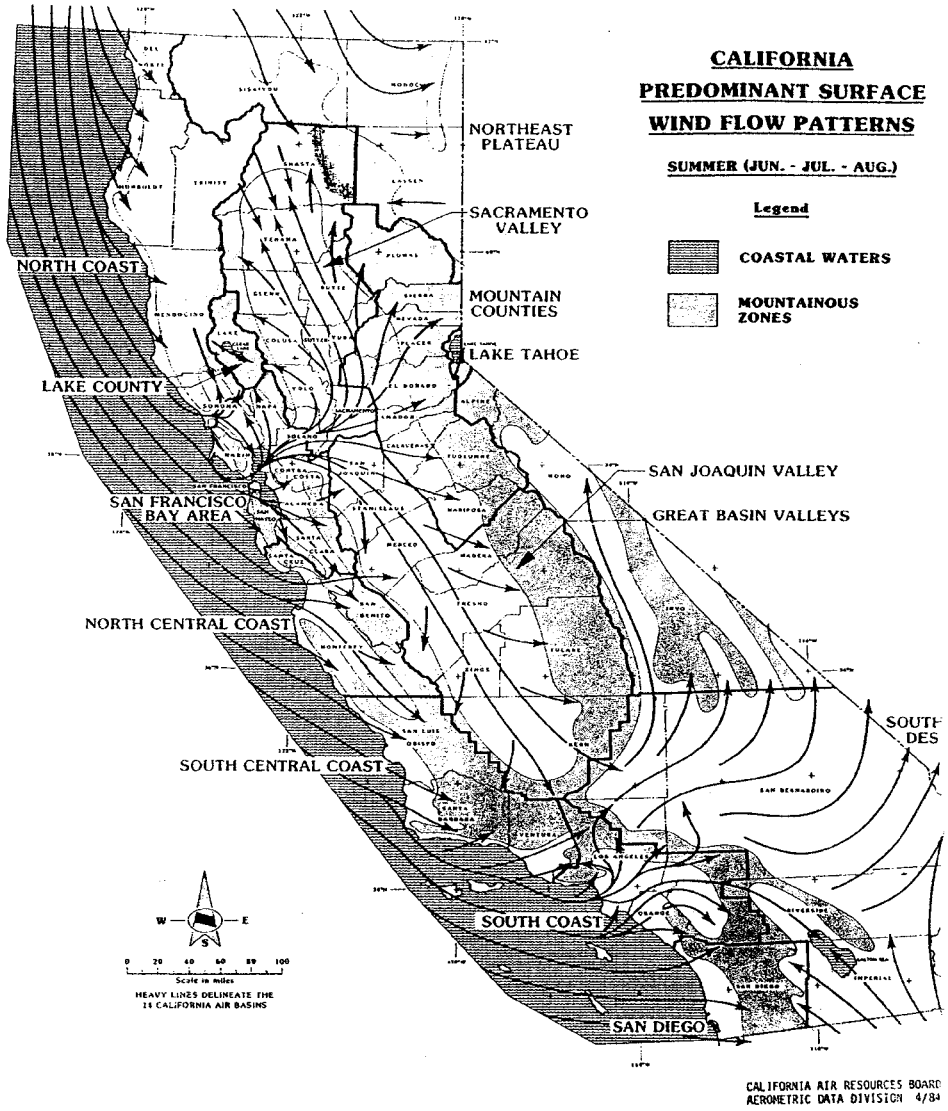


Figure 8.1-4

Surface Wind Flow Patterns
Summer

TETRA TECH FW, INC.

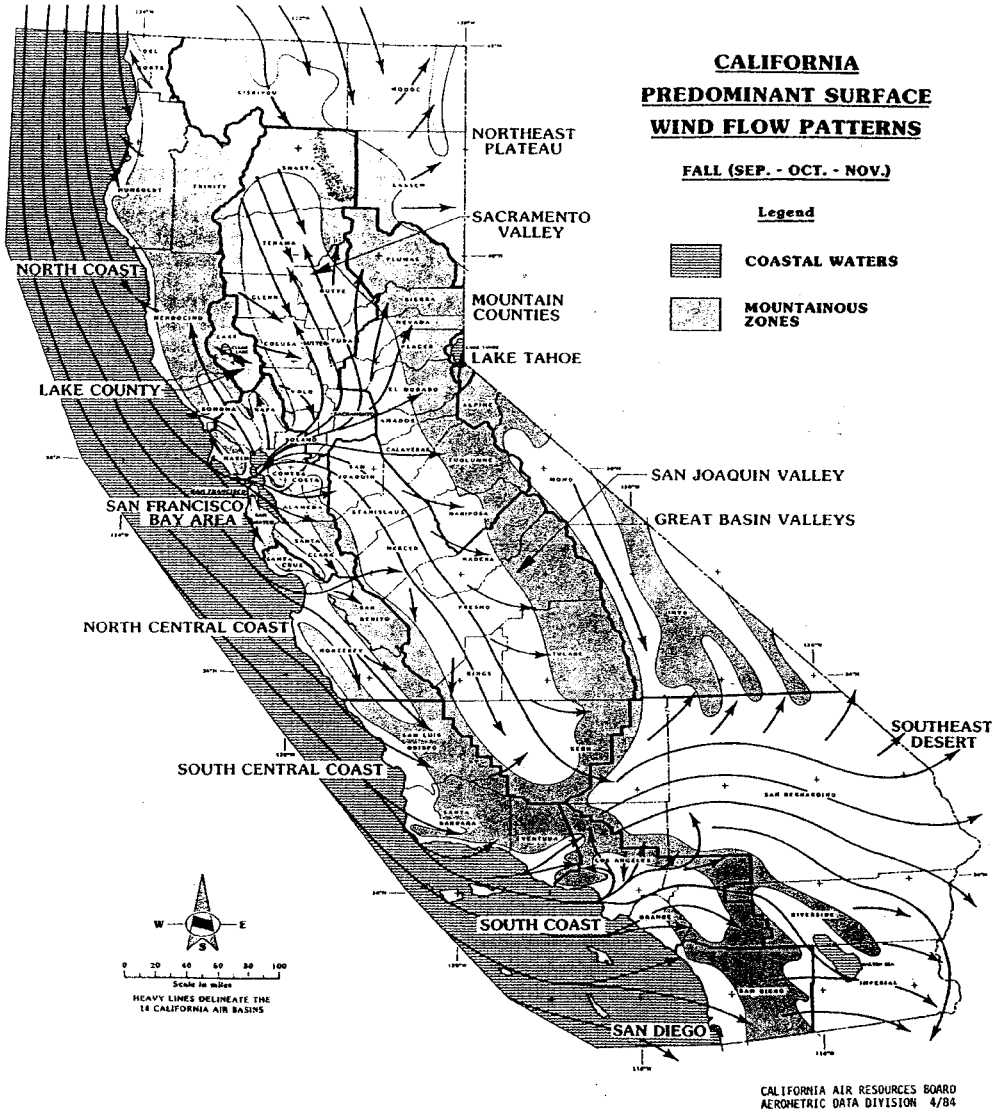


Figure 8.1-5

Surface Wind Flow Patterns
Fall

TETRATECH FW, INC.

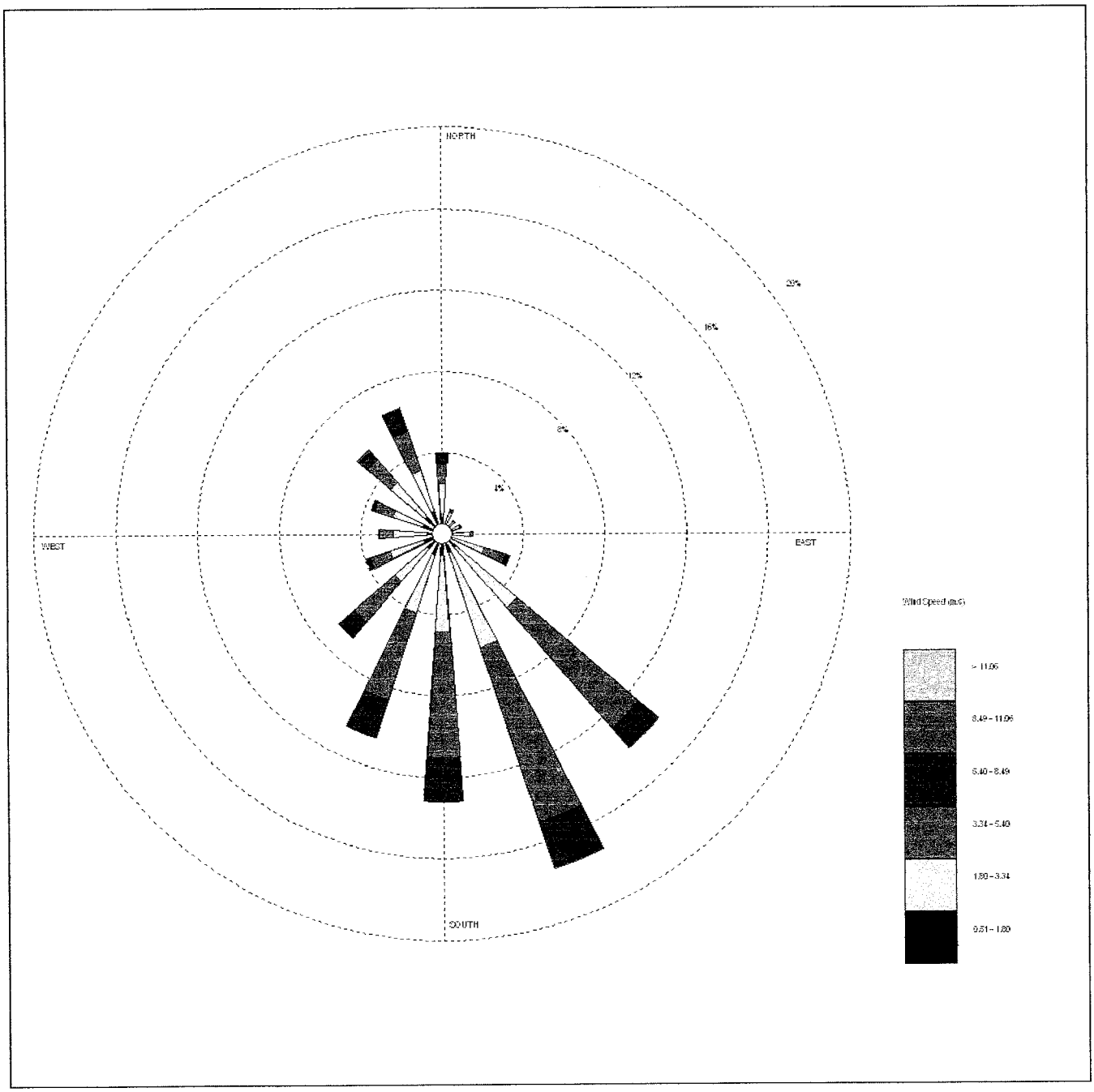


Figure 8.1-6a McClellan Air Force Base Spring Wind Rose (1992-1996)

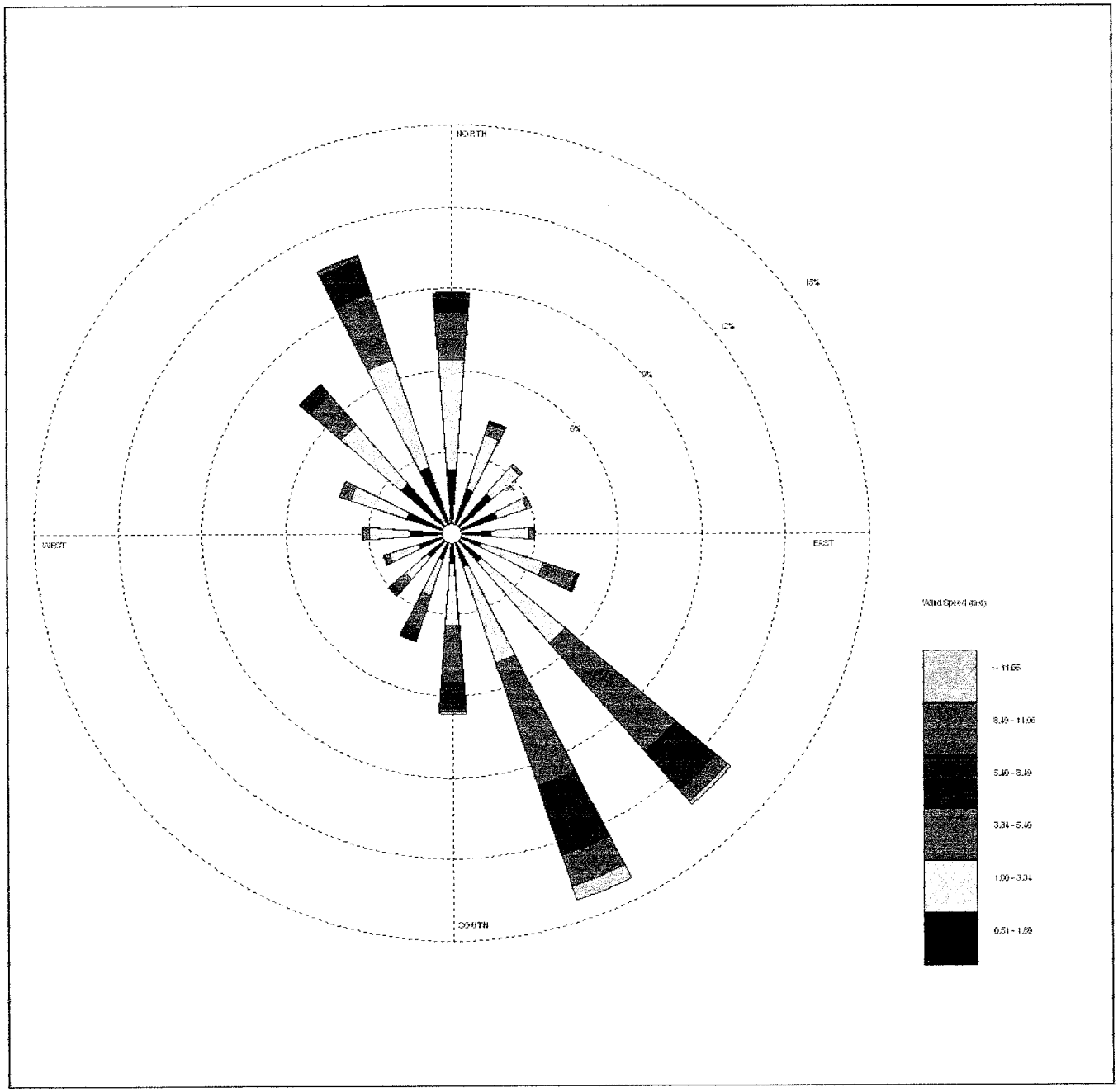


Figure 8.1-6b McClellan Air Force Base Fall Wind Rose (1992-1996)

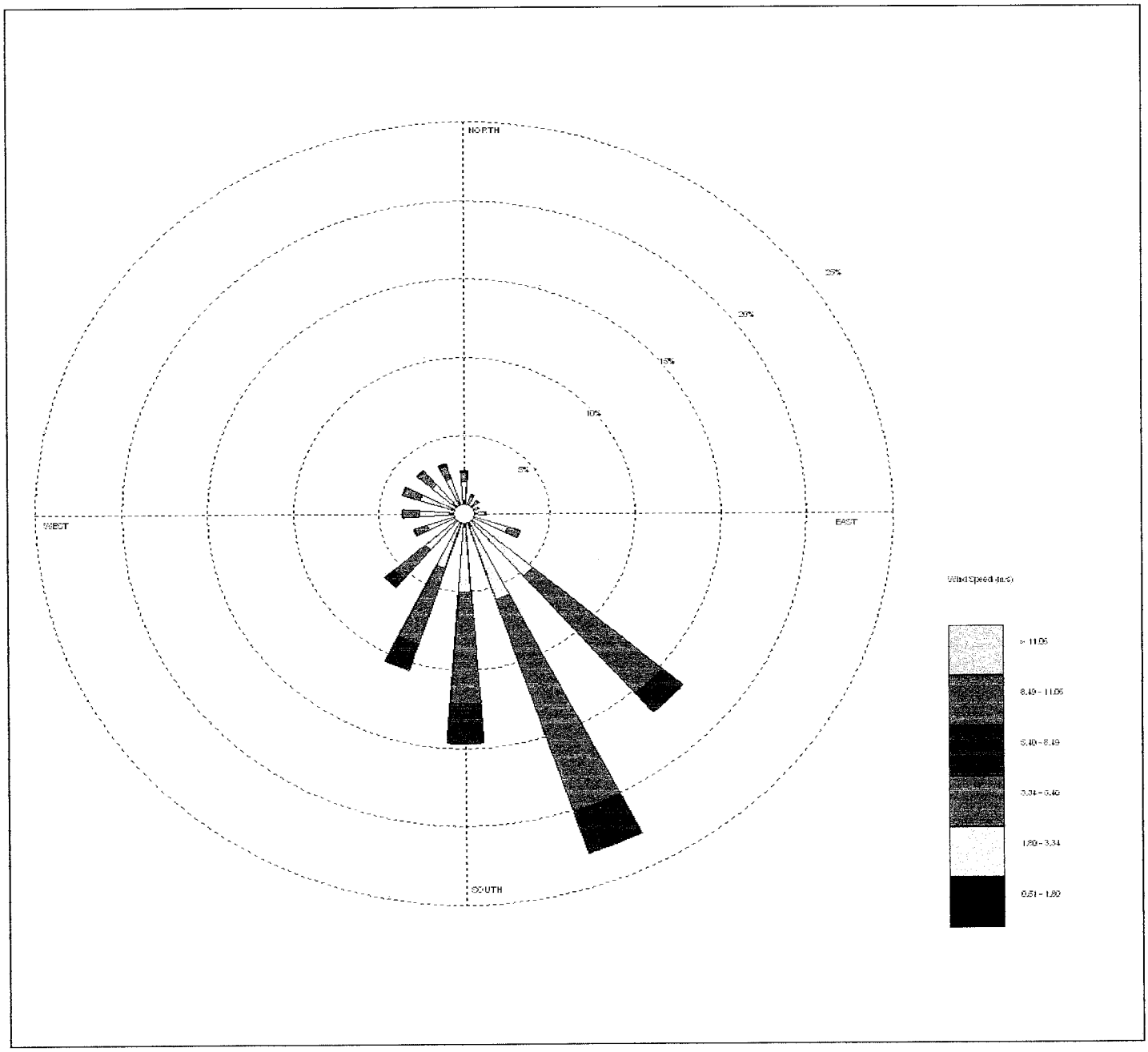


Figure 8.1-6c McClellan Air Force Base Summer Wind Rose (1992-1996)

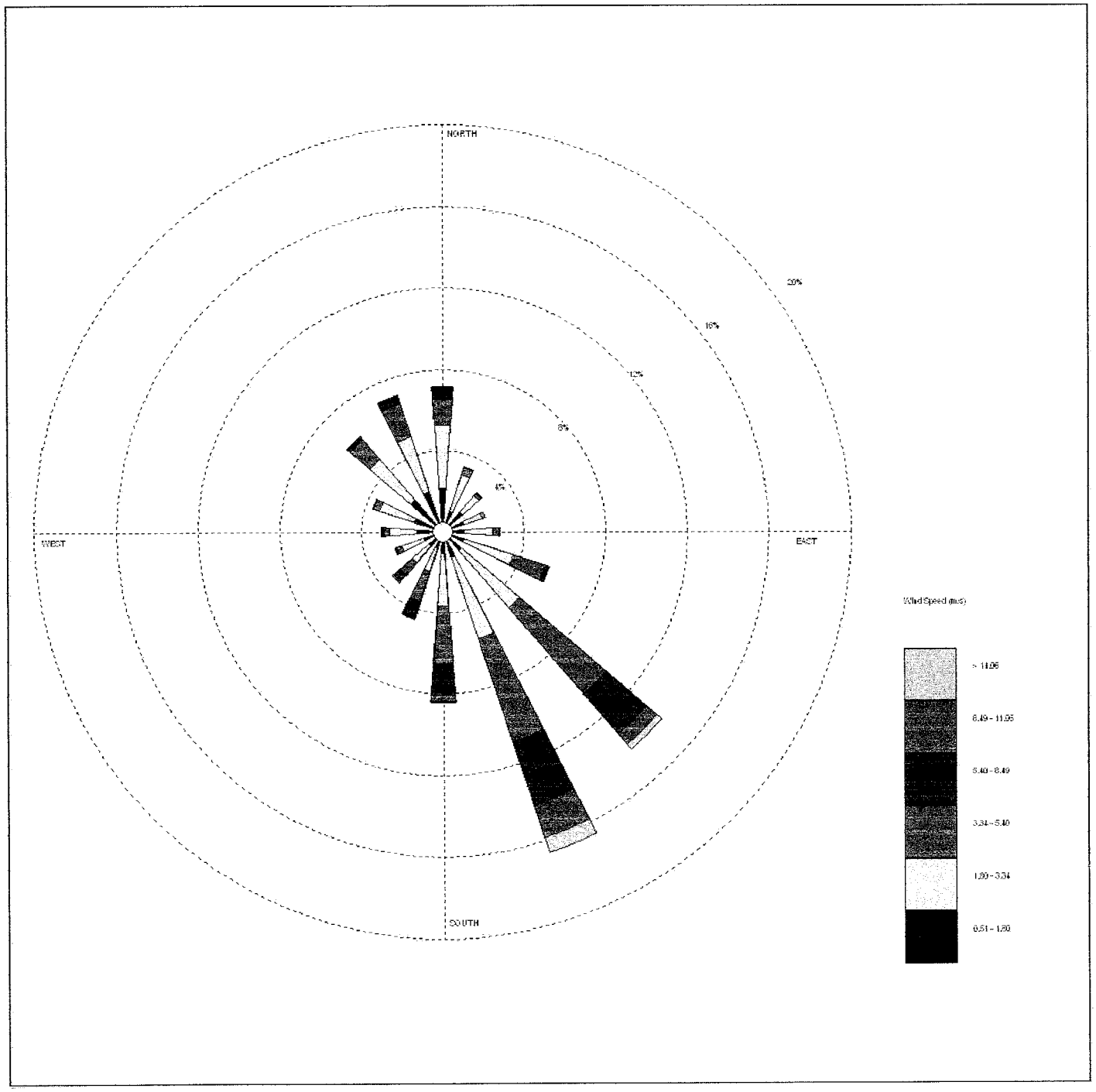


Figure 8.1-6d McClellan Air Force Base Winter Wind Rose (1992-1996)

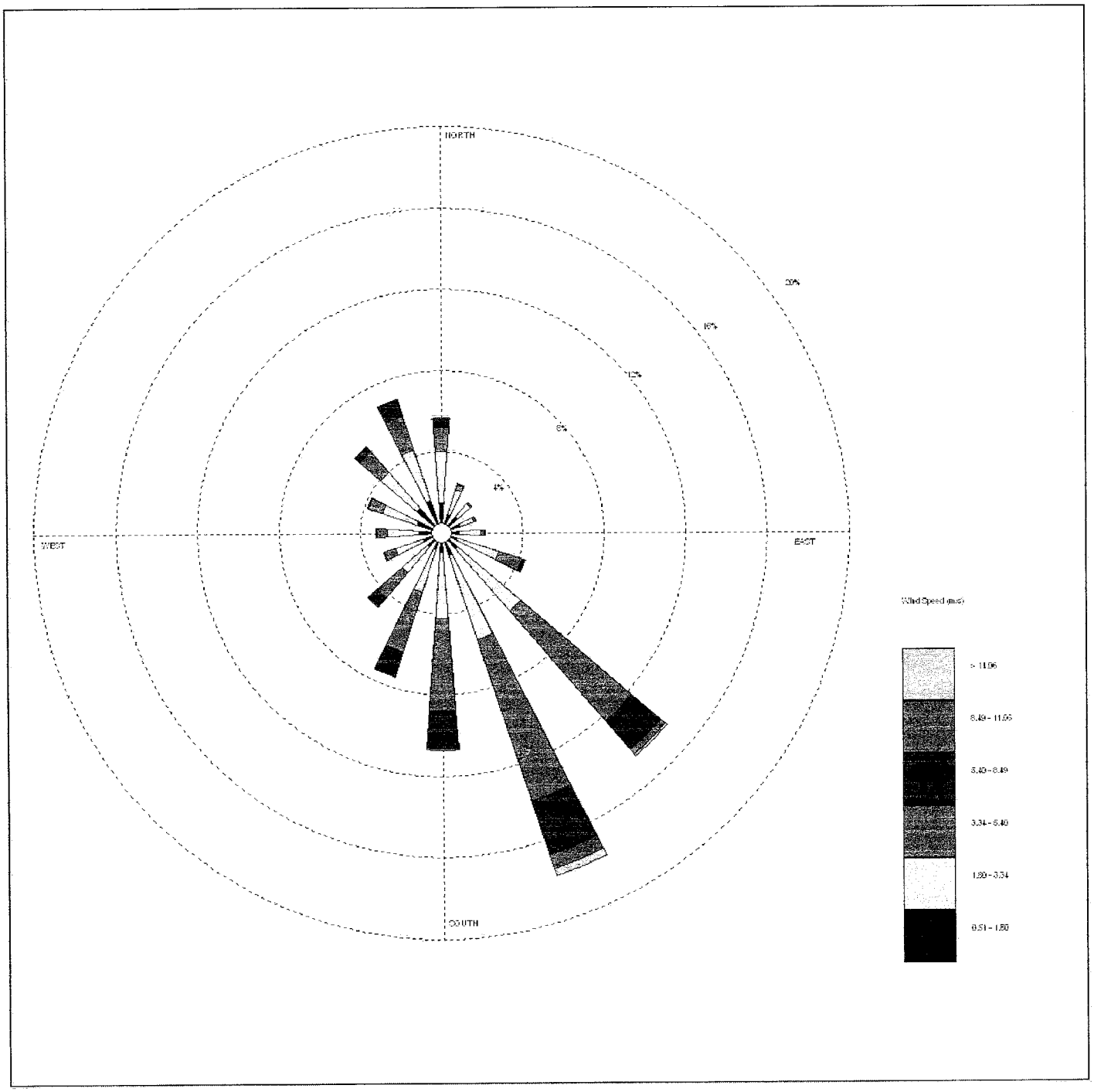
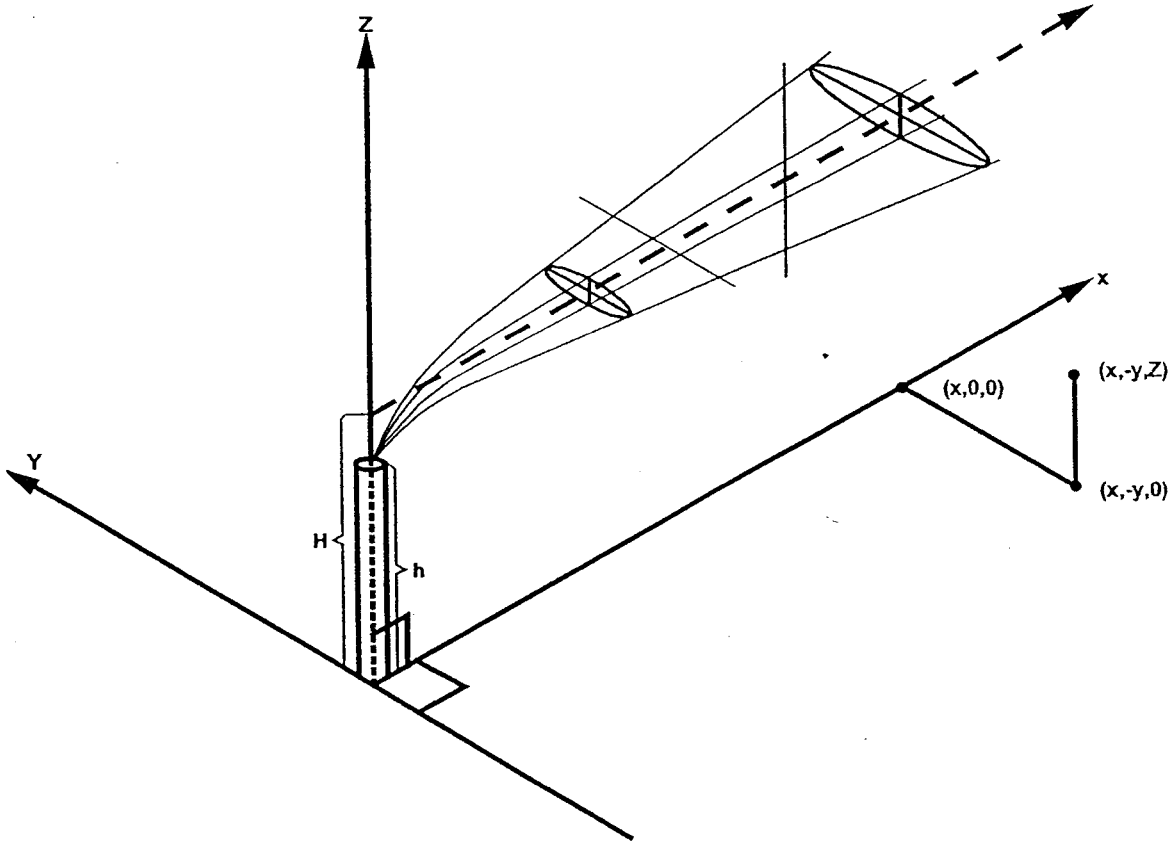


Figure 8.1-6e McClellan Air Force Base Annual Wind Rose (1992-1996)



Coordinate system showing Gaussian distributions in the horizontal and vertical.

Figure 8.1-7

Gaussian Plume Diagram

TETRA TECH FW, INC

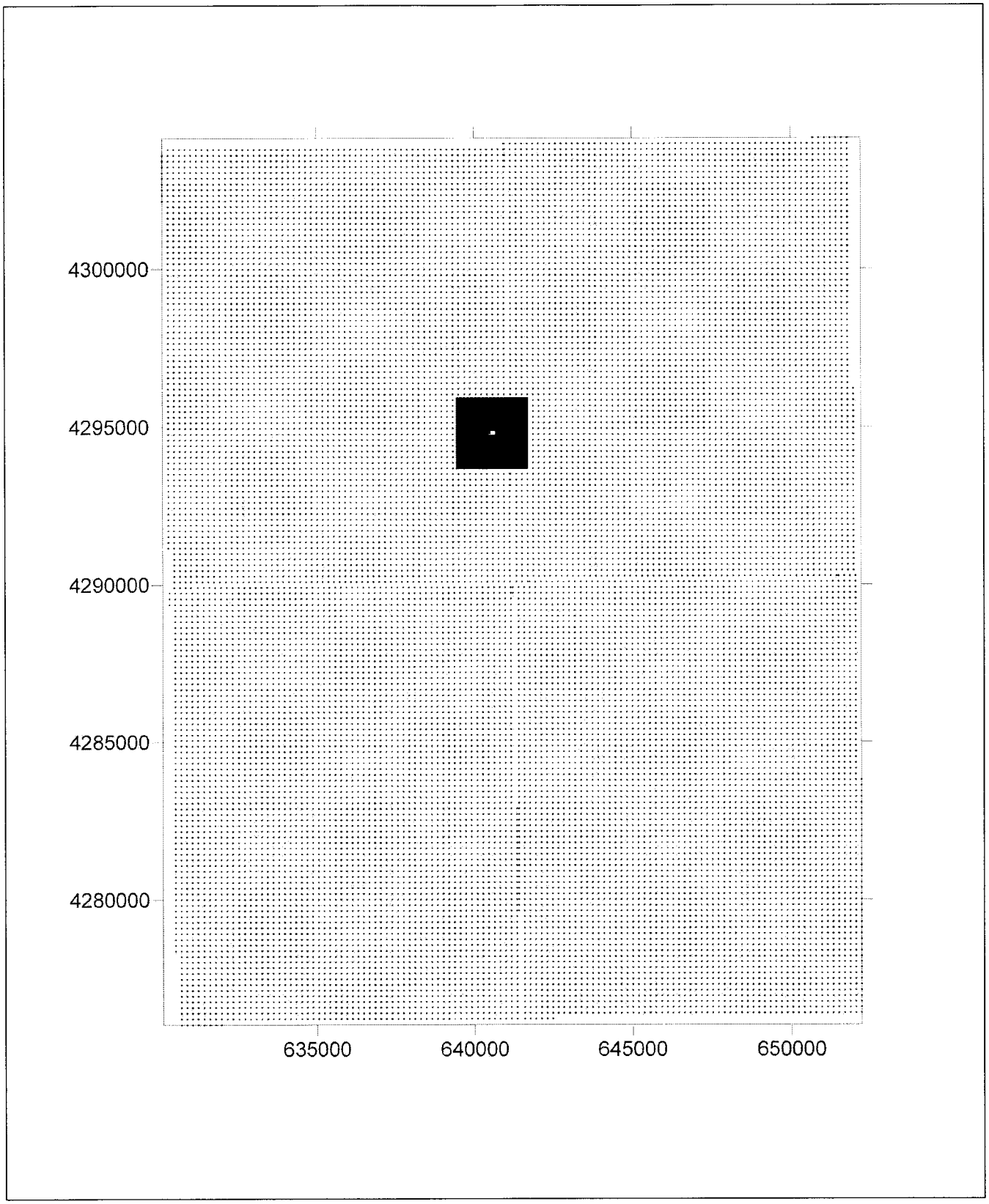


Figure 8.1-8 Modeling Grid

8.2 BIOLOGICAL RESOURCES

This section describes biological resources near the Roseville Energy Park (REP), and the potential effects of the project on them. Section 8.2.1 discusses the affected environment, including a regional overview of biological resources, vegetation, sensitive plant communities, wetlands, wildlife, economically important wildlife species, special environmental areas, and special status species. Section 8.2.1 also discusses methods and results of biological field surveys at the REP, and along each of the linear facilities. Section 8.2.2 discusses the effects that construction and subsequent operation of the new facilities may have on special status plant and animal species and sensitive habitats. Section 8.2.3 evaluates any potential cumulative impacts to biological resources in the project vicinity, and Section 8.2.4 addresses proposed mitigation measures. Section 8.2.5 presents applicable laws, ordinances, regulations and standards (LORS). Section 8.2.6 presents agency contacts and Section 8.2.7 presents permit requirements and schedules. Section 8.2.8 contains references.

8.2.1 Affected Environment

The REP project is located along the margins of California's Central Valley, immediately west of the Sierra Nevada foothills region. Locally, habitats include annual grassland, oak woodlands, riparian woodland, riparian scrub, valley needlegrass grassland, vernal pools, seasonal and emergent wetlands, alkali meadows, and alkali seeps. Community types in the project study area include annual grassland, riparian oak woodland, vernal pool complexes, seasonal wetlands, and urban residential areas.

8.2.1.1 Regional Biological Resources

The proposed REP project is located on the lower alluvial fans that extend westward from the Sierra Nevada foothills. This area is partly agricultural and, in the metropolitan area, has been partly converted to urban development. Remnants of historic ecosystems remain in parks and preserves, along major waterways, and as isolated patches in ranches and open spaces (Figure 8.2-1). Major waterways in the project area include the Sacramento River (west of the project site), the Yolo and Sutter Bypasses (west of the project site), the American River (southeast of the project area) and Folsom Lake State Recreation Area.

Other biological resources include Pleasant Grove Creek and associated riparian oak woodland and the annual grassland and vernal pool complexes near the project site.

8.2.1.2 Vegetation

Vegetation within the project study area includes annual grassland, riparian oak woodland, vernal pool complexes, seasonal wetlands, and urban residential areas. The dominant vegetation types at the REP plant site consist of annual grassland and disturbed ruderal areas, as well as vernal pool systems and seasonal wetlands. Vegetation within 1 mile of the REP plant site is dominated by annual grassland and vernal pool complexes, riparian oak woodland associated with Pleasant Grove Creek, agricultural lands, and urban landscaping with trees and shrubs. Habitats on the natural gas pipeline route alternatives, the recycled water line, the sanitary sewer pipeline, and the stormwater outfall consist of annual grassland, seasonal wetlands, and riparian oak woodland west of Fiddyment Road and urban residential environments with horticultural trees and shrubs east of Fiddyment Road.

8.2.1.3 Sensitive Plant Communities

Sensitive plant communities located in the project area include northern hardpan vernal pool complexes interspersed throughout the project area, as well as isolated remnants of valley needlegrass grassland. Other sensitive plant communities located in the Pleasant Grove and Roseville 7.5-minute topographic quadrangles that will not be affected by project development include alkali meadows, alkali seeps and northern volcanic mudflow vernal pools.

8.2.1.4 Wetlands and Waters of the U.S.

Waters of the U.S. in the REP project vicinity include Pleasant Grove, Kaseberg, and Curry creeks. Seasonal wetlands and vernal pools are common in the open agricultural areas surrounding the project site and along the natural gas pipeline corridors, partly because of poor drainage and the presence of hardpans on the older dissected alluvial fans of the Sierra Nevada.

8.2.1.5 Wildlife

Wildlife habitat on or within 1 mile of the project site consists of urban land, vernal pool complexes, seasonal wetlands, and riparian oak woodland. Listed species present in the study area consist of the vernal pool crustaceans such as the vernal pool fairy shrimp (*Branchinecta lynchi*) and vernal pool tadpole shrimp (*Lepidurus packardi*), California linderiella tadpole shrimp (*Linderiella occidentalis*), nesting and foraging habitat for raptors such as the burrowing owl (*Athene cunicularia*) and Swainson's hawk (*Buteo swainsoni*), and western spadefoot toad (*Scaphiopus hammondii*).

8.2.1.6 Economically Important Wildlife Species

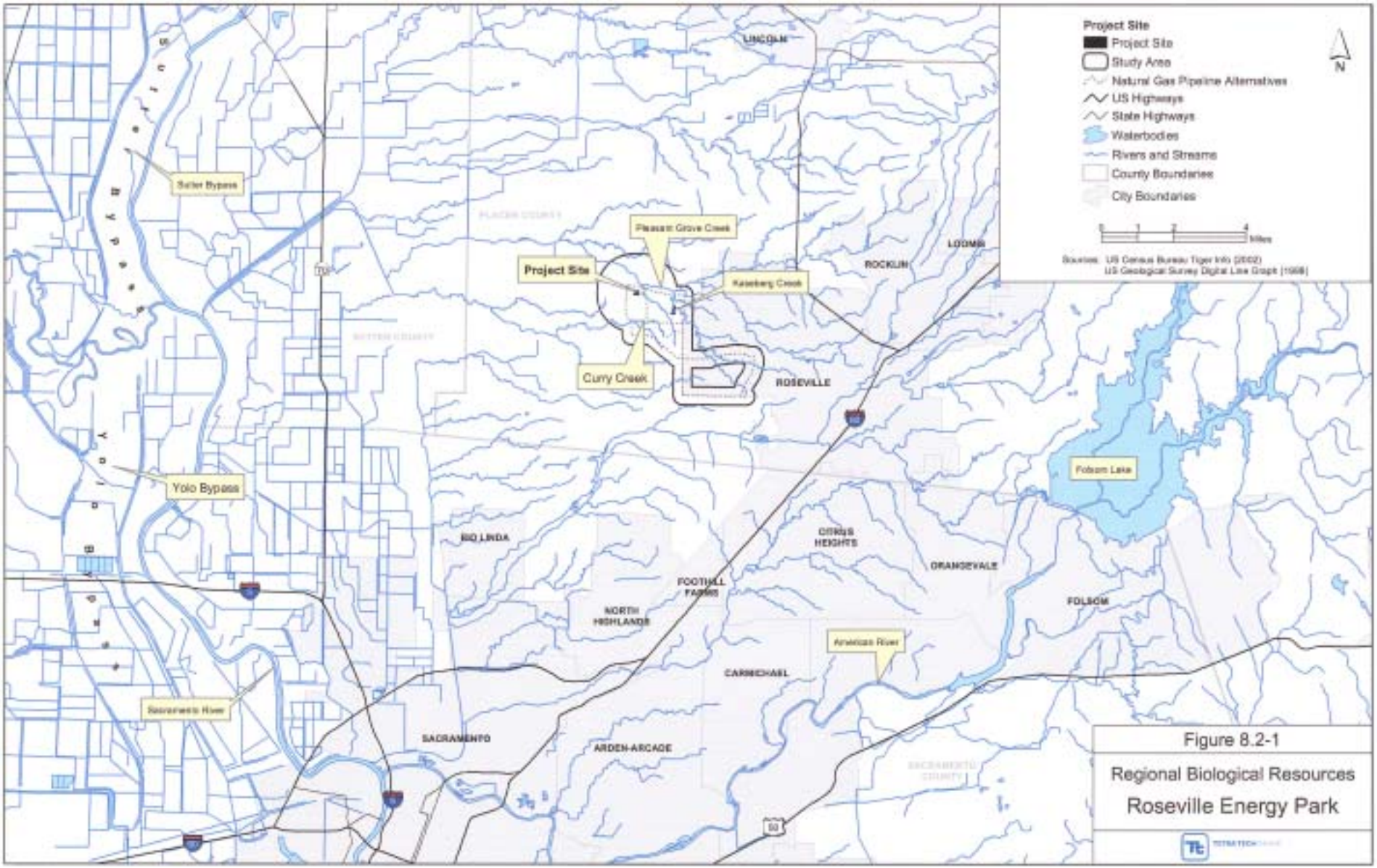
There are no economically important terrestrial wildlife species within the impact area of the proposed project.

8.2.1.7 Special Environmental Areas in Project Vicinity

There are no special environmental management areas within a mile of the proposed project site. A wetland preserve, the Woodcreek Oaks Mitigation Area, is located in the Western Area Power Administration's transmission corridor, which is located south of Pleasant Grove Boulevard and east of Fiddyment Road near natural gas pipeline alternative route A. Construction and operation of the pipeline, however, would avoid this area. The U.S. Fish and Wildlife Service (USFWS) has recently designated 32,230 acres in western Placer County as critical habitat for four species of vernal pool crustaceans (Federal Register Volume 68, No. 151, August 2003). This critical habitat unit occurs north of the Sacramento County line, north of the City of Roseville, and west of the City of Rocklin.

8.2.1.8 Special Status Species

The designation of special status includes all state and federal listed species under the state and federal Endangered Species Acts (ESAs); species proposed for those listings; federal Species of Concern (SC); California Species of Special Concern (CSC); California Fully Protected species under the Fish and Game Code; and plant species designated as Rare, Threatened, or Endangered by the California Native Plant Society (CNPS). Species of concern include those that could be listed in the future and those currently protected under other laws (e.g., the Bald and Golden Eagle Protection Act and the Migratory Bird Treaty Act).


Project Site
Project Site
Study Area
Natural Gas Pipeline Alternatives
US Highways
State Highways
Waterbodies
Rivers and Streams
County Boundaries
City Boundaries
N
Miles
Sources: US Census Bureau Tiger Info (2002)
US Geological Survey Digital Line Graph (1998)
Sutter Bypass
Pleasant Grove Creek
Project Site
Kaseberg Creek
Curry Creek
Yolo Bypass
Folsom Lake
American River
Sacramento River
LINCOLN
ROCKLIN
LOOMIS
ROSEVILLE
RIO LINDA
CITRUS HEIGHTS
ORANGEVALE
FOOTHILL FARMS
NORTH HIGHLANDS
FOLSOM
CARMICHAEL
SACRAMENTO
ARDEN-ARCADE
Figure 8.2-1
Regional Biological Resources
Roseville Energy Park

Standard references used for the biology and taxonomy of plants and plant communities included California Department of Fish and Game (1984), Hickman, ed. (1993), Holland (1986), and Tibor ed. (2001). Standard references used for the biology and taxonomy of wildlife included Ehrlich et al. (1988); Jameson and Peeters (1988); Jennings and Hayes (1994); Mayer and Laudenslayer, eds. (1988); McGinnis (1984); Peterson (1990); Stebbins (1985); Udvardy (1977); Verner and Boss (1980); Whitaker (1980); and Zeiner et al. (1988; 1990 a, b).

A computerized search of the California Natural Diversity Data Base (CNDDB/RareFind report, July, 2003) was conducted for the Roseville and Pleasant Grove USGS topographic quadrangles. This search was conducted to determine if there were any occurrences of state or federal listed species recorded within or near the project study area. Known locations of special status species, based on the database search, are mapped on Figure 8.2-2. Appendix 8.2-A contains the CNDDB/RareFind report. In addition to the CNDDB/RareFind report, a letter was sent to the USFWS, Sacramento Field Office, requesting file data on special status species that could occur in the project vicinity. The USFWS response, dated July 29, 2003, is presented in Appendix 8.2-B.

In addition to the literature sources mentioned above, site-specific information was gathered during field surveys conducted June and July of 2003 (Section 8.2.1.10).

Special Status Plants

Table 8.2-1 lists the special status plant species occurring in the project area, based on CNDDB/RareFind and USFWS data. Brief descriptions of special status plant species with potential habitat in the project area are presented below.

Big-scale Balsamroot (*Balsamorhiza macrolepis* var. *macrolepis*)

HABITAT AND BIOLOGY: Perennial herbaceous flower growing to 60 cm tall. Found in open grassy slopes and valleys of valley-foothill woodlands and grasslands at elevations less than 1,400 m. Threats include cattle grazing and development.

BLOOMING: March-June

RANGE: Populations known from the foothills of the Sierra Nevada, Sacramento Valley, and San Francisco Bay area.

CNDDB/RAREFIND RECORDS: One record for this species occurs in the Roseville Quad, located along a railroad right-of-way and U.S. Highway 99, 3.2 miles north of Roseville.

HABITAT PRESENT IN PROJECT AREA?: Yes. Potential habitat for this species occurs in annual grassland located on the REP plant site and linear facilities.

Dwarf dowingia (*Dowingia pusilla*)

HABITAT AND BIOLOGY: Annual herb, grows in vernal pools and valley and foothill grasslands below 445 m. Threatened by urbanization, agriculture, grazing, vehicles, and industrial forestry.

BLOOMING: March-May

RANGE: Known in the foothills of the Sierra Nevada and the Coast Ranges, as well as South America.

CNDDB/RAREFIND RECORDS: Seventeen records for this species occur within the 1-mile radius of the REP plant site.

HABITAT PRESENT IN PROJECT AREA?: Yes. Habitat for this species occurs in the vernal pools located in the REP plant site and associated linear corridors.

Table 8.2-1. Special status plant species potentially occurring in the project area.

Scientific Name	Common Name	Federal/ State/ CNPS[1]	Source[2]	Habitat in impact area?	Blooms
Plants					
Balsamohriza macrolepis var. *macrolepis*	Big-scale balsamroot	SC/--/1B	1,2	Yes	Mar-June
Cordylanthus mollis ssp. *hispidus*	Hispid bird's beak	SC/R/1B	1,2	No	Jul-Sep
Dowingia pusilla	Dwarf dowingia	--/--/2	2	Yes	Mar-May
Fritillaria agrestis	Stinkbells	SC/--/4	1,2	Yes	Mar-Jun
Gratiola heterosepala	Bogg's lake hedge hyssop	SC/E/1B	1,2	Yes	Apr-Aug
Juglans californica var. *hindsii*	Northern California black walnut	SC/--/1B	1	No	
Juncus leiospermus var. *ahartii*	Ahart's dwarf rush	SC/--/1B	1,2	Yes	Mar-May
Juncus leiospermus var. *leiospermus*	Red Bluff dwarf rush	SC/--/1B	1	Yes	Mar-May
Legenere liomosa	Legenere	SC/--/1B	1,2	Yes	Apr-Jun
Navaretia myersii ssp. *myersii*	Pincussion navarretia	SC/--/1B	1	Yes	May
Orcuttia viscida	Sacramento Orcutt grass	E/--/1B	1	Yes	Apr-July
Sagittaria sanfordii	Sanford's arrowhead	SC/--/1B	1	Yes	May-Oct

[1] **Status Categories:**
State status determined from *Special Plants List* (June 1999), and/or *State and Federally Listed Endangered, Threatened, and Rare Plants of California* (October 2003), prepared by DFG Natural Diversity DataBase. CNPS status determined from *CNPS Inventory of Rare and Endangered Vascular Plants of California* (Tibor 2001). Codes used in table are as follows:
E = Endangered; **T** = Threatened; **R** = California Rare; **PE** = Proposed Endangered, **PD** = Proposed for Delisting, **C** = Candidate: Taxa for which the USFWS has sufficient biological formation to support a proposal to list as endangered or threatened,
SC = USFWS Species of Concern: Taxa for which existing information may warrant listing, but for which substantial biological information to support a proposed rule is lacking.
SSC = DFG "Species of Special Concern.", CNPS List: **1A** = Presumed Extinct in CA; **1B** = Rare or Endangered in CA and elsewhere; **2** = R/E in CA and more common elsewhere; **3** = Need more information; **4** = Plants of limited distribution. -- = Species not state-listed.

[2] **Source:** 1 = From USFWS; 2 = From CNDDB/ RareFind, October 2003 edition

Fragrant fritillary (*Fritillaria lilliacea*)

HABITAT AND BIOLOGY: Perennial herbaceous flower (bulb) growing to 35 cm tall. Found in heavy soils, open hills, and fields associated with coastal prairies, coastal scrub, and valley and foothill serpentine derived grasslands at elevations less than 200 m. Threatened by cattle grazing and loss of habitat from agriculture and development.

BLOOMING: February-April

RANGE: Known from the south coastal range: Santa Clara, San Benito, Monterrey, San Luis Obispo, and Santa Barbara counties.

CNDDB/RAREFIND RECORDS: No records for this species occur in the Roseville or Pleasant Grove quads.

HABITAT PRESENT IN PROJECT AREA?: Yes. Potential habitat for this species occurs in annual grassland located on the REP plant site and linear facilities.

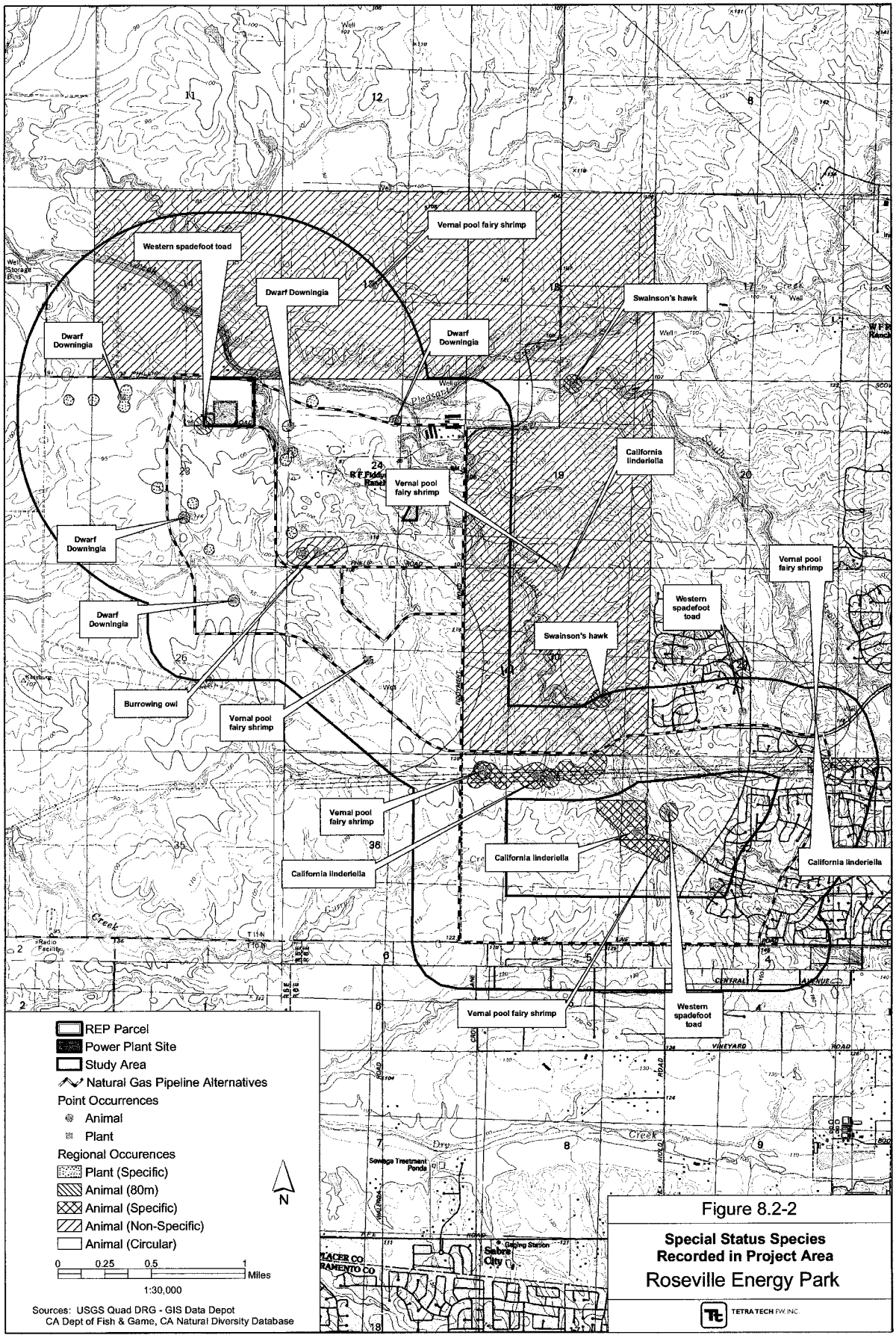


Figure 8.2-2

Special Status Species Recorded in Project Area

Roseville Energy Park

TETRA TECH FW, INC.

Boggs lake hedge-hyssop (*Gratiola heterosepala*)

HABITAT AND BIOLOGY: A perennial herb that grows in marshes, swamps (lake margins), and deep, late-season vernal pools at elevations ranging from 10 to 2,375 m. This species is threatened by agriculture, development, grazing, trampling, and vehicles.

BLOOMING: April-August

RANGE: Known from the northern Sacramento Valley, the Sierra Nevada Foothills, the Modoc Plateau, and southern Oregon.

CNDDB/RAREFIND RECORDS: One record for this species occurs north of Roseville, west of Antelope Creek.

HABITAT PRESENT IN PROJECT AREA?: Yes. Habitat for this species occurs in the deeper vernal pools located in the REP plant site and associated linear corridors.

Ahart's dwarf rush (*Juncus leiospermus* var. *ahartii*) and Red Bluff dwarf rush (*Juncus leiospermus* var. *leiospermus*)

HABITAT AND BIOLOGY: Diminutive annual herbs that grow in vernal pools and vernally mesic areas in valley and foothill grassland, chaparral, cismontane woodland, meadows and seeps from 30 to 100 m. Ahart's dwarf rush is known from only six occurrences in the Sierra Nevada foothill terraces. Threatened by development, agriculture, and industrial forestry.

BLOOMING: March-May

RANGE: Known from the eastern Sacramento Valley and the Sierra Nevada foothills.

CNDDB/RAREFIND RECORDS: One record for Red Bluff dwarf rush occurs north of Scow Road in Roseville.

HABITAT PRESENT IN PROJECT AREA?: Yes. Habitat for this species exists in the seasonal wetlands present at the REP plant site and associated linear corridors.

Legenere (Legenere limosa)

HABITAT AND BIOLOGY: An annual herb that grows in vernal pools below 880 m. Many historical occurrences have been extirpated by grazing and development.

BLOOMING: April-June

RANGE: Known from the northern Central Valley and adjacent foothill regions of the Sierra Nevada and Coast Range.

CNDDB/RAREFIND RECORDS: Two records for this species occur in the Roseville and Pleasant Grove topographic quadrangles. One record occurs in the north tributary of Pleasant Grove Creek east of Highway 65, and the other occurs in the floodplain of Pleasant Grove Creek approximately 2.2 miles east of the junction between Placer Boulevard and the Southern Pacific railroad tracks.

HABITAT PRESENT IN PROJECT AREA?: Yes. Habitat for this species exists in the seasonal wetlands present at the REP plant site and associated linear corridors.

Pincushion navarretia (*Navaretia myersii* ssp. *myersii*)

HABITAT AND BIOLOGY: Annual herb that grows in vernal pools from 20 to 230 m. Known in six occurrences, threatened by development.

BLOOMING: May

RANGE: Known in the eastern Sacramento Valley and adjacent foothill regions.

CNDDB/RAREFIND RECORDS: No records for this species occur in the Roseville or Pleasant Grove topographic quadrangles.

HABITAT PRESENT IN PROJECT AREA?: Yes. Habitat for this species exists in the seasonal wetlands present at the REP plant site and associated linear corridors.

Sacramento Orcutt grass (*Orcuttia viscida*)

HABITAT AND BIOLOGY: Annual herb found in undisturbed pools from 30 to 100 m. This species is known from seven occurrences in Sacramento County, and is threatened by agriculture, urbanization, overgrazing, vehicles, and non-native plants.

BLOOMING: April-July

RANGE: This species is endemic to Sacramento County.

CNDDB/RAREFIND RECORDS: No records for this species occur in the Roseville or Pleasant Grove topographic quadrangles.

HABITAT PRESENT IN PROJECT AREA?: Yes. Habitat for this species exists in the seasonal wetlands present at the REP plant site and associated linear corridors.

Sanfords arrowhead (*Sagittaria sanfordii*)

HABITAT AND BIOLOGY: Perennial, rhizomatous, emergent herb found in shallow freshwater marshes and swamps, sometimes in creeks and canals below 610 m. Threatened by grazing, development, and stream alteration.

BLOOMING: May-October

RANGE: This species has been extirpated from southern California, and mostly extirpated from the Central Valley. Currently known in Sacramento and San Joaquin valleys and adjacent foothill regions.

CNDDB/RAREFIND RECORDS: No records for this species occur in the Roseville and Pleasant Grove topographic quadrangles.

HABITAT PRESENT IN PROJECT AREA?: Yes. Habitat for this species occurs along the banks of Pleasant Grove Creek.

Special Status Wildlife Species

Table 8.2-2 lists the special status wildlife species in the vicinity of the REP project components, based on CNDDB/RareFind and USFWS data. Locations of species historically located within 1 mile of the REP project components are mapped on Figure 8.2-2. Brief descriptions of special status wildlife species with habitat in the project area (see Table 8.2-2) are presented below in the following order: invertebrates, fish, reptiles and amphibians, birds, and mammals.

Invertebrates:

Vernal pool fairy shrimp (*Branchinecta lynchi*)

HABITAT AND BIOLOGY: The vernal pool fairy shrimp is federally listed as a threatened species. There are 32 known populations of this fairy shrimp ranging from Stillwater Plain in Shasta County through most of the length of the Central Valley to Pixley in Tulare County. It is also found along the Central Coast Range from northern Solano County to the Pinnacles in San Benito County, at Soda Lake in San Luis Obispo County, near Santa Rosa Plateau and Rancho California in Riverside County, and in northern Santa Barbara County. Many of these populations comprise a single inhabited pool. Pool waters inhabited by the vernal pool fairy shrimp are typically low in total dissolved solids (TDS), conductivity, alkalinity, and chloride. The species displays a sporadic distribution in vernal pool complexes and typically occurs in low population densities.

Table 8.2-2. Special status wildlife species evaluated in the REP project area.

Scientific Name	Common Name	Federal/ State[a]	Habitat in impact area?	Source [b]
Invertebrates				
Branchinecta lynchi	Vernal pool fairy shrimp	T/SC	Yes	1,2
Desmocerus californicus dimorphus	Valley elderberry longhorn beetle	T/SC	Yes	1
Lepidurus packardi	Vernal pool tadpole shrimp	E/SC	Yes	1,2
Linderiella occidentalis	California linderiella fairy shrimp	SC/--	Yes	1,2
Fish				
Acipenser medirostris	Green sturgeon	C/SC	No	1
Hypomesus transpacificus	Delta smelt	T/T	No	1
Lampetra ayresi	River lamprey	SC/SC	No	1
Lampetra tridentata	Pacific lamprey	SC/SC	No	1
Oncorhynchus clarki henshawi	Lahonton cutthroat trout	T/SC	No	1
Oncorhynchus mykiss	Central Valley steelhead	T/--	Yes	1
		T/SC		
Oncorhynchus tshawytscha	Central valley spring-run chinook salmon	T/CT	Yes	1
	Central valley fall/late-fall run chinook salmon	C/SC		
	Central valley winter run chinook salmon	E/E		
Pogonichthys macrolepidotus	Sacramento splittail	T/SC	No	1
Amphibians				
Ambystoma californiense	California tiger salamander	PT/SC	Yes	1
Rana aurora draytonii	California red-legged frog	T/SC	Yes	1
Rana boylii	Foothill yellow-legged frog	SC/SC	No	1
Scaphiopus hammondii	Western spadefoot toad	SC/SC	Yes	1,2
Reptiles				
Clemmys marmorata	Western pond turtle	SC/SC	Yes	1
Clemmys marmorata marmorata	Northwestern pond turtle	SC/SC	Yes	1
Clemmys marmorata pallida	Southwestern pond turtle	SC/SC	Yes	1
Phrynosoma cornatum frontale	California horned lizard	SC/SC	No	1
Thamnophis gigas	Giant garter snake	T/SC	No	
Birds				
Accipeter cooperi	Cooper's hawk	--/SC	Yes	1
Agelaius tricolor	Tricolored blackbird (nesting colony)	SC/SC	No	1,2
Aquila chrysaetos	Golden eagle	SC/FP	Yes	1
Athene cunicularia	Western burrowing owl (burrow sites)	SC/SC	Yes	1,2
Brachyramphus marmoratus	Marbled murrelet (nesting)	T/CE	No	1
Branta canadensis leucopareia	Aleutian Canada goose	PD/SC	No	1
Buteo regalis	Ferruginous hawk (wintering)	SC/SC	No	1
Buteo swainsoni	Swainson's hawk (nesting and foraging)	SC/T	Yes	1,2

Table 8.2-2. (continued.)

Scientific Name	Common Name	Federal/ State[1]	Habitat in impact area?	Source [2]
Charadrius montanus	Mountain plover (wintering)	PT/SC	No	1
Coccyzus americanus occidentalis	Western yellow-billed cuckoo	C/SC	No	1
Elanus leucurus	White-tailed kite	--/SC	Yes	2
Empidonax traillii brewsteri	Little willow flycatcher (nesting)	SC/--	No	1
Eremophilaalpestris	Horned lark	SC/SC	No	1
Falco peregrinus anatum	American peregrine falcon (nesting)	D/E	No	1
Grus canadensis tabida	Greater sandhill crane	SC/T	No	1
Haliaeetus leucocephalus	Bald eagle (nesting and wintering)	T/E	No	1
Riparia riparia	Bank swallow (nesting)	SC/T	No	1
Mammals				
Corynorhinus (= Plecotus) townsendii townsendii	Pacific western big-eared bat	SC/SC	Yes	1
Dipodomys heermanni berkrleyensis	Berkely kangaroo rat	--/SC	No	2
Eumops perotis californicus	Greater western mastiff bat	SC/SC	No	1
Myotis ciliolabrum	Small-footed myotis bat	SC/--	No	1
Myotis evotis	Long-eared myotis bat	SC/--	No	1
Myotis thysanodes	Fringed myotis bat	SC/--	No	1
Myotis volans	Long-legged myotis bat	SC/--	No	1
Myotis yumanensis	Yuma myotis bat	SC/--	No	1
Neotoma fuscipes annectens	San Francisco dusky-footed woodrat	SC/SC	Yes	1
Perognathus inornatus	San Joaquin pocket mouse	SC/--	No	1

[1] **Status Categories:**

Federal status determined from the USFWS letter dated July 29, 2003 (Appendix 8.2-B). State status determined from *State and Federally Listed Endangered and Threatened Animals of California* (January 1999) and *Special Animals* (March 1998), prepared by DFG Natural Diversity Data Base (October 2003). Codes used in table are as follows:

E = Endangered; **T** = Threatened; **R** = California Rare; **PT** = Proposed Threatened; **PD** = Prosposed delisting

C = Candidate: Taxa for which the USFWS has sufficient biological formation to support a proposal to list as endangered or threatened.

SC = USFWS Species of Concern: Taxa for which existing information may warrant listing, but for which substantial biological information to support a proposed rule is lacking.

FP = CDFG "Fully Protected"

CNPS List: **1A** = Presumed Extinct in CA; **1B** = Rare or Endangered in CA and elsewhere; **2** = R/E in CA and more common elsewhere; **3** = Need more information; **4** = Plants of limited distribution.

-- = Species not state-listed.

[2] **Source:** **1** = From USFWS letter dated July 29, 2003, or state lists **2** = From CNDDB/ RareFind (October 2003).

RANGE: There are 32 known populations of this fairy shrimp ranging from Stillwater Plain in Shasta County through most of the length of the Central Valley to Pixley in Tulare County. It is also found along the Central Coast Range from northern Solano County to the Pinnacles in San Benito County, at Soda Lake in San Luis Obispo County, near Santa Rosa Plateau and Rancho California in Riverside County, and in northern Santa Barbara County. Many of these populations comprise a single inhabited pool.

CNDDB/RAREFIND RECORDS: Documented in vernal pools within 1 mile of the REP site.

HABITAT PRESENT IN PROJECT AREA?: Yes. Habitat for this species exists in the seasonal wetlands present at the REP plant site and associated linear corridors.

California linderiella fairy shrimp (*Linderiella occidentalis*)

HABITAT AND BIOLOGY: The California linderiella, a federal Candidate species, is a 1-inch-long invertebrate similar to the vernal pool fairy shrimp. This California endemic species grows in ephemeral pools, lays eggs as the water dries, and persists in the encysted stage until the following season. Vernal pools are being lost in the Central Valley, and, consequently, the range of this species is being reduced.

RANGE: Found in vernal pools in the Central Valley.

CNDDB/RAREFIND RECORDS: Known in 18 sites in Placer County, some near the project area.

HABITAT PRESENT IN PROJECT AREA?: Yes. Habitat for this species exists in the seasonal wetlands present at the REP plant site and associated linear corridors.

Vernal pool tadpole shrimp (*Lepidurus packardi*) and California linderiella fairy shrimp (*Linderiella occidentalis*)

HABITAT AND BIOLOGY: The vernal pool tadpole shrimp is Federally listed as an Endangered species. This freshwater shrimp inhabits vernal pools containing clear to highly turbid water and ranging in size from 5 square miles in the Mather Air Force Base area of Sacramento to 89 acres at Olcott Lake at the Jepson Prairie. Pools that support the tadpole shrimp are typically located in grass-bottomed swales of grasslands in old alluvial soils underlain by hardpan or in mud-bottomed pools containing highly turbid water.

RANGE: There are 17 known populations of the vernal pool tadpole shrimp within the Central Valley area ranging from east of Redding in Shasta County and south to the San Luis National Wildlife Refuge in Merced County. There is also a single population located in a vernal pool complex at the San Francisco Wildlife Refuge in the City of Fremont, in Alameda County.

CNDDB/RAREFIND RECORDS: Two occurrences in Placer County, one on Roseville Quadrangle.

HABITAT PRESENT IN PROJECT AREA?: Yes. Habitat for this species exists in the seasonal wetlands present at the REP plant site and associated linear corridors.

Valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*)

HABITAT AND BIOLOGY: The valley elderberry longhorn beetle is a federally listed threatened species. This beetle is associated with elderberry trees for its entire life cycle: eggs are laid in crevices in the bark, the larvae tunnel into the tree and eat interior wood, the adults emerge from pupation inside the wood, and then they eat the foliage of the tree. The reasons for the decline of valley elderberry longhorn beetle populations are the clearing of riparian forest for agricultural and urban development and the extensive use of pesticides and grazing which have degraded the remaining riparian patches.

RANGE: Historically, this species ranged throughout the Central Valley. In the Central Valley, elderberry trees are associated with riparian forests that occur along rivers and streams. Recent surveys have revealed the beetle in only a few scattered locations along the Sacramento, American, San Joaquin, Kings, Kaweah, and Tule rivers and tributaries.

CNDDB/RAREFIND RECORDS: Known from 3 miles south of the project site.

HABITAT PRESENT IN PROJECT AREA?: Possible. Surveys indicated no elderberry shrubs in the immediate project area, but shrubs may be located along the Pleasant Grove Creek corridor.

Fish:

Central Valley steelhead (*Oncorhynchus mykiss*)

HABITAT AND BIOLOGY: California steelhead habitat includes major river reaches and estuarine areas within central California. Steelhead are anadromous fish that hatch and rear in freshwater and then migrate to saltwater where they reach maturity. They spend 1 to 3 years in the oceans before they return to freshwater to spawn.

RANGE: From the Russian River to Aptos Creek, and the drainages of San Francisco and San Pablo Bays eastward to the Napa River (inclusive), excluding the Sacramento-San Joaquin River Basin.

CNDDB/RAREFIND RECORDS: Not known in the Pleasant Grove or Roseville quadrangles.

HABITAT PRESENT IN PROJECT AREA?: Possible. Pleasant Grove Creek is a Sacramento River tributary, but the creek bed is heavily silted and lacking in sufficient flows or suitable spawning gravels.

Central Valley chinook salmon, fall/late-fall (*Oncorhynchus tshawytscha*)

HABITAT AND BIOLOGY: chinook salmon, a federal candidate species, migrate from the Pacific Ocean to fresh water spawning grounds in the Sacramento, San Joaquin, and Stanislaus rivers. California's Central Valley contains habitat for four runs (races) of chinook salmon: spring-run, fall-run, late-fall run, and winter-run.

RANGE: California Central Valley rivers.

CNDDB/RAREFIND RECORDS: Not known in the Pleasant Grove or Roseville quadrangles.

HABITAT PRESENT IN PROJECT AREA: No. Pleasant Grove Creek is a Sacramento River tributary, but the creek bed is heavily silted and lacking in sufficient flows or suitable spawning gravels.

Reptiles and amphibians:

California tiger salamander (*Ambystoma californiense*)

HABITAT AND BIOLOGY: The California tiger salamander frequents annual grass habitats, but can also be found in grassy understory of valley-foothill woodlands. Tiger salamanders need temporary or seasonal ponds such as vernal pools for breeding. Occasionally, tiger salamanders will use human-made ponds for breeding, but only if predatory fish and frogs are not present. Tiger salamanders migrate to breeding ponds after the first rains in November and breed from December to February. Larval metamorphosis occurs in early July. Tiger salamander larvae feed on zooplankton and aquatic arthropods. Postmetamorphic juveniles and adults feed on terrestrial worms, insects, snails, small fish, and sometimes small mammals. Additionally, postmetamorphic tiger salamanders need abandoned small animal burrows for refugia (Zeiner 1988).

RANGE: Central valley from Yolo County south to Kern County, coastal grasslands from the San Francisco Bay area to Santa Barbara County.

CNDDB/RAREFIND RECORDS: Not known from Placer County, but records in Sacramento County.

HABITAT PRESENT IN PROJECT AREA?: Possible, but unlikely. Inventory of project site (URS 2001) for tiger salamander larvae failed to find any.

California red-legged frog (*Rana aurora draytonii*)

HABITAT AND BIOLOGY: The red-legged frog requires permanent to seasonal pools and is usually associated with streams, marshes, and occasionally ponds. Occurs in aquatic areas with dense shrubby or emergent riparian vegetation. Breeds from January to July in the south of the state and

from March to July in the north. Feeds on aquatic and terrestrial insects, snails, small fish, and other frogs and tadpoles. Habitat destruction and predation, especially from bullfrogs, are factors in population reduction (Zeiner 1988).

RANGE: Occurs in the Coast Ranges along the entire length of the state and within the western foothills of the Sierra Nevada, north of Mariposa County.

CNDDB/RAREFIND RECORDS: Believed extirpated in Placer County (URS 2001).

HABITAT PRESENT IN PROJECT AREA?: Possible in Pleasant Grove Creek wetlands.

Western spadefoot toad (*Rana aurora draytonii*)

HABITAT AND BIOLOGY: The western spadefoot toad is found in grasslands and occasionally populates valley-foothill woodlands. Populations have also been noted to survive a few years in orchard-vineyard habitats. Post-metamorphic toads feed on insects, worms, and other invertebrates while juveniles consume planktonic organisms and algae. This species seeks refugia in mammal burrows or burrows of their own construction. This species uses shallow temporary pools for breeding (Zeiner 1988).

RANGE: The western spadefoot toad is found throughout the Central Valley and adjacent foothills and along the Coast Range from Santa Barbara County south.

CNDDB/RAREFIND RECORDS: One record from Phillip Road near the REP. Also known from Kaseberg Creek area.

HABITAT PRESENT IN PROJECT AREA?: Vernal pools at the REP project site and along the natural gas pipeline routes.

Western, Northwestern, Southwestern pond turtle (*Clemmys marmorata, Clemmys marmorata marmorata, Clemmys marmorata pallida*)

HABITAT AND BIOLOGY: The western pond turtle is associated with permanent and semi-permanent waterways in various habitats below 6000 feet elevation. The pond turtle breeds between March and August with slight variation between locations. The species is fairly omnivorous, feeding on aquatic plant material, as well as aquatic invertebrates, amphibians, and fish. The turtles require basking sites in or close to waterways or ponds. Basking sites take the form of logs, rocks, floating mats of vegetation, and the banks of the waterways (Zeiner 1988).

RANGE: Present throughout California west of the Sierra-Cascade crest.

CNDDB/RAREFIND RECORDS: Not known in Roseville or Pleasant Grove quadrangles.

HABITAT PRESENT IN PROJECT AREA?: Possible in Pleasant Grove Creek and tributaries.

Birds:

Cooper's hawk (*Accipeter cooperi*)

HABITAT AND BIOLOGY: Coniferous and deciduous forests with dense canopy cover, using woodland edges and clearings for hunting. In winter, ubiquitous, including urban areas. With loss of forest habitat, rapid adaptation to the urban setting has occurred, commonly visiting bird feeding stations for prey, and nesting is becoming more prevalent. Breeds from March to July, earlier in southern extremes. Solitary. The nest is a compact flat platform of sticks lined with bark or greenery. The nest is usually 24 to 48 feet above the ground and is placed in the main crotch of either a deciduous or coniferous tree. Even though extended forests are preferred, urban nesters will take any small stand of trees available.

The Cooper's hawk has declined throughout California as a breeding bird. This species was once considered a common nester throughout California. Breeding populations have completely disappeared from some areas, such as the Colorado River and sharp declines have been noted in the Sacramento Valley, Santa Clara and Santa Cruz counties; the Santa Barbara, northern San Diego County, and the Yosemite region.

RANGE: Western United States into northern Mexico.

CNDDB/RAREFIND RECORDS: No records in the Pleasant Grove or Roseville quadrangles.

HABITAT PRESENT IN PROJECT AREA?: Yes. Habitat for this species occurs in the Pleasant Grove Creek riparian corridor. Has been seen in the project area during biological inventories (URS 2001).

Golden eagle (*Aquila chrysaetos*)

HABITAT AND BIOLOGY: Ranges from desert to tundra and from sea level to mountains, but in summer tends toward the more hilly and alpine environments. Generally prefers open, deserted, and sparsely vegetated terrain to heavily wooded areas. Prefers rodents (rats, squirrels, etc.) and rabbits; will take foxes and small cats. Songbirds, cranes, storks, and swans are taken, but prefers game birds, such as grouse. Less frequent prey includes lizards, snakes, and turtles, often dropping the latter onto rocks to break their shells. Carrion (including domestic stock and deer or antelope) is used, especially in winter. Nest location varies by region and includes cliff ledges, crags, and trees (10- to 100-foot-high high nest placement).

This species was once a common permanent resident throughout the open areas of California; numbers are now reduced near human population centers; in general, however, populations seem stable.

RANGE: Western north America, Alaska to Mexico.

CNDDB/RAREFIND RECORDS: Several occurrences in project area.

HABITAT PRESENT IN PROJECT AREA?: Yes. Habitat for this species occurs in grasslands and oak woodlands. Has been seen in the project area during surveys (URS 2001).

Western burrowing owl (*Athene cunicularia*)

HABITAT AND BIOLOGY: A yearlong resident of dry, open grassland and desert habitats. Also found in open shrub stages of pinyon-juniper and ponderosa pine habitats. Breeding season is considered to be March through August. Western burrowing owl hunt from a perch and feed mostly on insects, but also feed on rodents, reptiles, and, occasionally, other birds and carrion. Use burrows of rodents for nests and roosting sites. Nests are usually lined with pellets, feathers, and wash (Zeiner 1990b).

RANGE: Yearlong presence in the Central Valley, Coastal Range, and southeastern deserts, as well as along the north coast.

CNDDB/RAREFIND RECORDS: Recorded 1 mile south of project site.

HABITAT PRESENT IN PROJECT AREA?: Yes. Habitat occurs in open fields and vacant lots.

Swainson's hawk (*Buteo swainsoni*)

HABITAT AND BIOLOGY: Swainson's hawk, state-listed as threatened, is another special status species likely to be present along the project route. The Swainson's hawk is a medium-sized hawk, which can be distinguished from other hawks by its long, narrow, pointed wings. Swainson's hawks require large nesting trees with a panoramic view of their foraging grounds. The hawk's nesting preference is for large cottonwoods (*Populus fremontii*), valley oaks (*Quercus lobata*), or willows

(*Salix goodingii*) within 1 mile of riparian areas. Suitable cover types for foraging habitats include the following, in order of suitability: 1) native grassland; 2) agricultural fields soon after discing; 3) alfalfa and other hay crops; 4) fallow fields; 5) lightly grazed pastures; 6) combinations of hay, grain, and row crops; 7) rice fields before flooding and after draining; and 8) heavily grazed pastures. The survey period for the Swainson's hawk is during their mating season (late March to late August). Swainson's hawks migrate to and live in South America during the winter (September to early March). They feed primarily on voles and small mammals in open grasslands. Grazing and cultivation have reduced the habitat for voles, and reductions in large riparian trees have limited suitable nesting areas. Some agriculture such as alfalfa or hay is compatible with Swainson's hawk use, but urban development which results in conversion of grassland to paved areas or non-grass crops, is not.

RANGE: It is distributed in California in the lower Sacramento and San Joaquin valleys, the Klamath Basin, and Butte Valley, with the highest nesting densities occurring near Davis and Woodland, Yolo County.

CNDDB/RAREFIND RECORDS: Nesting pair noted along Kaseberg Creek in 1996.

HABITAT PRESENT IN PROJECT AREA?: Yes. Nesting habitat occurs along Pleasant Grove Creek. Foraging habitat throughout the rural portions of the project area in open grassland. Observed during surveys for the REP in 2003 and for a previous project at the REP site (URS 2001).

White-tailed kite (*Elanus leucurus*)

HABITAT AND BIOLOGY: The white-tailed kite is a CDFG fully protected species. Ideal habitat for the species is characterized by open cultivated and marshy bottomlands with scattered tall trees, savanna, grassy foothill slopes interspersed with oaks, agricultural areas with trees for windbreaks, orchards, and roadside verges (Small 1994). Population declines have been attributed to the conversion of native lands to agricultural and urban lands. Because of the species' increased use of suboptimal habitats, however, it is now fairly common in some areas of California, such as the Central Valley.

RANGE: It occurs in lowland areas west of the Sierra Nevada from the head of the Sacramento Valley south to San Diego County and inhabits low foothills or valley areas with valley or live oaks, riparian areas, and marshlands near open grasslands for foraging. It is known to breed and winter throughout lowland California, including the Central Valley and central and southern coastal valleys.

CNDDB/RAREFIND RECORDS: Nesting pair known from Pleasant Grove Creek

HABITAT PRESENT IN PROJECT AREA?: Yes. Habitat is found along Pleasant Grove Creek and adjacent areas.

Mammals:

San Francisco dusky-footed woodrat (*Neotoma fuscipes annectens*)

HABITAT AND BIOLOGY: The San Francisco dusky-footed woodrat is a federal and state species of special concern. They occupy a variety of habitats including chaparral, coastal sage-scrub, and juniper-pinyon pine, oak and riparian woodlands. Woodrats are most well known for the elaborate stick houses that they build and live in. These houses are most commonly leaned up against the base of a coast live oak or willow tree. Woodrat houses vary in shape and size and may be up to 6 feet tall. The houses provide shelter from temperature and moisture extremes

RANGE: Dusky-footed woodrats range in a narrow band from the Columbia River, throughout California, and into northern Baja California.
CNDDB/RAREFIND RECORDS: Not noted on Roseville and Pleasant Grove quadrangles.
HABITAT PRESENT IN PROJECT AREA?: Possible along Pleasant Grove Creek.

8.2.1.9 Field Survey Methods

This section describes the field survey methods used to determine biological resources that could be affected by project activities and the results of those surveys for each of the project areas.

Biological field surveys for the REP project were conducted by Tetra Tech FW, Inc. (TtFWI), ecologists Brett Hartman, Eric Htain, and Lenny Malo, and by Dr. Brent Helm of Helm Associates (qualifications are presented in Appendix 8.2-C). Surveys included a biological survey of the plant site on June 23 and 27, 2003, and a reconnaissance level survey of the wider project area on July 28, 2003, and wetland delineations on September 4 and 5, 2003. The project area is defined as a 1-mile radius from the project site plus the 50-foot-wide natural gas pipeline alternative corridors and areas extending 1,000 feet on either side of the boundaries of the corridors, for the recycled water pipeline, sanitary sewer pipeline, and storm water outfall.

The REP project area has been intensively surveyed during previous projects, including numerous focused surveys for special status species associated with a proposal in 2000, cancelled in 2002, to construct a much larger power plant at the REP site, called the Roseville Energy Facility. Additional surveys have been conducted on behalf of the West Roseville Specific Plan (WRSP) and Environmental Impact Report (City of Roseville 2003). The WRSP includes both the Fiddyment Ranch and Westpark properties. These are summarized below:

Vegetation

Vegetation surveys included the following tasks:

- Site surveys to determine the type and location of vegetation communities
- Vegetation mapping
- Preparation of plant lists

Activities associated with the special status plant species surveys included the following:

- Consultation with CDFG and USFWS regarding potential occurrence of state and federally listed plant species on or near the project area
- Determination of CNPS status of special status plant species using the CNPS electronic inventory
- Determination of habitat preference and flowering times of special status plant species
- Review of data from previous field surveys, including the following:
  - Field surveys conducted for the West Park and Fiddyment Ranch segments of the WRSP area, including a special status species survey conducted by Miriam Green Associates of both of these segments of the WRSP (2000). This work included a total of 19 survey days during the months of April, May, and June of 2000. Gibson & Skordal conducted wetland inventories and delineations of the West Park (also known as Placer 1600) segment (1999) and the Fiddyment Ranch (1998).

- A reconnaissance level biological resources survey conducted on March 23, 2001, for the Roseville Energy Facility project, as well as focused surveys for rare plants from April 16 to 20, 2001 and May 21 to 24, 2001. This survey covered the entire REP project site (40-acre parcel) (URS 2001).
- Rare plant surveys, vernal pool surveys, and wetland delineations associated with the West Roseville Specific Plan area. Additional special-status plant surveys and vernal pool surveys were conducted within portions of the WRSP area by Jones & Stokes Associates (2002) on April 23, 2002, and May 3, 2002. Rare plant surveys of the WRSP area were conducted by URS (2002b) on April 22, 2002.

- Field surveys of the REP plant site, natural gas pipeline route alternatives, recycled water pipeline, sanitary sewer pipeline, and storm water outfall conducted by TtFWI during June and July 2003. TtFWI also conducted wetland inventories and delineations of 80 acres of City of Roseville properties including the 40-acre REP site and adjacent parcels on which the storm water outfall and sanitary sewer line are located.

A list of plant species observed at the project site and linear facilities during 2003 botanical surveys is presented in Table 8.2-3. Due to their bloom time, certain species with potential habitat in the project area of potential effects could not be surveyed when this AFC was developed.

Wildlife Surveys

Wildlife surveys for the REP project were conducted in July and August of 2003 by TtFWI. ecologist Brett D. Hartman. Wildlife species were observed in the early morning and late afternoon hours at the project site and associated linear corridors. Habitat suitability for special-status species was also evaluated. A list of wildlife species observed during surveys of the project site and associated facilities is provided in Table 8.2-4.

In addition to the summer 2003 surveys for the REP project, the following focused surveys have been conducted in the study area:

- Surveys for special status species were conducted for the West Park (formerly called Placer 1600) and Fiddyment Ranch portions of the WRSP development area by Miriam Green Associates (2000) in April, May, and June 2000.
- CDFG protocol surveys for California tiger salamander larvae were conducted in the REP project area between March 15, 2001, and May, 2001 (URS 2001, 2002c).
- Surveys for special-status amphibians were conducted between January and April 2002. Ten visits were conducted in the WRSP area (URS 2002c).
- A survey for valley elderberry longhorn beetles, based on an inventory of elderberry shrubs (*Sambucus mexicanus*), was conducted in the REP project area on July 9, 1999 (URS 2001).
- Special-status bird surveys were conducted in the WRSP area between the months of April and June 2001 (URS 2001). Surveys took nine days.
- Surveys for vernal pool crustaceans (dry season) were conducted by Dr. Brent Helm of Helm Associates on October 2 and 3, 2003, at all of the seasonal wetlands located within the City of Roseville's 80-acre property north of the Pleasant Grove Waste Water Treatment Plant (PGWWTP), including the 40-acre REP site.

Wetland Delineation

A wetland delineation was performed for the 80-acre City property that lies north of the PGWWTP and includes the REP site. Areas outside of the 40-acre REP site were included because they contain construction laydown and worker parking areas and the rights-of-way for the storm water outfall and sanitary sewer pipelines for the REP. Standard methodology as defined in the U.S. Army Corps of Engineers Wetlands Delineation Manual (1987) was used. The delineation was conducted on September 4 and 5, 2003, by Eric Htain and Lenny Malo of TtFWI and Dr. Brett Helm of Helm Associates. The report of this delineation is attached as Appendix 8.2-D.

8.2.1.10 REP Plant Site Survey

The 40-acre plant site is bordered on the north, east and west by annual grassland and rural residential areas, and by the PGWWTP to the south. Figure 8.2-3 (at end of section) shows biological resources observed within 1 mile of the plant site and 1,000 feet of the project linear facility corridors. Tables 8.2-3 and 8.2-4 list the plant and animal species observed in the REP project area during the summer 2003 surveys.

Vegetation

The REP plant site is dominated by disturbed ruderal areas associated with the laydown area for the PGWWTP, annual grassland, seasonal wetlands, and vernal pools. Table 8.2-5 lists the approximate acreage of habitat types at the plant site.

Habitats within a 1-mile radius of the plant site include annual grasslands, vernal pools, and riparian oak woodlands. Annual grassland vegetation is dominated by introduced annual grasses such as wild oats (*Avena fatua*), ripgut brome (*Bromus diandrus*) and Italian wild rye (*Lolium multiflorum*), as well as ruderal species such as black mustard (*Brassica nigra*) and yellow starthistle (*Centaurea solstitialis*). Vernal pools are dominated by ephemeral species such as dowingia (*Dowingia* spp.), goldfields (Lasthenia spp.), coyote thistle (*Eryngium vaseyi*), bractless hedge-hyssop (*Gratiola ebracteata*), as well as Italian ryegrass, spikerush (*Eleocharis machrostachya*), and turkey mullein (*Eremocarpus setigerus*). Seasonal wetland vegetation is found in swales and is dominated by Italian wildrye, curly dock (*Rumex crispus*), and rushes (*Juncus* sp.).

The riparian oak woodland is dominated by valley oaks (*Quercus lobata*), interior live oaks (*Quercus wislizenii*), blue oaks (*Quercus douglasii*), and other understory trees and shrubs such as Gooding's figure willow (*Salix goodingii*) and poison oak (*Toxicodendron diversilobum*). The understory consists of annual grasses and forbs.

Wildlife

Common wildlife species observed in the project area include brewer's blackbirds, mourning dove, western meadowlark, and killdeer. Black-tailed jackrabbit burrows and runs are common. Raptor activity includes red-tailed hawks, barn owl, and white-tailed kite. Although suitable habitat for special-status raptors such as burrowing owls and Swainson's hawk was noted, no evidence of these species was detected during the summer 2003 surveys.

Table 8.2-3. Plant species observed during 2003 botanical surveys for the REP project.

Scientific Name	Common Name	N/I*
Aegilops triuncialis	Barbed goatgrass	I
Aira caryophyllea	Silver hairgrass	I
Avena sp.	Wild oats	I
Ascepias fascicularis	Narrow-leaf milkweed	N
Asclepias speciosa	Showy milkweed	N
Baccharis pilularis	Coyote bush	N
Brassica nigra	Black mustard	I
Bromus catharticus	Brome	I
Bromus diandrus	Ripgut brome	I
Bromus hordeaceus	Soft chess	I
Centaurea solstitialis	Yellow star thistle	I
Cirsium vulgare	Bull thistle	I
Convolvulus arvensis	Bindweed	I
Cyperus eragrostis	Tall flatsedge	N
Eleocharis machrostachya	Spikerush	N
Epilobium densiflorum	Dense boisduvalia	N
Eremocarpus setigerus	Turkey mullein	N
Erodium spp.	Filarees	I
Eryngium vaseyi	Coyote thistle	N
Ficus caric	Common fig	I
Fraxinus latifolia	Oregon ash	N
Hemizonia fitchii	Fitch's spikeweed	N
Hemizonia pungens	Common spikeweed	N
Holocarpha heermannii	Tarweed	N
Hordeum marinum	Mediterranean barley	I
Hordeum murinum ssp. *leporinum*	Hare barley	N
Hypochaeris radicata	Rough cat's ear	I
Juncus bufonius	Common toad rush	N
Juglans californica var. *hindsii*	N. California black walnut	N
Lactuca serriola	Prickly lettuce	I
Lolium multiflorum	Annual ryegrass	I
Lotus corniculatus	Bird's foot trefoil	I
Phalaris sp.	Canary grass	--
Polygonum sp.	Knotweed	--
Polypogon monspeliensis	Rabbitsfoot grass	I
Raphanus sativus	Wild radish	I
Rubus discolor	Himalayan blackberry	I
Senecio vulgaris	Common groundsel	I
Sisybrium sp.	Mustard	--
Solanum sp.	Solanum	--
Sonchus asper	Sowthistle	I

*N=Native; I=Introduced; --Unknown

Table 8.2-4. Wildlife species observed during 2003 wildlife surveys.

Common Name	Scientific name
Western fence lizard	*Scleroporis occidentalis*
Pacific tree frog	*Hylla regilla*
Black tailed-hare	*Lepus californicus*
Brewer's blackbird	*Euphagus cyanocephalus*
Common Crow	*Corvus brachrhynchos*
Killdeer	*Charadrius vociferus*
Mallard	*Anas platyrhynchos*
Mourning dove	*Zenaida macroura*
Northern harrier	*Circus cyaneus*
White-tailed kite	*Elanus caeruleus*
Scrub jay	*Aphelocoma Coerulescens*
Barn owl	*Tyto alba*
Red-tailed hawk	*Buteo jamaicensis*
Western meadowlark	*Sturnella neglecta*

Wetlands

The project site and surrounding 1-mile radius is dominated by annual grassland interspersed with vernal pools and seasonal wetlands. Vernal pools are habitat for several special-status species, including vernal pool crustaceans, vernal pool endemic plants, and amphibian species such as the California tiger salamander and western spadefoot toad. Seasonal wetlands and vernal pools at the project site and adjacent, City-owned parcels are shown in Figure 2 of the wetland delineation report, found in Appendix 8.2-D. The wetland inventory and delineation identified 31 individual seasonal wetlands and 2 perennial ponds within the 70 acres of City of Roseville property. REP construction will use 50 acres of this area as a construction zone (the 40-acre power plant site and the 10-acre parcel to the west that will be used for construction laydown). Two of the projects' linear features, the stormwater outfall and the sanitary sewer pipeline, enter one or both of the two City-owned parcels to the east. Acreages of seasonal wetlands and vernal pools potentially affected by construction of the REP plant site and these two linears on City property are listed in Table 8.2-5.

8.2.1.11 Linear Feature Surveys

Natural Gas Pipeline

Vegetation along the natural gas pipeline route alternatives A, B, B1, and C are dominated by annual grassland and vernal pool complexes west of Fiddyment Road, and suburban environments with horticultural trees and shrubs east of Fiddyment Road. Natural gas pipeline alternative A will traverse riparian oak woodland habitat associated with Pleasant Grove Creek. The natural gas pipeline alternatives will potentially affect wetlands and waters of the U.S., including vernal pools, seasonal wetlands, and several stream crossings. Wetland acreage potentially affected is shown in Table 8.2-5. Stream crossings associated with the natural gas pipeline alternatives are shown in Table 8.2-6.

Recycled Water Pipeline

The recycled water pipeline crosses Phillip Road from the PGWWTP to the REP site, traversing paved streets and disturbed ruderal areas (extending for approximately 40 feet, outside of the REP and PGWWTP boundaries). There are no biological or wetland resources located along this route.

Sanitary Sewer Pipeline

The sanitary sewer pipeline goes east adjacent to the right-of-way for Phillip Road to the PGWWTP's influent junction structure, located approximately 800 feet east of the REP site. Approximately half of this distance (400 feet) lies outside of the 50-acre power plant construction and laydown zone (see Table 8.2-5).

Storm Water Outfall

The storm water outfall will traverse approximately 720 feet of annual grassland habitat and discharge to the unnamed creek east-northeast of the project site. About 300 feet of this alignment lies outside of the 50-acre power plant construction and laydown zone. This area is dominated by annual non-native species such as wild oat (*Avena fatua*), ripgut grass (*Bromus diandrus*), and Italian rye grass (*Lolium multiflorum*).

Table 8.2-5. Habitat types encountered in the REP area of potential effects.

Project feature	Habitat type	Acres
Power plant construction zone (50 acres: 40-acre REP site, plus 10-acre parcel to the east)	Annual grassland	40.91
	Ruderal	7.30
	Seasonal wetland pools	0.82
	Seasonal wetland swales	0.97
	Total	50.0
Natural gas pipeline alternative A	Annual grassland	4.8
	Riparian oak woodland	2.0
	Vernal pools	1.0
	Seasonal wetlands	1.0
	Total	8.8
Natural gas pipeline alternative B	Annual grassland	4.7
	Vernal pools	1.0
	Seasonal wetlands	0.4
		6.1
Natural gas pipeline alternative B1 (assuming construction in Phillip Road)		0.0
Natural gas pipeline alternative C	Annual grassland	17.6
	Vernal pools	2.0
	Seasonal wetlands	1.0
	Total	20.6
Recycled water pipeline	(no habitat crossed)	0.0
Sanitary sewer pipeline (east of 50-acre power plant construction zone)	Annual grassland	0.3
Storm water outfall (east of 50-acre power plant construction zone)	Annual grassland	0.3

Table 8.2-6. Water bodies crossed by REP pipelines.

Pipeline	Stream Crossing No.	Water Body
Natural Gas Pipeline Alternative A	A-1	Unnamed tributary to Pleasant Grove Creek
	A-2	Kaseberg Creek Crossing #1
	A-3	Unnamed tributary to Kaseberg Creek
	A-4	Kaseberg Creek Crossing #2
	A-5	Unnamed tributary to Kaseberg Creek
	A-6	Kaseberg Creek Crossing #3
	A-7	Kaseberg Creek Crossing #4
	A-8	Curry Creek
Natural Gas Pipeline Alternative B	B-1	Unnamed tributary to Curry Creek
	B-2	Unnamed tributary to Curry Creek
	B-3	Unnamed tributary to Pleasant Grove Creek
	B-4	Curry Creek
Natural Gas Pipeline Alternative B1	B1-1	Unnamed tributary to Curry Creek
	B1-2	Unnamed tributary to Curry Creek
	B1-3	Unnamed tributary to Pleasant Grove Creek
	B1-4	Curry Creek
Natural Gas Pipeline Alternative C	C-1	Unnamed tributary to Curry Creek Crossing
	C-2	Unnamed tributary to Curry Creek Crossing
	C-3	Unnamed tributary to Kaseberg Creek
	C-4	Kaseberg Creek Crossing #1
	C-5	Kaseberg Creek Crossing #2
Sanitary sewer pipeline	S-1	Unnamed tributary to Pleasant Grove Creek

8.2.2 Environmental Consequences

This section summarizes the direct and indirect effects of construction, operation, and maintenance activities on the biological resources potentially affected by the proposed project.

8.2.2.1 Significance Criteria

Impacts to biological resources caused by the development of a project such as the REP may result from the following:

- Habitat loss/disturbance
- Direct impacts to special-status species
- Project operation

Appendix G of California Environmental Quality Act (CEQA) addresses the significance criteria with respect to biological resources [Public Resources Code (PRC) Section 21000 et seq.]. An impact would be considered significant if it would:

- Have a substantial adverse effect on any federal or state listed species identified as endangered, threatened, or candidate.
- Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, or regulations.
- Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act through direct removal, filling, hydrological interruption, or other means.
- Interfere substantially with the movement of any native resident, migratory fish, or wildlife species, with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites.
- Conflict with any local ordinances protecting biological resources.
- Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan.

8.2.2.2 Habitat Loss/Disturbance

REP Plant Site

Habitat loss

Construction of the REP power plant could result in the temporary and permanent loss of habitat including nonnative annual grassland, wetlands, and agricultural areas. A summary of the potential project temporary and permanent impacts to these habitats is provided in Table 8.2-7. The total acreage affected on City of Roseville property (40-acre REP parcel, plus 10-acre laydown parcel to the west, plus pipeline and outfall rights-of-way) is 50.65 acres. This is greater than the power plant construction zone's 50 acres because the storm water outfall and sanitary sewer pipeline extend outside of the 50-acre power plant construction zone (project site plus laydown) on City property.

Table 8.2-7. Habitat loss/disturbance impacts summary (in acres).

	Wetlands		Annual Grassland	
Project Component	**Permanent**	**Temporary**	**Permanent**	**Temporary**
I. REP project construction zone (City property outside of the WRSP area):				
Power plant and switchyard	0.17	-	8.00	-
Construction laydown and parking	1.62	-	-	40.21
Recycled water supply pipeline	-	-	-	-
Sanitary sewer pipeline	-	-	-	0.31
Storm water outfall	-	-	0.16	0.18
Subtotal	1.79	-	8.16	40.70
II. Natural gas pipeline alternatives (in the WRSP area):				
Alternative A	2.0	-	-	4.8
Alternative B	1.4	-	-	4.7
Alternative B1	0.0	-	-	-
Alternative C	3.0	-	-	17.6

Table 8.2-7 provides an estimate of the potential habitat losses associated with construction of the pipeline along each of the alternative routes. The environmental permitting of these pipeline routes is nearly completed as part of the WRSP.

Construction of the natural gas pipeline will potentially impact streams, including Pleasant Grove, Kaseberg, and Curry creeks. Impacts to streams and their tributaries, however, will be avoided where possible through the jack-and-bore construction method, horizontal directional drilling, or cut-and-cover construction with subsequent restoration. A Streambed Alteration Agreement with the CDFG will be required, to ensure that mitigation measures are implemented to avoid impacts to special-status fish species such as steelhead, and chinook salmon, as well as reptile species such as the western pond turtle.

In addition to special status species, wetlands, and waters of the United States, construction of natural gas pipeline alternative A will take place near oak tress larger than 6 inches in diameter at breast height (dbh). Under the Tree Preservation Chapter of the City of Roseville Zoning Ordinance, a permit is required for any activity that would harm, destroy, kill, or remove any protected tree. Tree removal or construction within the dripline would require the replacement of trees in-kind or an in-lieu mitigation fee to the Native Oak Tree Propagation Fund. Construction of natural gas alternative route A, however, would be designed to avoid impacts to these trees and to oak woodland habitat.

Noise

Construction activity noise levels are provided in Section 8.7 of this AFC. The loudest composite noise levels are approximately 89 dBA at 50 feet, which results in noise levels of approximately 77 and 61 dBA at distances of 200 and 400 feet, respectively. Noise impacts to wildlife are difficult to measure; however, results of several studies summarized by Golden, et al. (1980; *Environmental Impact Data Book*, Table 8-9, page 517) indicate no impacts from aircraft noise at 75 dBA for several wildlife species (caribou, waterfowl, moose, bison). Burrowing owl, for example, have been noted to reside within 100 to 200 feet of an active railway with measured noise levels of approximately 90 dBA at a distance of 50 feet from the railway (Rio Linda/Elverta Power Project, 01-AFC- 01, Appendix J-1, Map Sheet A). The construction period is relatively short, about 20 months, and wildlife become habituated to the general construction noise. No construction noise mitigation measures are necessary.

Operational noise will be more consistent and at a much lower level than for construction. In general, equipment will be specified to have near-field noise levels that do not exceed 85 dBA at 3 feet to limit the noise exposure of plant personnel to acceptable levels (see Section 8.7). As a result of these design features, the noise levels at the project fence line are not expected to have any significant impact on wildlife resources.

Wetlands

Construction of the REP power plant site, including the power plant and switchyard footprints and construction laydown areas, would involve filling 1.79 acres in 14 seasonal wetlands that are not jurisdictional wetlands, but that may or may not be habitat for vernal pool crustaceans, and 12 seasonal swales that are jurisdictional wetlands. Dry season sampling of each of these areas has been conducted to determine whether or not vernal pool crustacean cysts are present. A final determination as to the presence of vernal pool crustaceans will be made after wet-season sampling takes place in December.

Natural Gas Pipeline

Construction of the natural gas pipeline would take place almost entirely within utility easements associated with the WSRP, the potential impacts of which on wetlands and protected species have been taken into account as part of the environmental permitting process for the WRSP. The only exception to this would be the final segment of the pipeline reaching from the new (WRSP) alignment of Phillip Road westward along the existing alignment of Phillip Road (to become a private drive once the new alignment of Phillip Road is constructed). The pipeline alternatives all share this final segment. The segment will be approximately 700 feet long between new Phillip Road and the REP gas metering station. The pipeline will be placed either in (existing) Phillip Road or adjacent to the north, in the same surface disturbance area as the sanitary sewer pipeline (see below). For this reason, this portion of the natural gas pipeline routing that is located outside of the WRSP will not cause additional impacts to biological resources beyond those that are accounted for as part of the sanitary sewer pipeline.

Recycled Water Supply Pipeline

Construction of the recycled water supply line will not affect biological or wetland resources habitat, because this 40-foot-long pipeline crosses Phillip Road to the PGWWTP and will not displace wetlands or biological resources habitat.

Sanitary Sewer Pipeline

Construction the sanitary sewer pipeline will temporarily disrupt 0.31 acre of annual grassland raptor foraging habitat located adjacent to Phillip Road. This figure assumes a disturbance area 50 feet wide by 800 feet long between the REP's eastern boundary and the PGWWTP's influent junction structure east of the REP. Approximately 450 feet of this, however, is ruderal land in a soil stockpile located in the southeast corner of the 40-acre REP parcel, leaving 350 feet of annual grassland that lies outside of the 50-acre power plant construction zone. This area will be revegetated after construction, so there will be no permanent habitat loss. This pipeline will also cross the unnamed tributary to Pleasant Grove Creek. This will be done using the cut-and-cover technique.

Storm Water Outfall

Construction the storm water outfall will temporarily disturb 0.34 acres of annual grassland raptor foraging habitat that would not also be disturbed by construction laydown (assumes a disturbance area 50 feet wide by 700 feet long between the REP's eastern fence and the unnamed tributary to Pleasant Grove Creek). Portions of this area (the underground portion) will be revegetated after construction and so there will be no permanent habitat loss. There will be permanent loss of 0.18 acres of raptor foraging habitat in the portion of the outfall that is open ditch, rather than underground pipeline (assumes ditch 20 feet wide by 300 feet long). The outfall will cross jurisdictional wetland P7. This impact is considered as part of the construction laydown area within the 50-acre power plant construction zone, however.

Construction Laydown and Worker Parking

Construction laydown areas will involve the temporary disturbance of 40.21 acres of annual grassland and the filling of 1.79 acres of seasonal wetlands.

8.2.2.3 Impacts to Special-Status Species

Direct Impacts

Construction of the REP could result in the temporary and permanent loss of habitat important to special-status wildlife species in the project area. The special-status species known to occur in the project area that may be affected by the project include the Swainson's hawk, western spadefoot toad, vernal pool brachnipods, and vernal pool endemic plants. Impacts to Swainson's hawk include the removal of foraging habitat for project facilities and the temporary removal of foraging habitat during project construction. The project will permanently remove 8.16 acres of annual grassland and temporarily disturb 40.70 acres. There would be no impacts anticipated to Swainson's hawk nesting. The closest recorded (CNDDB) nest is located about 2 miles from the REP site and about 1 mile from the closest point of natural gas pipeline alternative C.

Impacts to vernal pool brachnipods and endemic plants involve the permanent removal of vernal pools at the project site and the natural gas pipeline route. As mentioned above, surveys are ongoing to determine whether or not these species are present. This determination can only be made, however, after a wet-season inventory that is scheduled to take place in December.

Indirect Impacts

Indirect impacts from project construction are unlikely as long as best management practices are followed. There are no nesting sites for protected species within a mile of the site. The construction site will be fenced to control access, and this will also help to prevent wildlife from entering the project site. Fencing will also keep construction activity within the project parcel boundaries so that off-site impacts to sensitive biological resources that may be located there are avoided. Standard BMPs for construction, such as attention to dust control, will prevent dust from travelling off-site where it might disrupt the viability of protected species habitat. The organization of the laydown and worker parking areas, and the training of the construction workforce, will reduce potential indirect impacts on biological resources. Other indirect effects will be avoided through the use of standard measures that will be designed through consultation with the USACE during the Section 404 permitting process.

8.2.2.4 Operation Phase Impacts

Direct Impacts

Operation of the project would cause an increase in noise that may cause disturbance to wildlife using nearby areas. Project operations would increase localized traffic, which could result in additional incidental road kills. However, because the wildlife in the area is already exposed to similar impacts, impacts from the REP are expected to be insignificant.

Indirect Impacts

Project emissions could impact nearby vegetation. Section 8.1 presents an evaluation of the potential impacts of project emissions on vegetation. The evaluation discusses oxides of nitrogen and sulfur compounds. Dust and emission pollution is regulated in Placer County and will not exceed levels considered harmful to wildlife and plants during the construction and operation of the project. Emission impacts on vegetation from the proposed project are expected to be below levels of significance.

The project includes a mechanical draft cooling tower. Cooling tower drift could cause deposition of salts that may impact nearby vegetation. Water for the cooling towers will be supplied from the nearby

PGWWTP. An analysis of this water is presented in Section 8.15. Based on the water balances provided in Figures 7.1-1 through 7.1-4, the concentration of dissolved materials in the cooling tower drift is expected to be approximately 5 times higher than in the water supplied by the waste water treatment plant. The drift would primarily consist of the following dissolved solids: sodium, sulfate, chloride, silica, bicarbonate, calcium, potassium, phosphate, magnesium, nitrate, and fluoride. Other dissolved solids would be present in the circulating water, but are projected to be in concentrations of one part per million or less. The annual cooling tower drift deposition modeled using the ISCST3 model projected a maximum of 0.0116 g/m^2/year at a location approximately 1.17 km northwest of the cooling tower. The drift would diminish rapidly with increasing distance.

Literature was reviewed to ascertain whether circulating water components might cause adverse effects on vegetation when applied as drift. Pahwa and Shipley (1979) exposed vegetation (corn, tobacco, and soybeans) to varying salt deposition rates to simulate drift from cooling towers that use saltwater (20 to parts per thousand) circulation. These agricultural varieties of plants were selected for large leaf area, rapid growth, and high yield, and they are considered to be more sensitive than most non-cultivated natural vegetation to cooling tower drift. Salt stress symptoms on the most sensitive crop plant (soybeans) were barely perceptible at a deposition rate of 2.98 g/m^2/year (Pawha and Shipley 1979). Using an assumption that 100 percent of the airborne particulates from REP cooling tower emissions are salts in the cooling tower drift, the calculated deposition rate of 0.0116 g/m^2/year is well below the deposition rate that was shown to cause barely perceptible vegetation stress from salt mist. As a result, the deposition of salts to vegetation found near the power plant is not expected to cause detectable reduction in growth or significant visible damage.

Once constructed and operational, the facility will have a minimal effect on wildlife resources in the area. Operation of the REP would produce some noise, as described in Section 8.7 (Noise). However, there is no raptor nesting habitat or special-status vertebrate species potentially affected by elevated noise levels. Human activity at the facility should have no significant affect on the adjacent annual grassland because fencing will be present. Lighting would be designed to reduce glare (Section 8.13, Visual Resources). Storm water runoff from equipment and secondary containment areas will be collected in an oil-water separator and the oily fraction removed. Storm water runoff from paved areas will be routed through a storm water pond where the oily fraction will be separated. Water discharged to local drainage will thus be free of contaminants and will not affect the habitat quality of aquatic species.

8.2.2.5 West Roseville Not Annexed

If West Roseville annexation is denied or delayed indefinitely, it will be necessary to construct a 60 kV transmission line from the REP site along Phillips Road to Fiddyment Road and along Fiddyment Road to the Fiddyment Receiving Station. Under these circumstances, natural gas pipeline alternative B1 will be chosen. Route B1 follows the same routing as the transmission line as far as the Fiddyment Substation. It then continues south on Fiddyment Road, then turns east onto Baseline Road, where it continues to the PG&E Line 123 tie-in. It would be necessary, without West Roseville annexation, to extend the scope of project permitting and mitigation efforts to cover the areas along the natural gas pipeline and electrical transmission line that would otherwise lie within the WRSP area and the effects of which would be mitigated under permitting conducted for the WRSP.

8.2.3 Cumulative Impacts

The REP project would not result in significant cumulative effects on special status plants, natural plant communities, wetlands, or wildlife. Though the project would result in a permanent loss of raptor foraging habitat, vernal pool habitat, and seasonal wetlands, the habitat loss would not be significant when added to impacts from the build-out of the WRSP. The developers of the WRSP have been in negotiation with CDFG, USFWS, U.S. Army Corps of Engineers, Regional Water Quality Control Board, and U.S. Environmental Protection Agency regarding the development of a plan to mitigate significant biological resources impacts for the WRSP. The USFWS Biological Opinion for the WRSP is under preparation, and it is likely that the developers of West Roseville will have obtained the appropriate permits under the federal and state Endangered Species Acts and under the federal Clean Water Act (for wetlands and waters of the United States fill) before the CEC decision on the REP. Once these permits are in place, potential effects of the REP project within the WRSP area (the natural gas pipeline construction) will have been taken into consideration. Though consultation with these agencies will take place on behalf of the REP, it is likely that the applicable regulatory agencies and the WRSP developers will have a plan in place for mitigation of any potential effect of constructing and operating the REP gas pipeline in WRSP roadways and roadway utility easements, since these are features that are part of the WRSP development plan. For this reason, the effects of the REP natural gas pipeline will be included as impacts of the development of the WRSP, and any residual impacts will not be cumulative with the impacts of West Roseville.

Potential REP project impacts at the project site (40-acre project parcel and adjacent, City-owned parcels to the east and west) are not covered in the WRSP and its permitting activities. Residual impacts that are insignificant at the REP (such as minor disturbances due to noise and dust due to construction activity and project operational noise) and do not reach a level such that they would be cumulatively significant in combination with unmitigated impacts of reasonably foreseeable projects to the north of the project site outside of the WRSP area.

The area north of the REP is currently within the County and is proposed to be part of an amendment to be added to the City of Roseville's sphere of influence, as part of actions considered as part of the WRSP program. However, there are no specific development plans proposed for the area outside of the WRSP and part of the proposed sphere of influence at this time that would provide a basis for comparison (there are no pending development applications in this area). If development were proposed in the future and this area were to be developed in a manner similar to the WRSP, the most likely use for the area immediately north of the project site would be as an open space-riparian corridor for Pleasant Grove Creek. Development for such a use would be unlikely to create residual impacts that could be cumulatively significant with the residual impacts of the REP.

The WRSP build-out will leave natural corridors that will provide habitat for wildlife and for threatened and endangered species. This habitat, however, is far enough away from the REP site so that any residual impacts from the build-out of the WRSP in these areas would not be cumulatively significant with the REP's residual impacts.

8.2.4 Proposed Mitigation Measures

The following mitigation measures would ensure that any potentially significant project environmental impacts to biological resources would be mitigated below the threshold of significance.

- For the project's effects on sensitive species and habitat at the power plant site, construction laydown and worker parking areas, recycled water pipeline, sanitary sewage pipeline, and storm water outfall, the following mitigation applies:
  - The project will obtain a permit from the U.S. Army Corps of Engineers (USACE), under Section 404 of the Clean Water Act, as well as a permit from the Regional Water quality Control Board under Section 401 of the Clean Water Act, to fill on-site wetlands. The permit application will include a mitigation plan that identifies how the seasonal wetlands will be replaced in kind through a mitigation bank located as close to the project site as is feasible. The mitigation plan will be developed in consultation with the USFWS and the CDFG and will be consistent with the City of Roseville's (1999) Memorandum of Understanding with the USFWS. A pre-application meeting with the USACE and USFWS was held on October 2, 2003, to introduce the project and begin discussion of project permitting.
  - The project will require consultation with USFWS and CDFG for impacts to state and federally listed special-status species, including western spadefoot toad, vernal pool brachnipods, and vernal pool endemic plants, as well as the removal of annual grassland raptor foraging habitat. Consultation will include the preparation of a Biological Assessment, with a mitigation package that includes compensation at an approved mitigation bank as near to the project site as is feasible.
- For the natural gas pipeline routes that lie within the WRSP area, the effects of the project on biological resources will be taken into account and fully mitigated by the time of construction by the developers of the Fiddyment Ranch and Westpark properties (two components of the WRSP area). Permitting activities for these projects will include a Clean Water Act 401 and 404 permit for dredge and fill of wetlands, and a Biological Opinion from USFWS for impacts to state and federally listed species potentially present in the WRSP area. The developers of the WRSP will have mitigated for the effects of all WRSP development impacts on biological resources, most likely in the form of offsite restoration and compensation at approved mitigation banks in Placer County. Copies of the Biological Opinion and Clean Water Act permits for the West Roseville developments will be filed with the CEC when available. There are no gas pipeline biological resources effects outside of the WRSP because the natural gas route will either run in Phillip Road or adjacent to it along with the sanitary sewer pipeline (see discussion, above).
- The project will require a Streambed Alteration Agreement from CDFG under California Fish and Game Code 1600 for channel crossings associated with the natural gas pipeline route alternatives. Channel crossings may be directionally drilled or open cut. Standard measures included in a Stormwater Pollution Prevention Plan (SWPPP) will help ensure biological resources associated with Pleasant Grove, Kaseberg, and Curry creeks are protected.
- Personnel trained to detect any potential will carry out monitoring of construction activities to detect unforeseen impacts on listed, sensitive, or migratory wildlife and their habitats adjacent to the project site. If actual or potential effects are detected, the construction foreman will stop the activities that are potentially affecting these species and will consult with a professional biologist qualified to assess the situation and make recommendations to alter or alleviate any activities that are resulting in these effects.

8.2.5 Applicable Laws, Ordinances, Regulations, and Standards

Table 8.2-8 (end of section) describes the applicable laws, ordinances, regulations, and standards (LORS) pertaining to biological resources for the REP project.

8.2.6 Involved Agencies and Agency Contacts

A number of agencies are involved with biological resources and special status species. The agencies and persons to contact for each of these agencies are shown in Table 8.2-9.

Table 8.2-9. Agency contacts.

Agency	Contact	Title	Telephone
U.S. Fish and Wildlife Service Federal Building 2800 Cottage Way, Room W-2605 Sacramento, California 95825	Dan Buford	Chief, Endangered Species Division	916-414-6700
California Department of Fish and Game 1701 Nimbus Road Rancho Cordova, CA 95670	Banky Curtis	Regional Manager	(916) 358-2899
U.S. Army Corps of Engineers Regulatory Branch 1325 J Street Sacramento, CA 95814	William Ness	Acting Chief, Sacramento Valley Office	(916) 557-5250
Regional Water Quality Control Board Central Valley Region 3443 Routier Road Sacramento, CA 95827	Patrick Gillum	Water Quality Certification	(916) 255-3397

8.2.7 Permits Required and Schedule

Applicable biological resources permits required for the project are listed below in Table 8.2-10.

Table 8.2-10. Permits required and permit schedule.

Permit/Approval Required	Agency	Schedule
Biological Opinion, State and Federal Endangered Species Act	U.S. Fish and Wildlife Service, California Department of Fish and Game	Application concurrent with AFC filing, and approximately four to six month review
Clean Water Act, Section 404, Individual Project Permit to fill jurisdictional wetlands, outfall	U.S. Army Corps of Engineers	Application concurrent with AFC filing and approximately four-month review
Clean Water Act, Section 401, Water Quality Certification (for filling jurisdictional wetlands)	Regional Water Quality Control Board	Application concurrent with AFC filing, data adequacy, and approximately four-month review

8.2.8 References

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Table 8.2-8. Laws, ordinances, regulations, and standards.

LORS	Purpose	Regulating Agency	Permit or Approval	Schedule and Status of Permit	Conformance (Section)
Federal					
Endangered Species Act of 1973 and implementing regulations, Title 16 United States Code (USC) §1531 et seq. (16 USC 1531 et seq.), Title 50 Code of Federal Regulations (CFR) §17.1 et seq. (50 CFR 17.1 et seq.).	Designates and protects federally threatened and endangered plants and animals and their critical habitat.	USFWS and NMFS	Issues letter of concurrence after review of mitigation measures. Issues Biological Opinion (BO) with Conditions after review of BA.	Applicant will engage in informal consultation with USFWS. Letter of concurrence or biological opinion will be obtained prior to construction. Section 7 consultation may be required.	Figure 8.2-1 8.2.1.2 8.2.1.4 Table 8.2-1 8.2.2.2 8.2.5.2
Section 7 of Fish and Wildlife Coordinating Act, 16 USC 742 et seq., 16 USC 1531 et seq., and 50 CFR 17.	Requires consultation if any project facilities could jeopardize the continued existence of an endangered species. Applicability depends on federal jurisdiction over some aspect of the project.	USFWS	Issues BO with Conditions after review of BA.	Applicant will engage in informal consultation with USFWS. Letter of concurrence or biological opinion will be obtained prior to construction. Section 7 consultation may be required.	8.2.1.4 8.2.5.2
Section 10(1)(A) of the ESA	Requires a permit to "take" threatened or endangered species during lawful project activities. If no federal nexus for project, a Habitat Conservation Plan (HCP) may be necessary.	USFWS	USFWS issues a Section 10(1)(A) Federal Fish and Wildlife Permit and/or HCP approval.	N/A	8.2.2.1 8.2.5.2

Table 8.2-8. Laws, ordinances, regulations, and standards.

LORS	Purpose	Regulating Agency	Permit or Approval	Schedule and Status of Permit	Conformance (Section)
Section 404 of Clean Water Act of 1977 (33 USC 1251 et seq., 33 CFR §§320 and 323).	Gives the USACE authority to regulate discharges of dredge or fill material into waters of the United States, including wetlands.	USACE	Permit to fill vernal pools and seasonal wetlands on REP plant site.	PCNs to be developed describing the project and wetland mitigation measures, permits to be obtained before construction in wetlands.	8.2.2.1 8.2.2.2 8.2.3.1 8.2.5.2
Section 401 of Clean Water Act of 1977.	Requires the applicant to conduct water quality impact analysis for the project when using 404 permits and for discharges to waterways.	CRWQCB	Water Quality Certification	Water quality analysis currently being conducted, Certification to be obtained before construction begins in 2003.	8.2.3.1 8.2.5.2
Migratory Bird Treaty Act 16 USC §§703-711.	Prohibits the non-permitted take of migratory birds.	USFWS and CDFG	Issues BO with Conditions after review of BA.	Applicant will engage in informal consultation with USFWS. Letter of concurrence or BO will be obtained prior to construction.	8.2.1.2 8.2.2.2 8.2.2.3 8.2.2.4 8.2.3.3 8.2.5.2
State					
California Endangered Species Act of 1984, Fish and Game Code, §2050 through §2098.	Protects California's endangered and threatened species.	CDFG	Issues letter of concurrence after review of mitigation measures. Issues BO with Conditions after review of BA.	Applicant will engage in informal consultation with USFWS and CDFG. Letter of concurrence or BO will be obtained prior to construction.	Figure 8.2-1 8.2.1.2 8.2.1.4 8.2.2.2 8.2.5.2

Table 8.2-8. Laws, ordinances, regulations, and standards.

LORS	Purpose	Regulating Agency	Permit or Approval	Schedule and Status of Permit	Conformance (Section)
Title 14, California Code of Regulations (CCR) §§670.2 and 670.5.	Lists plants and animals of California declared to be threatened or endangered.	CDFG	Issues BO with Conditions after review of BA.	Applicant will engage in informal consultation with USFWS and CDFG. Letter of concurrence or BO will be obtained prior to construction.	8.2.1.4 Table 8.2-1
Fish and Game Code Fully Protected Species. §3511: Fully Protected birds §4700: Fully Protected mammals §5050: Fully Protected reptiles and amphibians §5515: Fully Protected fishes	Prohibits the taking of listed plants and animals that are Fully Protected in California.	CDFG	Issues BO with Conditions after review of BA.	Applicant will engage in informal consultation with USFWS and CDFG. Letter of concurrence or BO will be obtained prior to construction.	Figure 8.2-1 8.2.1.2 8.2.1.4 8.2.2.2 8.2.5.2
Fish and Game Code §1930, Significant Natural Areas.	Designates certain areas such as refuges, natural sloughs, riparian areas, and vernal pools as significant wildlife habitats. Listed in the CNDDB.	CDFG	Issues BO with Conditions after review of BA.	Applicant will engage in informal consultation with USFWS and CDFG. Letter of concurrence or BO will be obtained prior to construction.	8.2.1 Figure 8.2-1 8.2.1.1, 8.2.1.1, 8.2.1.4 Figure 8.2-4 8.2.2.2 8.2.2.3
Fish and Game Code §1580, Designated Ecological Reserves.	The CDFG commission designates land and water areas as significant wildlife habitats to be preserved in natural condition for the general public to observe and study.	CDFG	Issues BO with Conditions after review of BA.	Applicant will engage in informal consultation with USFWS and CDFG. Letter of concurrence or BO will be obtained prior to construction.	Figure 8.2-1a & b 8.2.2.3

Table 8.2-8. Laws, ordinances, regulations, and standards.

LORS	Purpose	Regulating Agency	Permit or Approval	Schedule and Status of Permit	Conformance (Section)
Fish and Game Code §1600, Streambed Alteration Agreement.	Reviews projects for impacts on waterways, including impacts to vegetation and wildlife from sediment, diversions, and other disturbances.	CDFG	Issues conditions of the Streambed Alteration Agreement that reduces and minimizes effects on vegetation and wildlife.	Streambed Alteration Agreement needed.	8.2.2.3
Native Plant Protection Act of 1977, Fish and Game Code, §1900 et seq.	Designates state rare and endangered plants and provides specific protection measures for identified populations.	CDFG	Reviews mitigation options if there will be significant project effects on threatened or endangered plant species.	Mitigation measures being prepared for review by agencies. Letter of concurrence to be obtained before construction.	Figure 8.2-1 8.2.1.4 8.2.2.3 8.2.3.2
CDFG Policies and Guidelines, Wetlands Resources Policy.	Provides for the protection, preservation, restoration, enhancement, and expansion of wetland habitats in California, including vernal pools.	CDFG California Environmental Protection Agency (Cal/EPA) CRWQCB	Reviews 404 permit application and wetland mitigation measures for compliance.	PCNs to be developed that include wetland mitigation measures. 404 permit to be obtained before start of construction.	8.2.2.2 8.2.5.2
Public Resource Code §§25500 & 25527.	Siting of facilities in certain areas of critical concern for biological resources is prohibited, or when no alternative, strict criteria is applied.	USFWS CDFG	Issues BO with Conditions after review of BA.	Applicant will engage in informal consultation with USFWS and CDFG. Letter of concurrence or BO will be obtained prior to construction.	8.2.1.2 8.2.2.3 8.2.3.2
Title 20 CCR §§1702 (q) and (v).	Protects "areas of critical concern" and "species of special concern" identified by local, state, or federal resource agencies within the project area, including the CNPS.	USFWS CDFG	Issues BO with Conditions after review of BA.	Applicant will engage in informal consultation with USFWS and CDFG. Letter of concurrence or BO will be obtained prior to construction.	Figure 8.2-1 8.2.1.2 8.2.1.4 Table 8.2-1 8.2.3.1 8.2.5

Table 8.2-8. Laws, ordinances, regulations, and standards.

LORS	Purpose	Regulating Agency	Permit or Approval	Schedule and Status of Permit	Conformance (Section)
Title 14 CCR Section 15000 et seq.	Describes the types and extent of information required to evaluate the effects of a proposed project on biological resources of a project site.	USFWS CDFG	Issues BO with Conditions after review of BA.	Applicant will engage in informal consultation with USFWS and CDFG. Letter of concurrence or BO will be obtained prior to construction.	8.2.2.1 8.2.2.3 8.2.5

Figure 8.2-3a

Biological Resources

Roseville Energy Park

TETRA TECH FW, INC.

Figure 8.2-3b

Biological Resources

Roseville Energy Park

8.3 CULTURAL RESOURCES

This section analyzes the Roseville Energy Park's (REP) potential effects on cultural resources within the project Area of Potential Effect (APE). For the purposes of this analysis, the APE is defined as the immediate project site and corridors extending 50 feet to either side of the centerline for linear facilities. Background information is provided for a broader area. Cultural resources in the general project area include historic and prehistoric archaeological sites, historic buildings and structures, and resources of traditional cultural significance to Native Americans and other groups.

Section 8.3.1 discusses the affected environment, including the prehistoric background, archaeology and archaeological sensitivity of the area, ethnographic background, and historic background. Section 8.3.1 also discusses methods and results of archival research and a pedestrian field survey, as well as the cultural resources documented within the APE. Section 8.3.2 discusses the effects that construction and subsequent operation of the project facilities may have on cultural resources. Section 8.3.3 evaluates any potential cumulative impacts to cultural resources in the project vicinity, and Section 8.3.4 addresses proposed mitigation measures. Section 8.3.5 presents applicable laws, ordinances, regulations, and standards (LORS). Section 8.3.6 presents agency contacts, and Section 8.3.7 presents permit requirements and schedules. Section 8.3.8 lists references cited.

8.3.1 Affected Environment

Cultural resources are the traces of human occupation and activity that, in California, extend back in time for at least 11,500 years. Archaeologists have reconstructed general trends of prehistory. Written historical sources tell the story of the past 200 years.

8.3.1.1 Prehistoric Background

This section discusses general trends in California prehistory. Section 8.3.1.4 discusses the history of archaeological research in the central valley region of California. Section 8.3.1.6 presents the results of archival research and archaeological field surveys conducted for this project.

The general trend throughout California prehistory has been an increase in population density over time, coupled with greater sedentism and the use of a greater diversity of food resources. Chartkoff and Chartkoff (1984) identified three major periods of prehistory observed throughout California: Pre-Archaic, Archaic, and Pacific. These patterns are roughly correlated with the Paleoindian, Archaic, and Emergent periods, developed by Bennyhoff and Fredrickson (1994) for central California. As Chartkoff and Chartkoff observe, culture change occurred in different ways and at different times throughout California. These changes, nevertheless, followed a broad pattern, as outlined below.

Pre-Archaic Period (Prior to 11,000 years before present [BP])

Evidence throughout California and the western United States generally suggests that Pre-Archaic (or Paleoindian) populations were small, and their subsistence economies included the capture of big game such as now-extinct large Pleistocene mammals, including mammoth and mastodon. Recent research in the Great Basin, which offers better preservation of Pre-Archaic sites than does California, indicates that the economies of the Pre-Archaic peoples of the far western United States were based on a wide-ranging hunting and gathering strategy, dependent to a large extent on local lake-marsh habitats (Willig 1988).

Large, fluted lanceolate projectile points known as Clovis points, which are the most widely recognized markers for this time period, have been found in the Clear Lake locality at the Borax Lake Site to the west of the project area (Meighan and Haynes 1970), the Tulare Lake Basin to the south (Wallace and Riddell 1988), and sporadically elsewhere in California. Archaeologists have suggested that very early sites may be buried in alluvium in the Sacramento Valley and foothills (Moratto 1984).

Early to Middle Archaic Period (11,000–6,000 years BP)

During the Early and Middle Archaic periods, northern California prehistoric cultures, as elsewhere, began to put less emphasis on large game hunting. Subsistence economies probably diversified somewhat, and Archaic-era people may have begun to use certain ecological zones, such as the coast littoral, more intensively than before. Advances in technology, such as the advent of milling stones, indicate that new food processing methods became important during the Archaic, enabling more efficient use of certain plant foods including grains and plants with hard seeds. Evidence of human occupation in the Sacramento Valley and adjacent foothills during these periods is rare, but present. This evidence has come mainly in the form of large stemmed projectile points of the Western Stemmed tradition (Willig and Aikens 1988). A model of early Holocene adaptation devised for the eastern Great Basin (Price and Johnston 1988) may be applicable to California. According to this model, this was a period of gradual warming and drying that supported a specialized economy based largely on marsh, lake, and stream resources. It supported higher population densities and a greater degree of sedentism than the Pre-Archaic period.

Early Archaic sites from central California with major Western Stemmed tradition components have been found in Calaveras County in the Stanislaus River drainage at Clarks Flat (Peak and Crew 1990) and the nearby Skyrocket site (Pryor and Weisman 1991). These two sites have recently produced artifact assemblages dated between 9,600 and 6,000 years BP. No sites dating to these periods have been found in the immediate project vicinity. However, the lack of sites from these periods may reflect the alluvial environment as well as the extensive urban development that may have destroyed or covered sites. It is possible that as yet undiscovered Early and/or Middle Archaic sites lie deeply buried or beneath existing paved and landscaped surfaces in the project area.

Late Archaic Period (6,000–4,000 years BP)

One important technological advance during the Late Archaic was the discovery of a process for removing the tannins from acorns, which made it possible to exploit this abundant and nutritious, though labor intensive, resource (Chartkoff and Chartkoff 1984). Prehistoric trade networks also began to diversify and develop during the Late Archaic, bringing raw materials and finished goods from one region to another. Resource exploitation during this period, as well as during the Early and Middle Archaic, was generally seasonal. Bands moved between established locations within a clearly defined and defended territory, scheduling the harvest of particular resources according to the time of their availability. Aggregations of food resources, such as occurred at the shores of a large body of water or along a major fish-producing river, allowed for larger aggregations of people, at least seasonally. Dispersed resources, large and small mammalian game during the winter for example, meant dispersal across the landscape into small family groups for more efficient food harvesting. The spear thrower (atl-atl) may have been introduced or increased in importance during this period, accounting for the change in projectile point styles from the Western Stemmed series to the Pinto and Humbolt series, which are

generally stemmed or have indented bases, or both. There was also an increase in the importance of seed grinding (Price and Johnston 1988).

Early and Middle Pacific Periods (4,000–1,500 years BP)

According to Chartkoff and Chartkoff (1984), the beginning of the Pacific Period is marked by the advent of acorn meal as the most important staple food resource for most California Indians. Increasing population densities throughout the period made it desirable and necessary for California populations to produce more food from available land and to seek more dependable food supplies. The increasing use of food processing techniques, such as seed grinding and acorn leaching, developed during the Archaic, allowed for the exploitation of more dependable food resources. Increasing use of previously neglected ecological zones may also have been part of this trend.

Late and Final Pacific Period (1,500 years BP-Historic Era)

A.D. 500 (1,500 years BP) is a cultural watershed throughout California. Sometime near this date, the bow and arrow replaced the spear thrower and dart as the hunting tool and weapon of choice. The most useful markers for this period tend to be the small projectile points used as arrow tips. The date of bow and arrow introduction is a point of some controversy, but most authors place it between A.D. 500 and 600. Others believe bows and arrows were introduced as early as A.D. 250 (750 years BP; Hughes 1986) or as late as A.D. 700 (1,300 years BP; Bennyhoff et al. 1982).

During the Final Pacific Period, populations became increasingly sedentary and dependent on stored staple foods. Staple foods were stored for the winter in permanent settlements with populations as high as 1,000 persons. At the same time, there is evidence of continued diversification of the resource base. By the Final Pacific Period, every available ecological niche was exploited, at least on a seasonal basis. There was full exploitation of the marine/estuarine zone and further development of long-distance trade networks and more complex social and political systems.

Late and Final Pacific Period sites are generally well-developed midden deposits, some with surface components. The midden deposits contain both cremated and intact human burials and residential features, including house floors, reflecting the increasingly sedentary populations.

8.3.1.2 Archaeology and Archaeological Sensitivity of the Project Area

Prehistorically, the Sacramento valley and foothill region near rivers, such as the Sacramento, American, or Feather sustained relatively high prehistoric population densities because these areas afforded a high density of reliable terrestrial food resources, supplemented by aquatic resources from rivers, marshes, creeks, and intermittent streams. The topographically diverse environment also included oak woodlands rich in acorn production, and grassland prairies that extended into the foothills. Oak groves, tule marshes, grasslands, and stream terraces played a key role in the ecology and prehistoric subsistence and settlement patterns in the area. Meandering creeks, gentle sloping hills, and woodland and grassland zones characterized the project area and vicinity. Areas along creek terraces, near marshlands, and close to oak woodlands, have the highest probability for archaeological sites in the project area. Prehistoric residential locations in these areas allowed easy access to upland, riparian, and seasonal wetland food resources. Pleasant Grove Creek flows a few hundred meters north of the REP plant site boundary, and a tributary named Kaseberg Creek joins Pleasant Grove Creek about 1 mile to the east. Riparian areas along these two creeks and near their confluence support large groves of native oak woodlands and

undergrowth (PAR 2001). Open uplands further from the streams are less likely to contain surface or buried archaeological sites due to lack of good water, shelter, and a diversity of food resources.

One of the earliest systematic archaeological surveys in the project area took place in 1966, with Palumbo's formal archaeological investigation of portions of Dry Creek, approximately 3 to 4 miles south and parallel to Pleasant Grove Creek. Her field observations resulted in the identification and recording of 32 sites and the excavation of six sites along Dry Creek (Palumbo 1966 in PAR 2001). Based on analysis of shell beads, ornaments, projectile points, bone tools, and human internments, Palumbo assigned three of the sites to the mid-late Horizon period (Palumbo 1966 in Foster and Foster 1981 and PAR 2001). The sites and artifact assemblages reflected two occupational types consisting of permanent villages and campsites.

A study for the Stanford Oaks residential project (now Whitney Oaks) 7 miles east of the project area on Pleasant Grove Creek included test excavations of six prehistoric sites and four historic ranching sites associated with historic figure Joel Parker Whitney's large Spring Valley Ranch (Davy et al. 1989). These excavations revealed artifact assemblages consisting of stone tool debitage, fire fractured rock, bone, stone and bone tools, shell and beads suggesting seasonal habitation (Davy et al. 1989). The sites were assigned to the Late Period.

Both small-scale and larger, more comprehensive, research-oriented projects occurring within a 10-mile radius of the present project continue to help shape the archaeologist's understanding of local prehistory (PAR 2001; cf. Johnson and Theodoratus 1978; Maniery 1992; Maniery and Syda 1993; Robinson 1967; and Rondeau 1980, to name a few).

8.3.1.3 Ethnographic Background

The project site is situated within the historical territory of the Hill Nisenan group, of the Nisenan tribe, also referred to as the Southern Maidu (Wilson and Towne 1978; Kroeber 1925). The term "Nisenan" is derived from the occupants of the Yuba and American rivers and means "from, among us; of our side" The Nisenan are part of a sub-group of the California Penutian linguistic family that is divided into three different dialect groupings, the Northern Hill Nisenan, Southern Hill Nisenan, and the Valley Nisenan (Wilson and Towne 1978; Kroeber 1925). The Penutian languages were spoken throughout north-central California by a number of aboriginal groups, including the Wintu, Maidu, Miwok, and Yokuts.

Figure 8.3-1 shows the approximate location of aboriginal territories in the project area at a scale of 1:24,000. The Nisenan occupied the American, Bear, and Yuba basins extending from the peaks of the Sierra Nevada crest into the lower oak-grasslands and marshes of the Sacramento Valley, including along intermittent and year-round streams and rivers (Wilson and Towne 1978). The Hill Nisenan, who inhabited the lower Sierra foothills, generally below 3,000 feet elevation, tended to be somewhat distinct in economic practice from the Valley Nisenan who occupied the banks of the Sacramento and lower American rivers. Villages of the Hill Nisenan were located in upland knolls and in flat areas along stream bank terraces, with populations ranging from 15 to 25 people in small settlements to over 500 in large villages of several families (Wilson and Towne 1978; and Krober 1925). Villages houses were conical-shaped structures covered with bark, animal skins, or brush, and often had associated bedrock milling sites for seed and nut processing. Site occupation of Nisenan territory also included seasonal camps, quarries, ceremonial centers, fishing stations, trading sites, cemeteries, river crossings and

battlegrounds. The Nisenan village site, *Pichiku,* has been identified as located within the Roseville area (Wilson and Towne 1978).

Political organization for the Nisenan was localized within a village or community group that had authority over specific territories, including hunting and gathering areas, and groups also collaborated in decision-making (Wilson and Towne 1978). The Hill Nisenan traded black oak acorns, manzanita berries, skins, bows, pine nuts, and bow wood with the Valley Nisenan and nearby tribes such as the Patwin, Wintu, Paiute, Washo, and Achomawi, in exchange for items like shell beads, obsidian, salmon, salt, and pine nuts (Wilson and Towne 1978; Kroeber 1925).

Subsistence practices among the Nisenan included hunting many types of game such as birds, rabbits, quail, deer, and elk and annual gathering of acorns, pine nuts, hazelnuts, wild onion, wild sweet potato, and many native berries. The acorn was undoubtedly the most important plant food gathered. Acorns were ground to a meal using stone mortars and pestles, then leached to remove the tannins. The leached acorn mush was cooked in watertight baskets and consumed immediately or formed into cakes, which were dried and stored. As with all the Valley groups, the Nisenan men used a variety of fishing tools and methods such as tule balsas and log canoes, gorgehooks, net, harpoon, trap, weir, and poison for catching chinook salmon, trout, perch, chub, sucker, hardhead, eels, and sturgeon (Wison and Towne 1978; Moratto 1984). Women and children in foraging groups within extended families or the whole village primarily executed gathering activities.

Clothing and basketry material was often gathered from grasses, herbs, roots, willows, redbud, and rushes (Wilson and Towne 1978). Baskets were an essential basic commodity for the storage and processing of food, for hunting traps, and cradles for children. Clothing for the Hill Nisenan included fur blankets and skins, men often went unclothed or wore a beechclout, while women dressed in short aprons of wire grass, tule, or shredded maple or willow bark (Wilson and Towne 1978).

Plant and animal resources were also used for medicinal, ornamental, and other functional uses (e.g., baskets, shelters, and tools). Resources that were available on a seasonal basis may have influenced prehistoric occupation patterns. For example, acorns are available in October and November, and hard seeds can be harvested from May to September. However, fishing could be practiced year-round in the valley and foothills. During various seasons, foraging parties left the villages to engage in fishing, hunting, and the collection of plants within the family or village's territory and to engage in trade outside this territory.

It was uncommon for the Nisenan to engage in or practice large-group warfare. Family disputes, raids, and surprise attacks were often the result of infringement upon a group's, family's, or village's territory (Wilson and Towne 1978). The Nisenan practiced burial and cremation of the dead, with the Hill Nisenan partaking more frequently in cremation rituals. The house of the deceased was often moved or destroyed, and all of the individual belongings were broken or burned (Wilson and Towne 1978; Kroeber 1925).

Ethnographic data pertaining to the Nisenan are incomplete at best. Interaction with European Americans brought disease and displacement to the Nisenan. Several epidemics greatly reduced the Native American population in the Sacramento Valley and foothills, even before the arrival of Americans in large numbers. The worst of these was the 1833 epidemic of malaria or influenza, which killed an estimated 75 percent of the native population (Cook 1978).

8.3.1.4 Historic Background

Recorded history in the project area begins with early Spanish exploration in the area and the arrival of fur trappers into the valley, soon followed by the influx of miners for the California Gold Rush. After the gold boom, agricultural and ranching activities became the main land use. Roseville became one of the largest railroad centers in the western United States after the construction of the Southern Pacific Railroad. Ranching and agriculture have been replaced by urban expansion and the demand for business development and housing.

Documented historic-era resources in the project area are associated chiefly with the various industries that developed here from the mid-1800s to the mid-1990s. The industrial history of the project area can be divided into several historic themes: agriculture and ranching and railroads and other transportation-related industries.

Hispanic Period

The earliest historic records for the project area are the accounts of Spaniards who explored beyond California's coastal zone into the interior valley. The early Spanish expeditions to the Central Valley were in search of additional Native American converts to populate the coastal missions and with attempts to punish natives of the interior who began to oppose the Spanish presence more aggressively in the early 1800s. The first recorded European American reconnaissance into the project region was the 1808 Gabriel Moraga expedition, one of the earliest to explore the eastern side of the Sacramento Valley. Although the Spanish ventured within the southern edge of Nisenan territory, there is no documentation that they removed Nisenan to a coastal mission (Wilson and Towne 1978).

While the Spanish entered the interior for military reasons more often than exploration, Americans began to show an exploratory interest in California. In 1826, Jedediah Smith arrived with a party of fur trappers. The following year, he made the first recorded crossing of the Sierra by a European American, near Ebbetts Pass (Farquhar 1965). Smith's reports of good fur trapping in California were one impetus for the annual Hudson's Bay Fur Brigades, which entered California's Sacramento Valley every year from 1829 to 1843 from their base at Fort Vancouver on the Columbia River. The best-documented fur brigade was John Work's party, which entered California in August 1832, returning to Fort Vancouver in October of 1833 (Maloney 1945). The fur trappers established peaceful relations with the Nisenan and often camped within Nisenan territory (Wilson and Towne 1978).

The Spanish resented these intrusions by American fur trappers, whom they suspected of inciting the Native Americans against them. The Spanish could do little to prevent the Americans from entering a part of California they had not previously settled; and thus, the American immigration began.

American Period

A new wave of American immigrants began to explore California. Captain John Sutter was granted permission to settle in the Sacramento Valley in 1839, and the Bartleson-Bidwell party of 1840 was the first major American attempt to traverse the region overland. Several of its members were later prominent California citizens. Reports of gold discoveries in California caused an influx of gold-seekers to the state. There were an estimated 4,000 miners in 1848, 200,000 in 1849, and 500,000 in 1850. The occupation of productive parts of Nisenan territory by miners, hostilities between the miners and Nisenan, and epidemic diseases to which the Nisenan had not developed resistance depleted the Nisenan

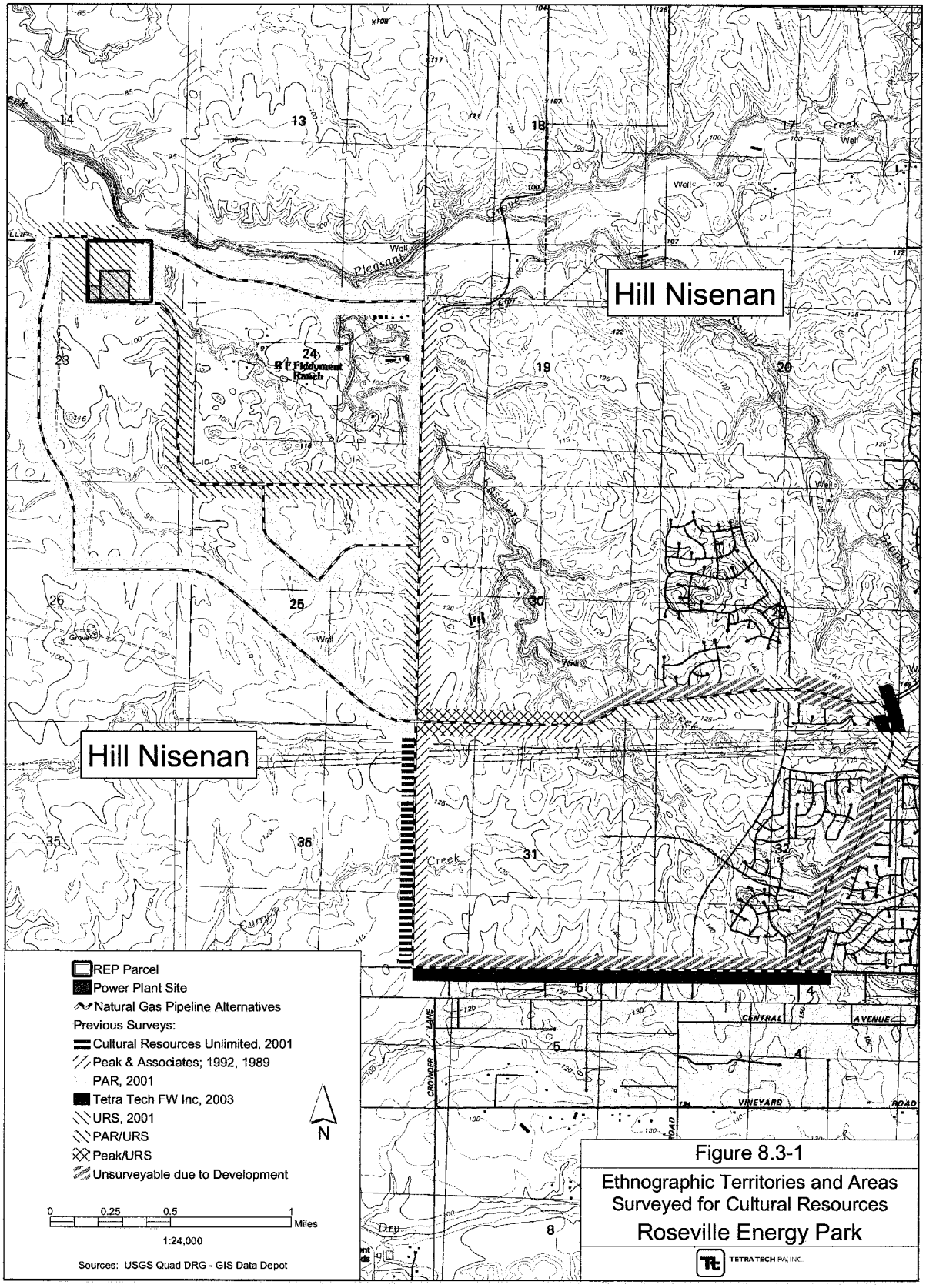

Figure 8.3-1

Ethnographic Territories and Areas Surveyed for Cultural Resources

Roseville Energy Park

TETRA TECH FW, INC.

population in only a few years (Wilson and Towne 1978). The small population of surviving Nisenan retreated to the low foothill towns and found work in agriculture and as ranch hands.

Placer County was established in 1851 and took its name from the Spanish term meaning "sand or gravel deposits containing gold." After 1852, gold mining began to decline and other local industries, chiefly agriculture and ranching, began to develop. Agricultural fields were identified within the locality of the project area on General Land Office survey plat maps from 1856 and 1866. Construction of the Central Pacific Railroad (CPR) in the early 1860s continued development in Roseville, at one time known as "Junction." Roseville remained a small railroad shipping station with a population of 250 inhabitants for almost half a century (Davis 1993). The CPR eventually became the Southern Pacific Railroad (SPR). By the early 1900s, SPR had moved its central railroad facility from Rocklin to Roseville, creating one of the largest railroad centers in the western United States. The small town grew to a population of over 2,000 people.

Leonard M. Davis (1993) wrote the following in *"A Brief History of Roseville*:"

> The year 1909 saw the first units of the vast Pacific Fruit Express ice plant completed. By the 1920's it was the world's largest artificial ice plant. Southern Pacific also continued to expand, and by the 1920's Roseville boasted the largest freight yards west of the Mississippi River. The busy rail yards became even busier during World War II when thousands of troops and munitions trains made their way through Roseville on their way to the battlegrounds of the Pacific. Roseville continued as a major railroad center into post-war years, but by the 1950's it faced stiff competition from airlines and interstate truckers.... By 1972, the local depot was closed; it was torn down the following year, as was the massive Pacific Fruit Express ice plant which was rendered obsolete by the introduction of self-refrigerating "reefers."

Roseville continues to be an important maintenance depot for the Union Pacific Railroad and is also growing very rapidly as a metropolitan commercial and industrial center.

Fiddyment Ranch

Roseville provided a good market for agricultural commodities, such as grain and stock, and the project area saw a growth in agriculture and ranching in the mid to late 1800s, as discussed above. Since the 1850s, the Fiddyment family has established a long history of agricultural land use in the project area. Early settlers belonging to this family included Elizabeth Fiddyment and George Hill who settled in the Pleasant Grove District in 1856 (PAR 2001). For over 125 years, members of this family have raised livestock and produce in western Placer County in and around the project area. Many ranching structures and features remain on the project area landscape, and some are still in use today. PAR Environmental Services, Inc., performed extensive research, interviews, recording, and evaluation of historic properties associated with the Fiddyment family and ranch in 2001 for the West Roseville Specific Plan. A detailed history of the Fiddyment family is provided in the 2001 PAR report (included in Appendix 8.3-C).

Electrical Distribution System

Electrical power plants and long-distance transmission lines began to be constructed in California in the late 1800s. Long-distance, high-voltage transmission lines came to western Placer County during the 1950s, with the construction of the Central Valley Project and associated transmission system designed to export hydroelectric power from Folsom and Nimbus dams. The Western Area Power Administration

markets this power. The transmission line appears as a single line of towers on the 1953 USGS Pleasant Grove quadrangle, and as a double line on the 1981 map. There are now three high-voltage lines running in this utility corridor to the Fiddyment Substation near the corner of Fiddyment Road and Pleasant Grove Boulevard.

Historic Archaeological and Historic Site Sensitivity

Sensitivity for historic resources and historic archaeological resources in the project area is moderate. Early historic uses near the project area included ranching and farming. Historic resources were identified within and near the alternative natural gas pipeline routes. No historic resources were located on the REP plant site, or on any parcels immediately adjacent to it.

8.3.1.5 Resources Inventory Methods

Inventory methods for the REP consisted of archival research, an intensive pedestrian field survey, architectural reconnaissance, and Native American consultation.

Archival Research Methods

Tetra Tech FW Inc. conducted a records search at the North Central Center of the California Historical Resources Information System (CHRIS) at Sacramento State University in Sacramento, on July 31, 2003 (File No: Pla-03-91). The search area included a 0.25-mile (1,320-foot) radius of the proposed plant site and 0.25-mile either side of the proposed linear features. Table 8.3-1 is a list of previous surveys within 0.25-mile of the proposed power plant site and 0.25-mile of the alternative natural gas pipeline routes. Table 8.3-2 lists previously recorded prehistoric and historic archaeological sites within 0.25 miles of the plant site and within 0.25-mile of the alternative natural gas linear routes. Figure 8.3-1 shows the survey coverage areas.

In addition to reviewing available survey reports, lists of historic properties (e.g., the National Register of Historic Places, California Inventory of Historic Resources, California Points of Historic Interest, California Landmark files, City of Roseville Sites of Historical and Cultural Importance, City of Roseville General Plan, and the Placer County General Plan) were reviewed to locate historic archaeological sites within the project area. Tetra Tech FW also studied USGS topographic maps and other historical maps to determine where unrecorded historic structures and features might be located.

Archaeological Survey Methods and Previous Inventories

The records search indicated that recent archaeological surveys have inventoried the entire REP power plant site and nearly all of the project's alternative natural gas pipeline alignments. The only remaining inventoried area was the road shoulder of Baseline Road on the south side between PG&E Line 123 (500 feet east of Country Club Lane) and Fiddyment Road. All other portions of the natural gas pipeline alternative routes had either been recently (within the past 5 years) surveyed by professional archaeologists or are entirely developed in residential and landscaping that would prevent effective survey. Jenna Farrell of Tetra Tech FW conducted a field inventory of the south road shoulder area of Baseline Road on August 6, 2003, between PG&E Line 123 and Fiddyment Road (approximately 1.9 miles). Visibility was poor over most of this route, with road fill and landscaping extending throughout the shoulder area. Visibility was very poor in non-landscaped areas because of dense weed cover. The ground was closely inspected for artifacts or signs of archaeological soils where vegetation was thin or soil was exposed. Ms. Farrell has a Bachelors degree in Archaeology and five years of experience in archaeology and historic preservation. Ms. Farrell's resume is attached as Appendix 8.3-A

Table 8.3-1. Previous archaeological surveys conducted within and near the project site APE and natural gas pipeline APE.

Author	Title	Sponsor	Area Surveyed	Survey Type	Visibility	Results
JRP Historical Consulting Services 2001	Historic Inventory and Evaluation Report, Roseville AFC, Placer County, California	Enron Corporation	25 acres	Historic Resources Inventory	Good	1 historic property
URS Corporation 2001	Roseville Energy Facility Cultural Resources, Appendix J of Application for Certification	Enron Corporation	3,000 acres	Intensive Pedestrian Survey	Poor to good	1 historic property
PAR Environmental Services Inc. 2001	Cultural Resources Investigation of the Westpark/Fiddyment Ranch and Liveoak Enterprises/Signature Property Development Project, Placer County, California	City of Roseville	3,600 acres	Intensive Pedestrian Survey	N/A	11 historic, 5 isolates
PAR Environmental Services, Inc. 1995	Cultural Resources Investigation for the Villages at Blue Oaks, Phase One, Placer County, California	Robbins and Livingston	1,079 acres	Cultural Resource Survey	Good	1 historic
PAR Environmental Services Inc. 2002	Historical Evaluation of the Fiddyment Ranch Road, Placer County, California	Signature Properties	N/A (part of 3,600 acres PAR 2001)	Road segment evaluation	Good	1 Historic road segment not eligible for CRHP
Archaeological Services, Inc. 1993	Record Search and Field Survey for the Roseville Regional Waste Water Master Plan/Environmental Impact Report Cultural Resources Analyses.	Environmental Science Associates	Approximately 23 square miles and 6 linear miles	Intensive Pedestrian Survey	N/A	Negative
Peak & Associates, Inc. 1989	Cultural Resources Assessment of the Del Webb Sun City Project, Placer County, California	Omni-Means, Ltd.	1,200 acres	Intensive Pedestrian Survey	N/A	1 prehistoric, 1 historic
Peak & Associates, Inc. 1994	Cultural Resources Assessment of the Walaire Property (APN 17-110-05), Northwest Roseville Vicinity, Placer Country, California	John Mourier Construction, Inc.	160 acres	Pedestrian Survey	N/A	2 prehistoric sites
Cultural Resources Unlimited 2001	Baseline/Fiddyment Property Assessment, Roseville, Placer County, California	Mourier Land Investment Corporation	430 acres	Intensive Pedestrian Survey	Good	Negative
Browns & Mills, Pastron, Allen Ph.D. 2000	Historical And Cultural Resource Assessment (Revised) Existing Telecommunications Facility Sun City, Site No. SA-727-C1, 5400 Fiddyment Road, Placer County, CA	Brown & Mills, Inc.	N/A	Surface Reconnaissance	N/A	Negative

Table 8.3-1. (continued.)

Author	Title	Sponsor	Area Surveyed	Survey Type	Visibility	Results
Browns & Mills, Pastron, Allen Ph.D. 2000	Historical and Cultural Resource Assessment (Revised) Existing Telecommunications Facility Sun City, Site No. SA-727-02, Mahany Park, Pleasant Grove Blvd. Placer County, CA	Brown & Mills, Inc.	N/A	Surface Reconnaissance	N/A	Negative
Peak & Associates 1992	Cultural Resources Assessment of Two Properties in the Northwest Roseville Vicinity, Placer County, CA	The Sammis Company	724 acres	Surface Reconnaissance	Adequate for complete field inspection	Negative
Peak & Associates 1979	Cultural Resources Assessment of Sacramento Municipal Utility District's Project C, Phase I 230 kV Transmission Line, Tower No. 355 Placer County to Elverta Substation, Sacramento County, CA	Sacramento Municipal Utility District	13 linear miles	Surface Reconnaissance	N/A	Negative
Far Western Anthropological Research Group 1986	An Archaeological Reconnaissance of a 14 Mile Long Transmission Line Corridor between the Elverta Street Substation, Sacramento County, and the Berry street Substation, Placer County, CA	United states Department of Energy	14 linear miles	Intensive Reconnaissance	Poor-to-good	Negative
Foster and Foster 1981	An Archaeological Reconnaissance of the Roseville-Placer County-Rocklin West Sewer Assessment District	R.C. Fuller Associates	30 linear miles	Surface Reconnaissance	Adequate for complete field inspection	6 prehistoric, two historic, 8 historic features, and 6 isolates
Archeo-Tec 1989	An Archaeological Surface Reconnaissance of the Stanford Ranch West Property, Placer County, California	EIP Associates	3,100 acres	Surface Reconnaissance	Poor to adequate	1 prehistoric, 1 historic
Peak & Associates 2001	ATC Fiddyment Tower Site #82560	ATC Associates	N/A	Surface Reconnaissance	Adequate	Negative

Table 8.3-2. Previously recorded archaeological sites within 0.25 miles of the project site APE and project linear appurtenances.

Primary Trinomial	Report Citation	7.5' Quad	Distance	Site Type	Effect	Action
CA-PLA-263B	N/A	Pleasant Grove	Near REP site boundary	Prehistoric milling stones.	No effect	avoidance
CA-PLA-730	Peak & Associates, Inc. 1989	Roseville	200' from gas Alt. A	Foundation stones, possible for Old Pleasant Grove School	No effect	None
P-31-1590	Dames & Moore 1993	Roseville	200' from gas Route A	Historic grave - two slabs of schist set vertically in the ground	No effect	None
CA-PLA-729	Peak & Associates 1989	Roseville	1300' from Alt A	Mortars on a series of small bedrock exposures	No effect	None
P-31-1229	PAR 2001	Roseville	1050' from gas Alt. A	Pumphouse, c. 1949	No effect	None
P-31-1227	PAR 2001	Roseville	525' from gas Alt. A	Turkey brooding shed, c. late 1930s	No effect	None
P-31-1228	PAR 2001	Roseville	Near Gas Alt. A	Turkey farm structure complex c. 1941-45, 1970s-1980s	Demolition	
CA-PLA-969	PAR 2001	Roseville	1250' from gas Alt. A	Concrete footings, water spigot with concrete foundation, machinery fragments, c. 1953	No effect	None
P-31-1225	PAR 2001	Roseville	1100' from gas Alt. A	Fiddyment ranch sheep shearing barn, c. mid-1920s	No effect	None
P-31-1224	PAR 2001	Roseville	1050' from gas Alt A	Concrete insecticide dip structure, historic debris c. 1950	No effect	None
CA-PLA-073	Mott, J. B.	Citrus Heights	845' from gas Alt. A	Prehistoric milling stones	No effect	None
CA-PLA-970	PAR 2001	Roseville	350' from gas Alt. B	Fiddyment ranch main complex, c. 1870s-1949	No effect	None
P-31-1217	PAR 2001	Roseville, Pleasant Grove	500' from gas Alt. B	Privy pit, debris	No effect	None
P-31-1216	PAR 2001	Pleasant Grove	350' from gas Alt. C	Farmers dump; barbwire, wood, tires, etc.	No effect	None
P-31-1218	PAR 2001	Pleasant Grove	250' from gas Alt. C	Machinery; windmill fragments.	No effect	None
P-31-1215	PAR 2001	Pleasant Grove	650' from gas Alt C	Foundation pad late 1930s	No effect	None
CA-PLA-967	PAR 2001	Roseville	300' from gas Alt C	Water well, c. 1950	No effect	None
CA-PLA-968	PAR 2001	Roseville	1320' from gas Alt. C	Windmill depression and fragments, c. late 1930s	No effect	None
P-31-1219	PAR 2001	Roseville	1320' from gas Alt. A	Road segment	No effect	None

Architectural Reconnaissance Methods

Historic buildings and structures older than 45 years are potentially significant historic resources in the project area. The historic structure inventory of the project area covered the APE of the project site and linear facilities to determine whether potentially significant historic architecture is located within the APE and, if so, whether the project will significantly affect the structures. In 2001, JRP Historical Consulting and PAR surveyed the project area for potentially significant historic resources. Potential historic resources visited and recorded include the Fiddyment Ranch and associated structures (PAR 2001). PAR (2002) conducted historic resource evaluations of a number of structures in the West Roseville Specific Plan area, including the Fiddyment Ranch.

Native American Consultation Methods

The Native American Heritage Commission (NAHC) was contacted by mail on August 4, 2003, and information regarding traditional cultural properties and sacred places, such as Native American cemeteries, in the project area, was requested (see copies of the letters, Appendix 8.3-B).

8.3.1.6 Records Search Results

The records search indicated that recent archaeological surveys conducted for the West Park and Signature developments within the West Roseville Specific Plan area, Enron Corporation's power plant license application, and Del Webb Sun City and other recent housing developments have inventoried all of the REP power plant site, construction laydown and worker parking areas, and linear appurtenances near the power plant (recycled water pipeline, sanitary sewer pipeline, and storm water outfall) and nearly all of the alternative natural gas pipeline routes.

Three studies, in particular, covered major portions of the project site and associated pipeline routes. In 2001, PAR (2001) conducted a field inventory of the entire 3,600-acre West Roseville Specific Plan Area. This inventory included the REP project site, construction laydown and worker parking areas, recycled water pipeline route, sanitary sewer pipeline, and storm water outfall, and all of the alternative natural gas pipeline route segments west of Fiddyment Road and north of Pleasant Grove Boulevard (portions of alternative routes A, B, B1, and C). The survey methods involved systematic transects spaced 15 to 30 meters apart throughout the project area. A copy of the report of this inventory is included as Appendix 8.3-C (filed separately under confidential cover). Figure 8.3-1 maps the portions of the project APE inventoried by PAR and other recent surveys.

Also in 2001, URS Corporation (2001) conducted an intensive pedestrian field survey of most of the REP project site area and adjacent areas. This inventory included all but the northern one-quarter of the REP parcel and adjacent areas, including the sanitary sewer pipeline route and the storm water outfall route. It also included natural gas pipeline Alternatives B and B1 along Phillip Road, and Alternatives A and B on Fiddyment Road between Phillip Road and Pleasant Grove Boulevard, and Alternative C along Pleasant Grove Boulevard east of Fiddyment Road. The survey methods involved systematic transects spaced 15 to 25 meters apart throughout the project area. A copy of the report of this inventory is included as Appendix 8.3-D (filed separately under confidential cover).

Also for the proposed Enron energy facility project, JRP Historical Consulting Services (2001) conducted a historic buildings and structures inventory of the entire REP project site in June of 2001. JRP observed several structures on the plant site and concluded that none of the buildings were built

prior to 1981 (JRP 2001). This report is appended to the URS report and so is included as part of confidential Appendix 8.3-D.

The following summarizes previous inventories, by project feature. Figure 8.3-1 illustrates the coverage areas.

Power Plant Site

Both the PAR (2001) and URS (2001) inventories mentioned above covered the entire REP power plant site.

Natural Gas Pipeline Alternative A

Natural gas pipeline Alternative A was not previously inventoried on Baseline Road between PG&E Line 123 and Fiddyment Road. The area along the north side of Baseline Road is entirely in residential development and landscaping and is not amenable to inventory. Tetra Tech FW inventoried the area along the south side of Baseline Road on August 6, 2003. Along Fiddyment Road between Baseline Road and Pleasant Grove Boulevard, Alternatives A, B, and B1 were inventoried by Cultural Resources Unlimited (2001) on the west side of Fiddyment Road and by Peak and Associates (1992) along the east side of Fiddyment Road. The PAR (2001) surveys for the West Park Development covered the area on the west side of Fiddyment north of Pleasant Grove Boulevard, as well as the area along and south of the proposed new alignment of Blue Oak Boulevard to the power plant site. Areas near the power plant were inventoried both by URS (2001) and PAR (2001).

Natural Gas Pipeline Alternatives B and B1

Alternatives B and B1 follow the same route as Alternative A between PG&E Line 123 and Del Well Boulevard (see discussion above regarding surveys along Baseline and Fiddyment roads). These routes were inventoried by URS (2001) along Phillip Road between the power plant site and Fiddyment Road. This area was also inventoried by PAR (2001). The PAR survey included all of the portions of Route B that lie in the planned new alignment of Phillip Road. The route along Phillip Road between the power plant site and Fiddyment Road, was inventoried by URS (2001).

Natural Gas Pipeline Alternative C

The portion of Alternative C that lies in the WRSP was inventoried by PAR in 2001 for the West Park development. Areas near the power plant site were inventoried by both PAR and URS (2001). Previous pedestrian surveys were conducted by URS (2001) along most of Pleasant Grove Boulevard and the portion of Country Club Drive that underlies the Western Area Power Administration transmission corridor. There is no record of survey for the portion of Country Club Drive south of the transmission corridor, and for portions of the north side of Pleasant Grove Boulevard east of Sun City. Inventories were conducted on Fiddyment Road north of Pleasant Grove by Peak and Associates (1989) for Sun City Roseville (east side) and by URS (2001) and PAR (2001) (west side). These areas are currently in residential development. Tetra Tech FW conducted a reconnaissance of these areas in August 2003, but ground is not visible due to streets and landscaping. The Tetra Tech FW survey included one large vacant lot on the east side of Country Club Drive at the corner of Pleasant Grove Boulevard.

As part of the studies conducted for the Enron energy facility, JRP evaluated the Western Area Power Administration's transmission lines, which cross all of the natural gas pipeline routes. JRP determined that the transmission lines do not qualify as a significant historical resource (JRP 2001, see Appendix 8.3-D for JRP report).

Recycled Water Supply Pipeline

This recycled water supply pipeline route was surveyed by PAR (2001) and URS (2001). No significant cultural or historic resources were identified along this pipeline route.

Sanitary Sewer Pipeline

This sanitary sewer pipeline route was surveyed by PAR (2001) and by URS (2001). No significant cultural or historic resources were identified along this pipeline route.

Storm Water Outfall

This storm water outfall route was surveyed by PAR (2001) and URS (2001). No significant cultural or historic resources were identified along this pipeline route.

Construction Laydown and Worker Parking Areas

This construction laydown and worker parking areas were surveyed by PAR (2001) and URS (2001). The worker parking area was also surveyed by URS (2001). No cultural resources were identified in these areas.

8.3.1.7 Resources Inventory Results

Prehistoric Resources

Archival research located three previously recorded prehistoric sites near the project APE. The archival research area included land within 0.25-mile of the project site and linear facilities. No new archaeological sites or isolates were found during surveys conducted along Baseline Road in natural gas pipeline Alternatives B, B1 and C. The State of California DPR523 site forms of the previously recorded sites are attached under confidential cover as parts of Appendices 8.3-C, -D, and -E.

P-31-000263(B)—This site consists of a possible prehistoric milling station. It was first recorded in 1961 by Mott. The site record lists the artifacts present as one metate, several manos, and "many" pestles. It mentions that artifacts and fragments of cooking stones had turned up during plowing. Archaeologists for URS (2001) and Tetra Tech FW in August of 2003 attempted to locate and rerecord the site but were unable to locate it. The 1961 maps are not very precise, so it is difficult to understand where the artifacts were found. The area is no longer plowed field. The site is plotted on topographic maps as lying outside of the REP parcel boundary and within several hundred feet of the boundary.

CA-PLA-729—This site consists of mortars on a series of small bedrock exposures of poor-quality rock and is 0.25-mile from natural gas pipeline Alternative A. This site is not within the APE and will not be affected by the project.

CA-PLA-073—This site consists of prehistoric milling stones, two metates, five bowl mortars, a mano, and six pestles, and several obsidian projectile points. The site is within 850 feet of the natural gas pipeline Alternative A. This site is not within the APE, and will not be affected by the project.

Historic Resources

Archival research located 12 previously recorded historic sites and four isolates near the project APE. The archival research area included land within 0.25 miles of the project site and of the linear facilities. One new archaeological site and one isolate were found within the project APE during pedestrian field survey. The previous surveyed area included the entire project site, and areas within 100 feet of the

linear facilities. The State of California DPR523 site forms are attached under confidential cover as Appendix 8.3-E.

CA-PLA-856—This previously recorded site consists of historic foundation stones. It is approximately 200 feet from natural gas pipeline Alternative A, is not within the APE, and will not be affected by the project.

P-31-1590—This previously recorded site consists of two slabs of schist set vertically in the ground. It is a grave site. The original stones are in place, but a new head stone has been added with a picture of the deceased. The new headstone indicates that her name was Talitha Jane Banta Jackson, married to Thomas Jackson, 1840-1873. This site is within 200 feet of natural gas pipeline Alternative A, but is not within the APE and will not be affected by the project.

P-31-1229—This previously recorded site consists of a historic pumphouse c. 1949. This site is within 1,000 feet of natural gas pipeline Alternative A, is not within the APE, and will not be affected by the project.

P-31-1227—This previously recorded resource consists of historic and modern structures associated with turkey ranching. This site is described as a dilapidated turkey brooding shed (c. late 1930s), ruins of a turkey insemination house and a lighted nesting area (c. 1957) located 450 feet from the brooding shed, a house, four other ancillary buildings, and a concrete pad (basketball court) all built in the 1980s. This site is 500 feet from natural gas pipeline Alternative A and will not be affected by the project.

P-31-1228—This previously recorded resource consists of a historic and modern turkey farm complex (c. 1940s and 1980s). The site is described as 10 buildings; a feed mill, pump house, bunkhouse, chicken house, chicken brooding shed (c. 1940s), five turkey sheds, a mobile home, and a shop, all less than 50 years old (PAR 2001). Natural gas pipeline construction would run through this site area and would probably require demolition of some structures. The site was evaluated as part of the PAR study for the West Roseville Specific Plan and was found ineligible for the National Register of Historic Places or the California Register of Historical Resources.

CA-PLA-969—This previously recorded resource consists of three historic features associated with the Fiddyment ranch. The features are described as a set of 66 concrete footings that were part of a lambing barn (c.1952 or 1953), a water spigot with and adjoining concrete foundation (c. 1952 or 1953), and a structure foundation with three sections and an in situ piece of machinery. This site is 1,270 feet from natural gas pipeline Alternative A, is not within the project APE, and will not be affected by the project.

P-31-1225—This previously recorded resource consists of a barn. This site is described as the Fiddyment ranch sheep-shearing barn (c. mid 1920s). It is 1,110 feet from natural gas pipeline Alternative A, is not within the project APE, and will not be affected by the project. The site does not appear eligible for the National Register of Historic Places or the California Register of Historical Resources (PAR 2001).

P-31-1224—This previously recorded resource is a concrete insecticide dip structure (c. 1950s) and historic debris, including a herder's wagon, five tanks, and farm/automotive machinery associated with Fiddyment ranching activities. This site is 1,000 feet from natural gas pipeline Alternative A, is not within the project APE, and will not be affected by the project.

CA-PLA-970—This previously recorded resource is the Fiddyment homestead and main ranch complex. The site includes a house (c. 1870s) with a 1949 picket fence, a barn, brick cooler, smokehouse, reservoir (all c. 1880s), a bunkhouse (c. 1929), turkey hatchery structure (c. 1948), additional house and garage (1947 to 1949), windmill (c. 1930s), and ranch-related debris throughout the site. According to the PAR (2001, 2002) reports for the West Roseville Specific Plan, the Fiddyment Ranch main complex appears eligible for inclusion in the NRHP and the CRHR. This site is 1,000 feet from natural gas pipeline Alternative B, is not within the project APE, and will not be directly affected by the project. The project would also have no indirect effects on the ranch house complex's integrity in terms of the viewshed from the ranch house, as the project would not be seen from the ranch complex because of surrounding tree cover.

CA-PLA-967—This previously recorded resource consists of a well (c. 1950) and includes the well/tank, a wooden platform, a metal trough, a metal pipe, a power pole, and a metal electrical component box. The well was used for drinking water for cattle. This site is 300 feet from natural gas pipeline Alternative C, is not within the project APE, and will not be affected by the project.

CA-PLA-968—This previously recorded resource consists of windmill remnants. The site is described as a depression within the ground surface containing windmill fragments and little historic debris. This site is 1,320 feet from natural gas pipeline Alternative C, is not within the project APE, and will not be affected by the project.

P-31-1215—This previously recorded isolate is an historic foundation pad. This isolate is 250 feet from natural gas pipeline Alternative C. An isolated find is not considered a significant historic resource.

P-31-1216—This previously recorded isolate consists of historic and modern farm debris (barbwire, tires). This isolate is 350 feet from of natural gas pipeline Alternative C. An isolated find is not considered a significant historic resource.

P-31-1217—This previously recorded isolate consists of an historic privy pit and debris. This isolate is 650 feet from natural gas pipeline Alternative C. An isolated find is not considered a significant historic resource.

P-31-1218—This previously recorded isolate consists of historic machinery and windmill fragments. This isolate is 250 feet from natural gas pipeline Alternative C. An isolated find is not considered a significant historic resource.

P-31-1219—This previously recorded isolate consists of an historic dirt road. This road is described as an existing wagon grade that was established in the 1850s. The road exhibits a poor level of integrity and its unimproved, unengineered style is ubiquitous in the region. The integrity of setting, feeling, and association are poor and, thus are determined not eligible for inclusion in the CRHR (PAR 2002). This isolate is 1,320 feet from natural gas pipeline Alternative A.

8.3.2 Environmental Consequences

8.3.2.1 Significance Criteria

Under the California Environmental Quality Act (CEQA), an action may be considered to have a significant impact on cultural resources if it will cause a substantial adverse change to an historical resource or a "unique archaeological resource." Historical resources are those that are eligible for listing

on the California Register of Historical Resources (California Public Resources Code [PRC] §5024.1; Title 14, §4852 et seq., California Code of Regulations [CCR]). A property considered for listing can be an object, building, structure, site, area, place, record, or manuscript. A property is historically significant if it "is significant in the architectural, engineering, scientific, economic, agricultural, educational, social, political, economic, or cultural annals of California." (PRC §5020.1[j].) Such a property meets the California Register criteria if it meets the following criteria:

a) Is associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage;

b) Is associated with the lives of persons important in our past;

c) Embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of an important creative individual, or possesses high artistic values; or

d) has yielded, or may be likely to yield, information important in prehistory or history (PRC 5024.1).

Archaeological resources may qualify for significance under CEQA if they are determined to be unique archaeological resources as defined in PRC §21083.2. A unique archaeological resource is as follows:

An archaeological artifact, object, or site about which it can be clearly demonstrated that, without merely adding to the current body of knowledge, there is a high probability that it meets any of the following criteria:

1) Contains information needed to answer important scientific research questions and there is a demonstrable public interest in that information.

2) Has a special or particular quality such as being the oldest of its type or the best available example of its type.

3) *Is directly associated with a scientifically recognized important prehistoric or historic event or person (PRC §21083.2).*

It may appear that the California Register of Historical Resources was designed for properties of the historic era, while the criteria for consideration as a "unique archaeological resource" were designed to apply to prehistoric archaeological resources. Most significant archaeological resources (prehistoric or historic), however, would qualify for the California Register (particularly criteria A and D). Similarly, most significant historic archaeological sites (but not historic buildings and structures, or sites lacking archaeological deposits) would qualify as "unique archaeological resources."

A significant impact on a historical resource would be one that would cause a "substantial adverse change" to it (CCR, Title 14 §15064.5). That is, an action would be considered a significant adverse impact if it "demolishes or alters in an adverse manner those physical characteristics of an historical resource that convey its historical significance and that justify its inclusion in, or eligibility for inclusion in, the California Register of Historical Resources," or a local register of historical resources.

8.3.2.2 Construction Phase Impacts

Prehistoric Resources

There are no prehistoric sites located in the power plant site area, nor are there any located within the APE of any of the natural gas pipeline alternative routes (A, B, B1, C), recycled water pipeline, sanitary sewer pipeline, or storm water outfall routes. Similarly, there are no prehistoric sites within the construction laydown or worker parking areas. It is possible, however, that the project could encounter buried cultural resources that have not previously been discovered during the construction phase of the project. Portions of the project area are located along the terraces of Pleasant Grove and Kaseberg creeks and these are considered areas where the discovery of previously undiscovered archeological resources during construction is more likely.

Historic Resources

There is one site belonging to the historic period (more than 50 years ago) located in the project APE. This is site P-31-1228, a turkey farm complex dating the time period between the 1940s and 1980s. Construction of the natural gas pipeline could involve the removal of some structures associated with this complex, although it is unknown at this point which ones could be affected. The site has been determined not eligible for the National Register of Historic Places or the California Register of Historical Resources because of its lack of integrity and significant historical association, however; therefore it does not qualify as a historic resource (PAR 2001).

There are no other historic sites located in the project site area, or along any of the natural gas pipeline alternative routes (A, B, B1, C), recycled water pipeline, sanitary sewer pipeline, storm water outfall routes, or within the construction laydown or worker parking areas.

8.3.2.3 Operation Phase Impacts

Impacts to cultural resources are not anticipated during operation of the proposed facility. Maintenance of the power plant and associated linear facilities will not cause any effects outside of the initial construction impact area.

8.3.2.4 West Roseville Not Annexed

If West Roseville annexation is denied or delayed indefinitely, the only significant differences in the project design would be the following: 1) natural gas pipeline alternative B1 would be the preferred route, and 2) RE would construct a double-circuit 60 kV transmission line to connect the project with the Fiddyment Receiving Station. The route for this transmission line would be the same as for gas pipeline route B1. Beginning at the REP site, the route would run south, then east, on Phillip Road. It would then turn south on Fiddyment Road and run to the Fiddyment Receiving Station. This route does not contain known cultural resources sites. Its effects would be the same as natural gas pipeline route B1.

8.3.3 Cumulative Impacts

Since the project will not affect known significant cultural resources, it will not likely cause significant cumulative impacts. The project would cause no impacts below the level of significance that, combined with the impacts below significance of other projects, might attain the level of significance. If the project were to encounter a buried prehistoric midden site, the possibility of cumulative impacts would arise because such sites may be highly significant, and those that have been recorded in the project area have been partly damaged or destroyed by agricultural activity and other development.

8.3.4 Proposed Mitigation Measures

Implementation of the following mitigation measures will lower any potential project impact to cultural resources below the threshold of significance. These measures establish procedures to follow in case previously undiscovered archaeological deposits are encountered below the ground surface.

Preconstruction Assessment and Construction Training

A Designated Cultural Resources Specialist and Archaeological Monitor will visit the project area before construction begins to become familiar with the site conditions. As construction begins, the Designated Cultural Resources Specialist will conduct a worker education session for construction supervisory personnel to explain the importance of, and the legal basis for, the protection of significant archaeological resources. Information about archaeological resources may be combined with information about cultural resources in the training brochure that will be distributed to construction supervisory personnel.

Construction Monitoring

An Archaeological Monitor will be present at the construction site when mechanical excavation is taking place in high sensitivity areas such as areas on or near stream terraces. The monitor's role will be to watch for buried archaeological deposits during excavation.

Emergency Discovery

If the construction staff or others identify archaeological resources during construction, they will immediately notify the Archaeological Monitor, Designated Cultural Resources Specialist and the site superintendent, who will halt construction in the immediate vicinity of the find, if necessary. The Designated Cultural Resources Specialist will use flagging tape, rope, or some other means as necessary to delineate the area of the find within which construction will halt. This area will include the excavation trench from which the archaeological finds came as well as any piles of dirt or rock spoil from that area. Construction will not take place within the delineated find area until the Designated Cultural Resources Specialist, in consultation with the CEC staff, can inspect and evaluate the find.

If human remains are encountered during construction, project officials are required by law (California Health and Safety Code 7050.5) to contact the county coroner. If the coroner determines that the find is Native American, the coroner is required to contact the Native American Heritage Commission (NAHC). The NAHC is required (Public Resources Code 5097.98) to determine the Most Likely Descendant, notify that person or persons and request that they inspect the burial and make recommendations for treatment or disposal.

Site Recording and Evaluation

The Designated Cultural Resources Specialist and Archaeological Monitor will follow accepted professional standards in recording any find and will submit the standard Department of Parks and Recreation historic site form (Form DPR 523) and locational information to the Northwest Information Center of the California Historic Resources Information System at Sonoma State University, Rohnert Park.

If the Designated Cultural Resources Specialist determines that the find is not significant, construction will proceed. If the Designated Cultural Resources Specialist determines that further information is needed to determine whether the find is significant, the CEC and State Historic Preservation Officer

(SHPO) will be notified, and the Designated Cultural Resources Specialist will prepare a plan and a timetable for evaluating the find, in consultation with the CEC and SHPO.

Mitigation Planning

If the Designated Cultural Resources Specialist and the consulting parties (CEC staff and SHPO) determine that the find is significant, they will prepare and carry out a mitigation plan in accordance with state and federal guidelines. This plan will emphasize the avoidance, if possible, of significant archaeological resources. If avoidance is not possible, recovery of a sample of the deposit from which archaeologists can define scientific data to address archaeological research questions will be considered an effective mitigation measure for damage to or destruction of the deposit.

The mitigation program, if necessary, will be carried out as soon as possible to avoid construction delays. Construction will resume at the site as soon as the field data collection phase of any data recovery efforts is completed. The Designated Cultural Resources Specialist will verify the completion of field data collection by letter to City of Roseville (the Applicant) and the CEC Compliance Project Manager (CPM) so that City of Roseville and the CEC CPM can authorize resuming construction.

Curation

The Designated Cultural Resources Specialist will arrange for curation of archaeological materials collected during the monitoring and mitigation program at a qualified curation facility, that is, a recognized, nonprofit archaeological repository with a permanent curator. The Designated Cultural Resources Specialist will submit field notes, stratigraphic drawings, and other materials developed as part of the archaeological excavation program to the curation facility along with the archaeological collection.

Report of Findings

If buried archaeological deposits are found during construction, the Designated Cultural Resources Specialist will prepare a report summarizing the monitoring and archaeological investigatory program implemented to evaluate the find or to recover data from an archaeological site as a mitigation measure. This report will describe the site soils and stratigraphy, describe and analyze artifacts and other materials recovered, and explain the site's significance. This report will be submitted to the curation facility with the collection.

Designated Cultural Resources Specialist/Archaeological Monitor Qualifications

The Designated Cultural Resources Specialist will meet the minimum qualifications for Principal Investigator on federal projects under the Secretary of the Interior's Standards and Guidelines for Archaeology and Historic Preservation. Archaeological Monitors will hold a B.A. degree in anthropology with an emphasis in archaeology and have at least 1 year of experience conducting archaeological field projects, or 5 years of experience conducting archaeological field projects. Archaeological Monitors will be qualified to detect archaeological deposits in the field. The Designated Cultural Resources Specialist will be qualified, in addition to site detection, to evaluate the significance of the deposits, consult with regulatory agencies, and plan site evaluation and mitigation activities.

8.3.5 Applicable Laws, Ordinances, Regulations, and Standards

Table 8.3-3 provides a summary of the applicable cultural resources LORS.

Table 8.3-3. Applicable cultural resources LORS.

Law, Ordinance, Regulation, or Standard	Applicability	Mitigation Effective?	AFC Reference
California Environmental Quality Act, Section 15064.5	Project construction may encounter archaeological resources	Yes	Section 8.3.4, 8.3.5
California Public Resources Code, Section 21083.2 "Archaeological Resources"	Construction may encounter buried archaeological sites	Yes	Section 8.3.2.1, 8.3.5
California Code of Regulations, Title 14, Section 15064.5 "Determining the Significance of Impacts"	Construction may encounter buried archaeological sites	Yes	Section 8.3.2.1, 8.3.5
California Health and Safety Code, Section 7050.5	Construction may encounter Native American graves, coroner calls NAHC	Yes	Section 8.3.4, 8.3.5
City of Roseville's Open Space Policy Archaeology Programs	Construction may encounter buried archaeological sites	Yes	Section 8.3.2.1, 8.3.4, 8.3.5, 8.3.1.5
California Public Resources Code, Section 5097.98	Construction may encounter Native American graves, NAHC assigns Most Likely Descendant	Yes	Section 8.3.4, 8.3.5

The CEC environmental review process under the Warren-Alquist Act is considered functionally equivalent to that of the California Environmental Quality Act (CEQA) (Public Resources Code 15000 *et seq.*) with respect to cultural resources. CEQA and its implementing regulations state that "Public agencies will seek to avoid damaging effects on an archaeological resource whenever feasible."

The California Public Resources Code (PRC) and California Code of Regulations (CCR) provide statutes and guidelines for lead agency compliance with CEQA when evaluating potential effects on historical resources. For example, CCR §21083.2 Archaeological Resources addresses the evaluation of potential projects on archaeological resources and defines the term "unique archaeological resource." The PRC, Title 14, §15064.5 Determining the Significance of Impacts to Archaeological and Historical Resources, lists the criteria for the California Register of Historical Resources and defines the meaning of significant impact for historical and archaeological resources.

If a county coroner were to determine that human remains discovered on project lands were Native American, Section 7050.5 of the California Health and Safety Code and Section 5097.98 of the Public Resources Code would apply. These laws require that the county coroner notify the NAHC when a Native American grave is found. The NAHC would then identify a most likely descendant to inspect the burial site and make recommendations for treatment or disposal.

City of Roseville

The City of Roseville's General Plan (November 1992) lists nine policies and implementation measures to protect archaeological historical, and cultural resources. The policies and measures include the following:

- When items of historical, cultural or archaeological significance are discovered within the City, a qualified archaeologist or historian shall be called to evaluate the find and to recommend proper action. The City shall implement the Developmental Review Process and Specific plans.
- When feasible, incorporate significant archaeological sites into open space areas. The City shall implement the Development Review Process, Specific Plans, Land Use Designation, and Zoning Ordinance.
- Subject to approval by the appropriate federal, state, and local agencies, artifacts that are discovered and subsequently determined to be "removable" should be offered for dedication to the Maidu Park Native American Interpretive Center. The City shall implement the Development Review Process.
- Preserve and enhance Roseville's historic qualities through the implementation of the Downtown, Old Town, and Riverside Master Plans. The City shall implement Zoning Ordinance and Master Plans.
- Establish standards for the designation improvement and protection of buildings, landmarks, and sites of cultural and historic character. The City shall implement Zoning Ordinance and Master Plan.
- Participate in the completion of a countywide inventory of historical sites. The City shall implement Interagency Cooperation.
- Encourage public activities, including the placement of monuments or plaques, that recognize and celebrate historic sites, structures, and events. The City shall implement Community Organizations.
- Explore funding for Cultural, archaeological, and historic programs and activities. The City shall implement Interagency Cooperation and Community Organization.
- Provide opportunities to public awareness and education through coordination with Historical Society and local schools. The City shall implement Interagency Cooperation.

8.3.6 Involved Agencies and Agency Contacts

Table 8.3-4 lists the state agencies involved in cultural resources management for the project and lists a contact person at each agency. These agencies include the NAHC, which would be a consulting party in case human remains are found that are prehistoric or historic-era Native American in origin. The California Office of Historic Preservation (OHP) is also listed. This agency is responsible for management of the state and federal historic preservation programs in California. If properties potentially eligible for listing in the California Register of Historical Resources were discovered during construction, the OHP might wish to be a consulting party.

Table 8.3-4. Agency contacts.

Issue	Contact	Title	Telephone
Native American traditional cultural properties and human remains	Ms. Debbie Treadway Native American Heritage Commission	Associate Government Program Analyst	(916) 653-4038
California Register of Historical Resources and/or Federal agency NHPA Section 106 compliance (if emergency discovery with federal permit involvement)	Dr. Knox Mellon California Office of Historic Preservation	State Historic Preservation Officer (SHPO)	(916) 653-6624

8.3.7 Permits Required and Schedule

The project will require a street-opening permit from the City of Roseville, and the City's permit conditions include a requirement to adhere to City plans and policies governing historic and archaeological resources.

8.3.8 References

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8.4 GEOLOGICAL HAZARDS AND RESOURCES

This section presents an evaluation of potential impacts to geological resources and geological hazards that might result from construction and operation of the Roseville Energy Park (REP). Section 8.4.1 describes the existing environment that the project may affect. Section 8.4.2 identifies potential impacts on the environment associated with development of the REP. Section 8.4.3 discusses potential cumulative impacts, and Section 8.4.4 addresses proposed mitigation measures. Section 8.4.5 presents the laws, ordinances, regulations, and standards applicable to geological resources and hazards. Section 8.4.6 describes the agencies involved and provides agency contacts, and Section 8.4.7 describes permits required. Section 8.4.8 provides the references used to develop this section.

8.4.1 Affected Environment

8.4.1.1 Physiographic Setting

The project area is located in the lower Sacramento Valley, a subdivision of the Great Valley geomorphic province of California. The Great Valley is characterized by broad lowlands bounded by highly deformed rock units of the Coast Range to the west and by the gently sloping western foothills of the Sierra Nevada mountains to the east. The valley is filled with a thick sequence of marine and non-marine sedimentary rocks of Jurassic to Recent age.

The region has persisted as a lowland or shallow marine embayment since Mesozoic time. Beginning in late Cretaceous time, erosion of the ancestral Sierra Nevada mountains led to the deposition of a thick sequence of marine sandstone and shale on the basement complex. Intermittent periods of uplift and subsidence, apparently caused by Paleocene subduction and possibly faults, affected the history of deposition in the valley throughout the early Tertiary. The periods of uplift caused the development of submarine canyon, which were subsequently filled with transgressive marine sediments during times of subsidence. However, by early Miocene time, regional deformation and volcanism were occurring, and by middle Miocene time, the sea had withdrawn from the Sacramento area. Sedimentation changed from marine to non-marine with the deposition of volcanic and alluvial material. The sediments of Quaternary age consist of Pleistocene sand and gravel overlaid by Recent alluvial fan, floodplain, and stream channel deposits. Currently, streams such as Pleasant Grove Creek and Kaseberg Creek are eroding the low alluvial plains and aggrading the adjacent floodplains, flood basins, and stream channel areas.

The project area is located in the Pleasant Grove and Roseville 7.5-Minute U.S. Geological Survey (USGS) Quadrangles and the power plant site is approximately 40 acres in size. The topography of the project area consists of flat to gently rolling low-gradient alluvial fan dissected by east-west flowing streams such as Pleasant Grove Creek and its tributaries. Elevations at the project site average about 92 feet above mean sea level. Surrounding areas near the project area in the Riverbank Formation (see below) vary between 90 and 100 feet. Further east along the alternative pipeline routes in the more heavily dissected Turlock Lake Formation (see below), elevations vary between 120 and 150 feet. Pleasant Grove Creek runs just north of the project site in an alluvial floodplain about 1,000 feet wide.

8.4.1.2 Regional Geology

The Sacramento Valley is a part of the Central Valley that, together with the San Joaquin Valley to the south, forms an asymmetric structural trough. This trough or basin is bounded on the east by the Sierra Nevada and on the west by the Coast Ranges. This basin contains thick sequences of sedimentary rocks that range from Jurassic to Recent in age (Hackel 1966). Sedimentary depths of over 60,000 feet are

recorded although there is less sedimentary depth over the Stockton Arch, which, in the subsurface, separates the Sacramento Valley to the north from the San Joaquin Valley to the south (Hackel 1966).

The Sierra Nevada is a composite batholith approximately 600 km long and 93 km wide. Uplift of the range to its present elevation and configuration occurred from approximately 10 to 3.5 million years ago (Chase and Wallace 1988; Unruh 1991). The granitic rocks of the batholith were intruded into a variety of oceanic sediments and other rocks that are now metamorphosed and exposed along the western part of the range (Wagner et al. 1987). Additionally, volcanically derived rocks and sediments covered the range before its uplift and prior to glaciations of the Quaternary period (Wagner et al. 1987).

8.4.1.3 Local Geology

Figure 8.4-1 is a geologic map of the area within 2 miles of the REP parcel project area. The project area is composed of alluvial deposits of a range of ages. The surficial portions of the Sacramento Valley include a variety of sedimentary fill deposits related to alluvial fans, river channels, and flood basins. These deposits represent a complex sequence of fill and cut and fill sedimentary deposits sometimes with associated geomorphic surfaces. Broadly, these fills are related to river systems that drain from the Coast Ranges and from the Sierra Nevada (e.g., Marchand and Allwardt 1981; Harden 1987; Busacca et al. 1989; Unruh 1991) as well as the through-going drainage of the Sacramento River. Investigations of these deposits throughout the eastern side of the Sacramento and San Joaquin valleys indicate that erosion and depositional events throughout the Quaternary ice ages have been related to episodes of alluvial fan building, river incision, and soil formation that is correlated with glacial and interglacial climatic events in the Sierra Nevada (Marchand and Allwardt 1981). Because these river-derived sedimentary deposits were prograding (or progressively extending) into the valley, there is a tendency for the younger deposits to incise into older deposits closer to the Sierra Nevada, while burying the older deposits further into the valley (Marchand and Allwardt 1981; Harden 1987; Busacca et al. 1989; Unruh 1991). Where exposed at the surface, the older deposits have progressively more well-developed soils and soil characteristics are one of the criteria used in their identification and differentiation (Harden 1987; Busacca et al. 1989).

Numerous Quaternary (Pleistocene and Holocene) sedimentary formations have been identified and mapped in the region (Marchand and Allwardt 1981; Helley and Harwood 1985; Wagner et al. 1987; Busacca et al. 1989). From oldest to youngest (keyed to their standard mapping symbols), these are Turlock Lake Formation (Qtl, approximately 600,000 years old), Riverbank Formation (Qr, 300,000 to 100,000 years old), Modesto Formation (Qm, 40,000 to 10,000 years old), and modern or Holocene deposits (Q, less than 11,000 years old) (Harden 1987; Busacca et al. 1989; Wagner et al. 1987). The project area is underlain by the Turlock Lake and Riverbank Formations (Helley and Harwood 1985; Wagner et al. 1987). Helley and Harwood (1985) have mapped the Riverbank Formation with an upper and lower unit (Qru and Qrl), but their characteristics are the same.

Older, pre-Quaternary, formations in the valley and immediate Sierra Nevada foothills have a similar geomorphology and general distribution to those of the Quaternary sedimentary fill (Hackel 1966; Unruh 1991). These older formations tend to be more widely distributed into the mid-elevations of the Sierra Nevada and are often derived from volcanic events that included combinations of volcanic mudflows along with river transportation and deposition. In the mid-elevations of the Sierra Nevada, these deposits are found as erosional remnants on the upland surfaces between the incised modern river canyons (Unruh 1991). As these formations are traced into the eastern valley, they are found as erosional remnants that have been incised into by the Quaternary river deposits described above. Further into the valley, these

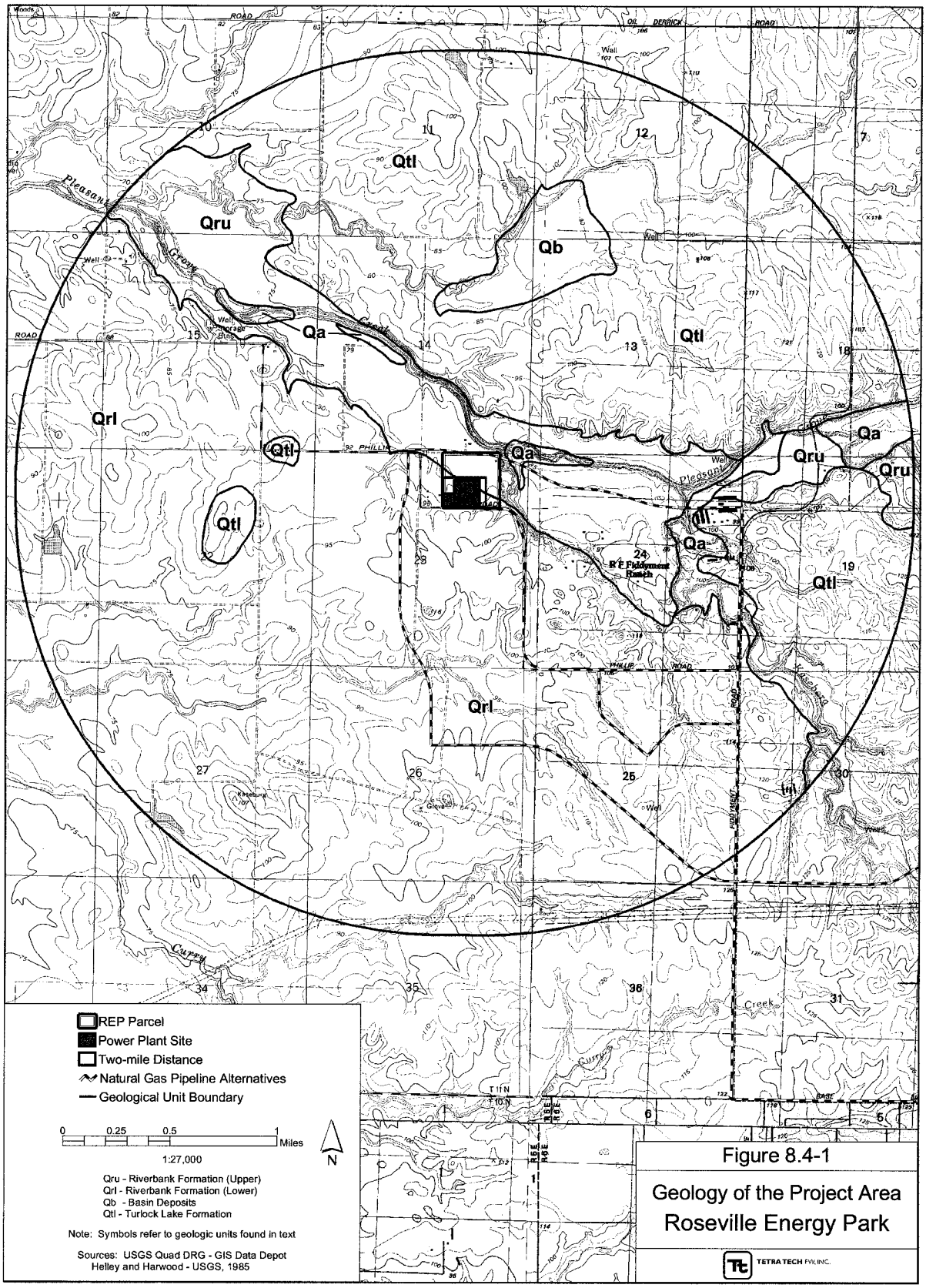

Figure 8.4-1

Geology of the Project Area
Roseville Energy Park

TETRA TECH FW, INC.

formations are buried beneath the younger Quaternary alluvial deposits (Unruh 1991). To the east of the project area is the volcanically derived Mehrten Formation (Oligocene) (Wagner et al. 1987).

To the east of these Quaternary and older volcanic deposits is granitic basement rock mapped as Mesozoic diorite rocks (Wagner et al. 1987).

A geotechical study was conducted on the project site for a previously planned project (URS 2001b). This study included 11 cone penetration tests and six soil borings. A copy of this study is included in this AFC in Appendix 10G. The borings encountered silts, sandy silts, silty sands, clayey silts, clays, silty clays, and fine-grained silts to depths of approximately 80 feet. The borings did not encounter groundwater within 80 feet of the surface.

8.4.1.4 Seismic Setting

The Sacramento Valley is a region of relatively low seismicity, compared to other parts of California. However, seismic activity along the boundary between the Great Valley and Coast Ranges, in the adjacent Coast Ranges/San Francisco Bay Area, and in the Sierra Nevada Tectonic Province may affect the project area. Table 8.4-1 lists faults within 160 km of the project site that have been active during the historic period. The table identifies all active faults that may pose a potential geologic hazard to the project area (Petersen et al. 1996). Active faults are those that show evidence of displacement during Holocene time (11,000 years ago to present). In addition, Table 8.4-1 identifies the approximate distance from the project site, nature of displacement, slip rate, maximum moment magnitude (M), recurrence interval, location, and various other characteristics unique to each fault.

As shown in Table 8.4-1, the San Andreas and Hayward Fault Zones are classified as "A" type faults. Faults with an "A" classification are capable of producing large magnitude events (M less and or equal to 7.0), have a high rate of seismic activity (i.e., having slip rates greater than 5 mm/yr), and have well constrained paleoseismic data (i.e., evidence of displacement within the last 700,000 years). These faults are somewhat distant from the project site, however. The San Andreas fault zone, for example, is approximately 160 km from the REP. The nearest Class A fault zone is the Rogers Creek Fault, at 118 km.

Table 8.4-1 also lists "B" class faults, which lack paleoseismic data necessary to constrain the recurrence intervals of large-scale events. Faults with a "B" classification are capable of producing an event of magnitude 6.5 or greater. The Class B faults listed on the table are also distant from the REP, at 97 to 127 km.

The Foothills Fault System is relatively near the project area, at 22 km. It is a Class "C" fault (low slip rate). The Foothills Fault system was presumed inactive until 1975, when the Oroville earthquake occurred in this system. Studies of this system designed to identify faulting in the northern and central Sierras since that time have identified some late Cenozoic faults using geomorphic profiling (Page and Sawyer 2001). These features are difficult to identify due to the very low slip rates on these faults (0.001 to 0.01 mm per year), compared with local stream incision rates, their low recurrence rates (tens or hundreds of thousands of years), and small displacement per event (5 to 50 cm).

Local Seismicity

The most active fault zone relatively near the project area has been the Foothills Fault zone discussed above. It is located in the Sierra Nevada foothills, east of the project area. Several earthquakes of low to moderate magnitude have taken place along this fault zone during the historic period, including the 1975

Table 8.4-1. Active faults in the project area.

FAULT NAME AND GEOMETRY (ss) strike slip, (r)reverse, (n) normal (rl) rt. lateral, (ll) left lateral, (o) oblique	Distance from REP (km)**	Length (km)	Slip Rate (mm/yr)	Rank (1)	Mmax (2)	R.I. (3)	Rake	Dip	Endpt. N	Endpt. S	Comment
A FAULTS:											
San Andreas Fault Zone:											
San Andreas (Peninsula) (rl-ss)	160	88	17.00	M	7.1	400	180	90	-122.60;37.81	-122.00:37.18	Max. magnitude based on 1.6 m displacement.
San Andreas (1906) (rl-ss)	160	470	24.00	M	7.9	210	180	90	-124.41;40.25	-121.51;36.82	Assumption that 1906 events rupture North Cost, Peninsula, and Santa Cruz Mtns. Segments to San Juan Bautista. Max magnitude based on 1906 average 5 m displacement.
Hayward Fault Zone:											
Hayward (total length) (rl-ss)	125	86	9.00	M-W	7.1	167	180	90	-122.41; 38.05	-121.81; 37.45	Well-constrained slip rate for southern segment. Model weighted 50%.
Hayward (south) (rl-ss)	125	43	9.00	W	6.9	167	180	90	-121.13; 37.73	-121.81; 37.45	The southern segment can be projected to Calaveras fault along prominent zone of seismicity. Net slip rate of 9 mm/yr can be resolved into 3 mm/yr vertical and 7.6 mm/yr r.l. along postulated Mission Link blind thrust of along with southern connection. Model weighted 50%.
Hayward (north) (rl-ss)	125	43	9.00	M	6.9	167	180	90	-122.41; 38.05	-122.13; 37.73	Model weighted 50%.
Rodgers Creek (rl-ss)	118	63	9.00	M	7.0	222	180	90	-122.77; 38.54 -	122.34; 38.09	Recurrence (222yrs) and slip per event (2.0 m) are based on WGCEP (1990).
B FAULTS:											
Calaveras Fault Zone:											
Calaveras (s. of Calaveras Reservoir) (rl-ss)	125	106	11	P-M	6.2	33	180	900	-121.79; 37.43	-121.18; 36.62	Includes Paicines fault south of Hollister. Slip rate is composite based on slip rate for a branch of Calaveras fault and slip rate of Paicines fault. Creep rate for fault zone approximately 15 mm/yr. Maximum earthquake assumed to about 5.2.
Calaveras (north of Calaveras Reservoir) (rl-ss)	125	52	5	M	6.8	146	180	90	-122.03; 37.86	-121.81; 37.45	Slip rate based on composite of 5 mm/yr rate and 6 mm/yr creep rate from small geodetic net.
Concord-Green Valley (rl-ss)	97	66	6.00	M	6.9	176	180	90	-122.20; 38.45	-121.98, 37.89	Slip rate of 6 mm/yr should be considered a minimum. No slip rates reported for Green Valley fault.
Greenville (rl-ss)	110	73	2.00	P	6.9	521	180	90	-121.94; 37.98	-121.50; 37.42	Slip rate of about 1 mm/hr, based on an offset stream channel. A 10 km rl offset of a serpentinite body suggests a long term slip rate of 2-3 mm/yr.
Genoa (n, 60 E)	127	50	1.00	M	6.9	1116	-90	60	-119.85;39.10	-119.81;38.67	Dip slip rate based on offset of late Tioga outwash.

Table 8.4-1. (continued).

FAULT NAME AND GEOMETRY (ss) strike slip, (r)reverse, (n) normal (rl) rt. lateral, (ll) left lateral, (o) oblique	Distance from REP (km)**	Length (km)	Slip Rate (mm/yr)	Rank (1)	Mmax (2)	R.I. (3)	Rake	Dip	Endpt. N	Endpt. S	Comment
West Napa (rl-ss)	100	30	1.00	U	6.5	701	180	90	-122.37;38.41	-122.24;38.16	Unconstrained slip rate based on assumption that geomorphic expression of fault is consistent with about 1mm/yr slip rate
C FAULTS:											
Foothills Fault System (n-rl-o, 75 E)	22	360	0.05	P	6.5	974	-90	75	n/a	n/a	Poorly constrained composite late Quaternary slip rate across Bear Mtn. and Melones flt zones. Areal source model assumes a maximum magnitude earthquake of 6.5.

(1) W = well-constrained slip rate; M = moderately constrained slip rate; P = poorly constrained slip rate; U = unconstrained slip rate.
(2) Maximum moment magnitude calculated from relationships (rupture area) derived by Wells and Coppersmith (1994)
(3) R.I. = recurrence interval
* Data from Petersen et al. 1996. *Probabilistic Seismic Hazard Assessment for the State of Califonia.*
** Approximate distance.

Oroville earthquake. This earthquake is the only seismic event known during the historic period to have produced surface rupture in the Sierra foothills (California Department of Water Resources 1979).

Locally, there are three known faults within 10 miles of the project area, but all are considered inactive. According to the Alquist-Priolo Earthquake Fault Zoning Act, inactive faults are classified as faults that do not display evidence of displacement during Holocene time (California Geological Survey 1997). Inactive faults in the project area are the Volcano Hill fault, east of Roseville; Linda Creek fault in southern Roseville; and an unnamed fault extending between Rocklin and Folsom Lake. Earthquakes of magnitude greater than 5.0 within 62 miles (100 km) of the site are identified in Table 8.4-2.

8.4.1.5 Geologic Hazards

The most important geologic hazard that could affect the project area is the risk to life and property from a large earthquake event generated by the San Andreas, Hayward, and Calaveras fault zones, which are capable of producing magnitude 7.9, 7.1, and 6.8 events, respectively (See Table 8.4-1). The magnitude of this hazard, however, is tempered by the distance between these fault zones and the REP project area.

Earthquake hazards include a number of phenomenon, such as seismic ground shaking, surface rupture, liquefaction, and subsidence and settlement. The susceptibility of a site to a particular hazard is a function of a number of factors, including the local geologic conditions, the magnitude and source mechanism of the earthquake, and the distance to seismic sources.

The following subsections discuss the potential geologic hazards that might occur in the project area and are based on a literature search.

Seismic Ground Shaking

Seismic waves passing through earth material during an earthquake cause the ground to shake. Severe ground shaking is the most widespread and destructive aspect of earthquakes. The intensity of ground shaking depends on the distance of the earthquake epicenter to the site, the magnitude of the earthquake, site soil conditions, and the characteristic of the source.

Seismic ground shaking is the most likely seismic hazard to affect the site. According to the California Building Code (CBC), 2001 edition, the site is located in Seismic Zone 3. This location implies a minimum horizontal acceleration of 0.3 times the force of gravity (g) for use in earthquake-resistant design.

Ground motions can be estimated by probabilistic method at specified hazard levels. The California Geological Survey prepared seismic shaking maps using consensus information for active and potentially active faults, historical seismicity throughout California, and geologic materials (Petersen et al. 1999). The results of these studies suggest that there is a 1 in 475 chance that the peak ground acceleration experienced at the project site will exceed 0.2g in a given year, which is equivalent to a 10 percent probability of exceeding this level in 50 years. This level of seismic shaking hazard is relatively low, however, compared with other parts of California.

Ground shaking attenuates with distance, as well as earthquake magnitude, and geological conditions. Mualchin and Jones (1992) provide peak acceleration distance attenuation curves. These show that, for example, peak acceleration for an earthquake of 8.5 magnitude would be 0.75g at the epicenter, but would drop to 0.1g at a distance of 100 km. This is below the level that would cause widespread damage. This assessment is consistent with the recent experience of the 1989 Loma Prieta earthquake, the epicenter

Table 8.4-2. Earthquakes within 100 km of the project area.

Distance[3] (Km)	Source[1]	Date						Location		Local Magnitude
		Year	Month	Day	Hour	Minute	Second	Latitude	Longitude	
81	PDE	1973	09	17	02	08	54	38.60	-122.15	4.70
99	PDE	1976	08	20	22	05	52	37.79	-122.97	4.00
98	PDE	1977	06	21	02	43	06	37.65	-121.64	4.70
62	PDE	1978	09	08	16	59	47	38.67	-121.90	4.40
85	PDE	1980	01	24	19	00	09	37.85	-121.82	5.90
84	PDE	1980	01	25	05	12	43	38.87	-121.81	4.90
84	PDE	1980	01	25	05	24	36	37.88	-121.83	4.60
84	PDE	1980	01	25	05	29	45	37.87	-121.83	4.00
84	PDE	1980	01	25	13	39	02	37.85	-121.80	4.20
84	PDE	1980	01	25	14	03	27	37.86	-121.80	4.00
93	PDE	1980	01	27	02	33	36	37.74	-121.74	5.80
85	PDE	1980	01	27	10	58	01	37.85	-121.80	4.10
91	PDE	1984	03	18	05	57	30	37.76	-121.74	4.30
93	PDE	1986	10	11	05	17	36	37.84	-121.94	4.70
86	PDE	1987	10	22	03	48	00	37.81	-121.74	4.40
73	PDE	1989	06	22	01	13	25	38.04	-121.86	4.30
93	PDE	1990	04	07	02	39	18	37.87	-121.99	4.50
92	PDE	1990	04	28	04	41	48	37.88	-121.98	4.60
95	PDE	1990	04	28	04	47	41	37.86	-122.00	4.20
94	PDE	1991	03	10	17	46	01	37.72	-121.75	4.00
92	PDE	1992	02	15	14	36	20	37.69	-121.59	4.00
93	CDMG	1864	08	18	13	18	-	39.30	-121.00	4.50
78	CDMG	1889	05	19	11	10	-	38.00	-121.90	6.00
67	CDMG	1892	04	19	10	50	-	38.40	-122.00	6.40
58	CDMG	1892	04	21	17	43	-	38.50	-121.90	6.20
50	CDMG	1892	04	30	00	09	-	38.40	-121.80	5.50
60	CDMG	1902	05	19	18	31	-	38.30	-121.90	5.50
73	CDMG	1902	05	21	06	20	-	38.20	-122.00	4.00
67	CDMG	1904	07	30	10	26	-	38.50	-122.00	4.50
38	CDMG	1908	05	30	19	38	-	38.80	-121.10	4.00
58	CDMG	1909	02	14	15	55	-	38.10	-121.70	4.50
92	CDMG	1912	08	31	04	53	-	38.92	-120.33	4.50
75	CDMG	1940	09	19	08	20	18	37.90	-121.70	4.00
75	CDMG	1940	09	20	18	59		37.90	-121.70	4.00
99	CDMG	1943	04	15	15	23	04	37.68	-121.77	4.00
99	CDMG	1943	04	15	15	31	02	37.68	-121.77	4.10
97	CDMG	1943	04	21	23	39	44	37.68	-121.72	4.20
93	CDMG	1946	05	02	01	26	12	37.68	-121.60	4.60

Table 8.4-2. (continued).

Distance[3] (Km)	Source[1]	Date						Location		Local Magnitude
		Year	Month	Day	Hour	Minute	Second	Latitude	Longitude	
80	CDMG	1949	11	30	08	31	54	38.62	-122.13	4.00
90	CDMG	1955	10	24	04	10	44	37.97	-122.05	5.40
98	CDMG	1958	04	20	21	06	58	38.62	-122.35	4.00
87	CDMG	1958	05	31	22	07	11	37.97	-122.00	4.10
92	CDMG	1962	03	17	21	38	44	37.82	-121.88	4.10
92	CDMG	1963	03	17	21	38	44	37.82	-121.88	4.10
85	CDMG	1969	05	08	22	10	53	38.70	-122.17	4.00
98	CDMG	1970	06	12	03	30	03	37.79	-121.94	4.27
98	CDMG	1970	06	12	03	30	18	37.78	-121.94	4.26
97	CDMG	1970	06	12	03	30	49	37.80	-121.95	4.12
90	CDMG	1973	09	17	02	08	54	38.61	-122.25	4.00

(1) CDMG California Division of Mines and Geology.
PDE Preliminary Determination of Epicentres from NEIS/CDMG.

(3) "Distance in kilometers" is equal to the radial distance from the site.

of which was located on a segment of the San Andreas fault in the southern San Francisco Bay Area. Ground shaking near the epicenter reached levels approaching 0.65g. According to the attenuation curves, ground shaking for a 7.0 magnitude earthquake would be approximately 0.65g at 1.0 km and would attenuate to 0.02g at a distance of 100 km. Downtown Sacramento is approximately 150 km from the Loma Prieta epicenter; the REP is approximately 170 km. Though the Loma Prieta quake caused some ground motion in Sacramento, it did little damage to structures. Similarly, a 6.5 magnitude earthquake along the Foothills Fault zne could cause ground shaking levels of approximately 0.4g (Mualchin and Jones 1992), attenuating to 0.1g at a distance of 20 km. The REP is approximately 22 km from this fault zone at the closest point. Levels of ground motion expected from a Foothills Fault zone earthquake would therefore lie well within the levels designed for under Seismic Zone 3 (0.3g).

For an earlier power plant proposal at the REP site, the Roseville Energy Facility, URS Corporation (2001a) conducted a probabilistic seismic hazard assessment for the site. This analysis included a consideration of the characteristics of 13 potentially active faults that could be considered to contribute to earthquake hazard due to their potential for earthquakes and proximity to the site. This study concluded that the mean probabilistic peak horizontal acceleration for a 500-year return seismic event would be approximately 0.12g. According to the California Building Code, power plants and energy facilities must be designed to withstand shaking levels that correspond to this event (also corresponding to a seismic event with a 10 percent probability of exceedence per 50 years). Since the project must meet the Seismic Zone 3 design criteria of 0.3g, the project design would also meet this criterion.

Ground Rupture

Surface ground rupture along faults is generally limited to a linear zone a few meters wide. Ground rupture is not considered a potential seismic hazard at the plant site and gas pipeline because there are no known active faults crossing the project area or in the immediate vicinity. The California Geological Survey has designated certain areas that may be subject to ground rupture as Alquist-Priolo Earthquake Fault Zones (areas located on or astride an earthquake fault) and has published maps showing these

locations, which are subject to special building requirements and avoidance of the area surrounding the faualt. Neither the project site nor the natural gas pipeline routes cross Alquist-Priolo Earthquake Faults.

Ground Failure/Liquefaction

Liquefaction is a process by which water-saturated materials (including soil, sediment, and certain types of volcanic deposits) lose strength and may fail during strong ground shaking. Liquefaction is defined as "the transformation of a granular material from a solid state into a liquefied state as a consequence of increased pore-water pressure" (Youd 1992). This behavior is most commonly induced by strong ground shaking associated with earthquakes. In some cases, a complete loss of strength occurs and catastrophic ground failure may result. However, liquefaction may happen where only minor shaking occurs and ground surface deformations are much less serious. The potential for liquefaction is highest in clay-free granular sediments (sand and silt fraction) that are water saturated, poorly consolidated, and well sorted.

In the event of a major earthquake, sediments underlying the project area, specifically at the plant site and gas pipeline, have a low liquefaction potential. This low potential is attributed to the relatively low level of seismic activity, the depth to groundwater (greater than 100 feet), and the lack of unconsolidated sandy substrate. Boreholes examined for the Roseville Energy Facility project on the same site (URS Corporation 2001b) indicated a lack of conditions that could lead to liquefaction. Geotechnical boring for the Pleasant Grove Waste Water Treatment Plant (PGWWTP) adjacent to the REP site, however, encountered some pockets of loosely consolidated fine to medium sand and shallow perched groundwater levels, which are conditions potentially conducive to liquefaction (España Geotechnical Consulting 1999). Geotechnical boring on the project site for the proposed Enron Roseville Energy Facility encountered some evidence of possible perched groundwater (URS 2001b).

Four types of ground failure or collapse of soil structures commonly result from liquefaction: lateral spread, flow failure, ground oscillation, and loss of bearing strength. Based on the site geology and topography, there is a moderate to high potential for the effects of lateral spread, ground oscillation, and loss of bearing strength to be experienced in the event of a major earthquake. Each type is briefly defined below.

Lateral Spread

This term defines the lateral displacement of surficial blocks of sediment as the result of liquefaction in a subsurface layer. Once liquefaction transforms the subsurface layer into a fluidized mass, gravity plus inertial forces that result from the earthquake may cause the mass to move downslope towards a cut slope or free face (such as a river channel or a canal). Lateral spreads most commonly occur on gentle slopes that range between 0.3° and 3° and commonly displace the surface by several meters to tens of meters. Such movement typically damages pipelines, utilities, bridges, and other structures with shallow foundations. During the 1906 San Francisco earthquake, lateral spreads causing displacement of only a few feet damaged many water supply pipelines. Thus, liquefaction compromised the ability to fight the fires that caused about 85 percent of the damage to San Francisco.

Ground Oscillation

When liquefaction occurs at depth, and the slope is too gentle to permit lateral displacement, the soil blocks that are not liquefied may decouple from one another and oscillate on the liquefied zone. The resulting ground oscillation may be accompanied by opening and closing of fissures and sand boils, which may damage structures and underground utilities.

Loss of Bearing Strength

When a soil loses strength and liquefies, loss of bearing strength may occur beneath a structure, possibly causing the structure to settle and tip. If the structure is buoyant, it may float upward.

Subsidence and Settlement

Land surface subsidence can be induced by both natural and human phenomena. Natural phenomena include subsidence resulting from tectonic deformations and seismically induced settlements; soil subsidence due to consolidation, hydrocompaction, or rapid sedimentation; subsidence due to oxidation or dewatering of organic-rich soils; and subsidence related to subsurface cavities. Subsidence related to human activity includes subsurface fluid or sediment withdrawal. Underground mining may also cause subsidence, but that is not a factor at this locality.

Subsidence due to compaction would be unlikely at the REP site due to the relatively compact materials of the Riverbank Formation (medium dense to dense silty sand and compact silt). Underlying rock formations are also unlikely to contain subsurface cavities. These Tertiary and Quaternary sediments are generally derived from fine-grained materials in alluvial fans of the Sierra Nevada mountain range (silts, sands, clays, and conglomerates) and are unlikely to contain cavities.

Subsidence resulting from groundwater pumping is also unlikely to occur at the site. Though water is being extracted from the Roseville groundwater basin for urban and other uses, extraction has not led to subsidence in the Roseville area.

Expansive/Compressive Soils

Expansive soils can shrink and swell with wetting and drying. The shrink-swell potential of expansive soils can result in differential movement beneath foundations. Soils derived from mapped deposits near the project area (Qru, Qrl, Qtl, see Figure 8.4-1) are considered to be somewhat expansive (see also Section 8.15, Soils and Agriculture). The Cometa-Ramona sandy loams are found over most of the project site, for example, have a very slow to moderate permeability and present a shrink-swell potential. This soil is somewhat variable in shrink-swell potential and can pose an expansive/compressive soils hazard. Beyond the project site, soils occasionally flooded along stream channels can also have a high shrink-swell potential. These soils may be encountered along the natural gas pipeline.

8.4.1.6 Geologic Resources

Based on the California Geological Survey's (CGS) (formerly California Department of Mines and Geology) mineral zone and mineral resource mapping, there are no known mineral resources associated within or near the project area (CDMG 1999). The project site is mapped as being located in CGS Mineral Resource Zone 4 ("areas of known mineral occurrences where geologic information does not rule out the presence or absence of significant mineral resources"). Potential resources could include gravels for aggregate and auriferous gravels found in buried stream channel deposits. No mineral extraction activities are currently taking place in the general project area (City of Roseville 2003).

Similarly, there are no known hydrocarbon resources near the REP; the closest is the Sacramento Airport gas field 12 km to the west.

Recreational geologic resources typically include rock or mineral collecting, volcanoes, surface hydrothermal features, or surface expression of geologic features unique enough to generate recreational interests of the general public (e.g., natural bridges, caves, features associated with glaciation, and geomorphic features such as waterfalls, cliffs, canyons, and badlands). There are no known recreational

geologic resources associated with the project area, based on the review of the geological literature, field guides to recreational geology, CGS inventories and maps, and the topographic maps.

8.4.2 Environmental Consequences

The potential environmental effects from construction and operation of the REP on geologic resources and risks to life and property from geologic hazards are presented in the following subsections.

8.4.2.1 Significance Criteria

According to Appendix G of CEQA, the project would have a significant environmental impact in terms of geological hazards and resources if it would do the following:

- Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:
- Rupture of a known earthquake fault
- Strong seismic ground shaking
- Seismic-related ground failure, including liquefaction
- Be located on a geologic unit or soil that is unstable or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction, or collapse
- Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state
- Result in the loss of availability of a locally important mineral resource recovery site delineated on a local plan, specific plan, or other land use plan

The potential for land subsidence, either seismically induced or by proposed building load factors and liquefaction hazards is further evaluated in a geotechnical investigation (Appendix 10-G).

8.4.2.2 Construction Phase Impacts

Power Plant Site

Preparation of the ground surface at the power plant site will involve grading, leveling, and filling. The plant site is situated on old alluvial fan deposits of the Riverbank Formation (Qr). These present minimal problems for preparation of a level surface on which to construct the power plant. The plant site will occupy 12 acres of land. The site will be graded to achieve a minimum 1 percent slope to promote surface drainage, and areas adjacent to equipment will be surfaced with asphalt, concrete, or gravel. Slopes will be provided with temporary drainage and erosion control measures during construction until permanent measures are installed. If there is excess material that cannot be used, it will be disposed of at a suitable location off-site, or within City of Roseville property adjacent to the plan site (excess borrow, topsoil, etc. will be spoiled locally). Site grading will not result in large-scale erosion or adverse impacts to the geological environment.

There is some potential for seismic ground shaking to affect the plant site in the event of a large magnitude earthquake occurring on fault segments located in the Sierra Foothills or Coastal Ranges. Seismic hazards and potential adverse foundation conditions will be minimized by conformance with the recommended seismic design criteria of the CBC (CBC [2001]) Seismic Zone 3 requirements. The seismic requirements are further defined in Appendix 10-B titled, "Structural Engineering Design

Criteria." The facility arrangement is such that no major structure or piece of equipment is within the projected trace of any known Alquist-Priolo Earthquake Fault.

There is low to high potential for shrink-well hazards at the project site (Cometa-Ramona sandy loams). This hazard can be mitigated, however, by preconstruction removal of soil units containing a significant amount of clay or by foundation design.

Natural Gas Pipeline Alternative Routes

Land disturbance during construction of the natural gas pipeline will be 2 to 3 feet wide in areas where the pipeline will be constructed within the roadway pavement. In other areas, surface disturbance may take place within a 50-foot-wide right-of-way work area. Pipeline excavation to a minimum depth of about 4 feet (1.3 m) may be performed with a backhoe or trenching machine, and the soil can be temporarily laid in a berm next to the trench. After the pipe is connected, it will be laid in the trench on a soil cushion and the trench backfilled with soil. The bored-and-jacked casing or horizontal directional drill methods may be used to cross under channels of Kaseberg Creek and other unnamed drainages along the pipeline route. Construction of the natural gas pipeline is not expected to negatively impact any geological or mineral resources because there are no known mineral resources along the pipeline route.

Recycled Water Pipeline

Construction of the recycled sewer pipeline will take place in Phillips Road and this pipeline will extend for about 40 feet directly from the REP to the PGWWTP to the south. The pipeline trench will be excavated with a backhoe, with soil temporarily laid in a berm next to the trench. Erosion control methods and potential impacts will be the same as for the natural gas pipeline.

Sanitary Sewer Pipeline

Construction of the sanitary sewer pipeline between the REP and the PGWWTP's lift station east of the project site will use the same trenching methods as for the natural gas pipeline. The 800-foot-long pipeline will be excavated with a backhoe, with soil temporarily laid in a berm next to the trench. Erosion control methods and potential impacts will be the same as for the natural gas pipeline.

Storm Water Outfall

The storm water outfall will be excavated with a backhoe, with soil temporarily laid in a berm next to the trench. Erosion control methods and potential impacts will be the same as for the natural gas pipeline.

Construction Laydown and Worker Parking Areas

These areas occur on developed land on previously disturbed ground. No significant adverse impacts to geological resources are expected.

8.4.2.3 Operation Phase Impacts

Power Plant Site

The plant structures and equipment and natural gas compressor station will be designed in accordance with CBC, Seismic Zone 3 requirements, which are further defined in Appendix 10B. Compliance with the CBC (2001), Seismic Zone 3 requirements will minimize the exposure of people to the risks associated with large seismic events. In addition, the major structures will be designed to withstand the strong ground motion of a design earthquake. A design earthquake is the postulated earthquake that is used for evaluating the earthquake resistance of a particular structure. Because the seismic hazard in the region of the project area is relatively well defined, the design earthquake will be established by the

maximum, or characteristic, magnitude earthquake that can potentially occur on those faults identified on Table 8.4-1.

No major structures or equipment are within the projected trace of any active faults.

Natural Gas Pipeline

The natural gas pipeline will be constructed in deposits of sand, silt, clay, and conglomerate (Qr and Qtl). The pipeline will be designed to withstand the strong ground motion and ground failure of a design earthquake.

Recycled Water Pipeline

The recycled water pipeline will be constructed in deposits of sand, silt, clay, and conglomerate (Qr). The pipeline will be designed to withstand the strong ground motion and ground failure of a design earthquake.

Sanitary Sewer Pipeline

The sanitary sewer pipeline will be constructed in deposits of sand, silt, clay, and conglomerate (Qr). The pipeline will be designed to withstand the strong ground motion and ground failure of a design earthquake.

Storm Water Outfall

The storm water outfall will be constructed in deposits of sand, silt, clay, and conglomerate (Qr). The pipeline will be designed to withstand the strong ground motion and ground failure of a design earthquake.

8.4.2.4 West Roseville Not Annexed

If the West Roseville annexation is denied or delayed indefinitely, there will be only one significant difference in relation to geological resources and hazards. The difference is that it will be necessary to construct a 60 kV transmission line from the REP site along Phillips Road to Fiddyment Road and along Fiddyment Road to the Fiddyment Receiving Station. This route would not differ in its potential effects from those of natural gas pipeline alternative B1 (except that gas pipeline B1 extends beyond the Fiddyment Substation). Construction of this transmission line will not result in significant impacts to geological resources or the exposure of people to geological hazards.

8.4.3 Cumulative Impacts

The project facilities will be constructed to the requirements of the CBC Seismic Zone 3. Site-specific geotechnical investigations will be performed before final design and construction. Construction and operation of the project will not cause adverse impacts to geological resources that are less than significant. The project is, therefore, unlikely to cause cumulative impacts to geological resources in conjunction with the effects of the PGWWTP, West Roseville build-out, or other developments.

8.4.4 Proposed Mitigation Measures

Mitigation measures for the project are as follows:

- Perform geotechnical field surveys to locate geologic hazards at the plant site and natural gas, recycled water, sanitary sewer pipeline, and storm water outfall routes to evaluate their impact on the construction activities and the environment.

- Conduct a geophysical investigation, as required by the Seismic Hazard Mapping Act (1990). The investigation will be conducted prior to facility construction and in accordance with recommended methods outlined in CDMG's Special Publication 117 titled, "Guidelines for Evaluating and Mitigating Seismic Hazards in California" (1997). In addition, the investigation will further address potential hazards associated with land settlement and subsidence and expansive/compressive soils
- Structures will be designed to meet seismic requirements of the 2001 CBC. Moreover, the design of plant structures and equipment will be in accordance with CBC, Seismic Zone 3 requirements to withstand the ground motion of a design earthquake. In addition, special design considerations will be made for constructed facilities, if warranted by the findings from the geotechnical investigation.
- An geotechnical engineer will be assigned to the project to carry out the duties required by the CBC to assess geologic conditions during construction and approve actual mitigation measures used to protect the facility from geologic hazards.

8.4.5 Applicable Laws, Ordinances, Regulations, and Standards

Design, construction, and operation of the REP will be conducted in accordance with applicable laws, ordinances, regulations, and standards (LORS) pertinent to geologic resources and hazards during and following construction. The LORS are summarized in Table 8.4-3.

Table 8.4-3. LORS Applicable to geologic resources and hazards.

LORS	Applicability	Mitigation Effective?	AFC Reference
CBC (California Building Code), Chapters 16, 18, 33	Design and construction of manmade structures with respect to seismic safety features; design and construction of open excavations. Requires a site-specific geotechnical study.	Yes	Section 8.4.2.1. 8.4.5.2

8.4.5.1 Federal

The Uniform Building Code (UBC 2001) specifies the acceptable design criteria for construction of facilities with respect to seismic design and load- bearing capacity. However, the CBC incorporates the UBC by reference and contains additional requirements, and is the applicable code to be followed for the project.

8.4.5.2 State

The CBC (2001) specifies the acceptable design criteria for construction of facilities with respect to seismic design and load-bearing capacity.

8.4.5.3 Local

The City of Roseville Zoning Ordinance contains policies and guidelines regulating grading and erosion control. Section 16.20.040 regulates stockpiling and grading. Section 16.20.070 identifies grading plan performance standards.

8.4.6 Involved Agencies and Agency Contacts

There is one agency that is involved with geologic resources and hazards at the project site. The agency contact is listed in Table 8.4-4.

Table 8.4-4. Involved agencies and agency contacts.

Issue	Contact/Agency	Title	Telephone
Building Permit; Grading/Drainage/Erosion Control Permit	Rob Jensen City of Roseville Department of Public Works	Director of Public Works	(916) 774-5331

8.4.7 Permits Required and Schedule

Permits required for matters dealing with geologic resources and hazards for the project and the schedule to obtain each of these permits are provided in Table 8.4-5. Information required to obtain each permit is also included.

Table 8.4-5. Permits required and permit schedule.

Permit/Required Information	Schedule
Building Permit including Seismic Design Criteria: • 30 day review and approval process • Requires structural, civil, electrical and mechanical plans • Geotechnical/Geologic report • Identify geologic hazards and potentially conduct a seismic risk analysis • Architectural plans	Submit application 30 days prior to start of construction.
Grading/Drainage/Erosion Control Permit: • Engineered Grading Plan • Topographic Plan • Drainage controls • Surface Hydrology Report • Geotechnical/Geological Hazard Evaluation • Identify material source or disposal location and haul route • Erosion and Dust Control Plan • Traffic Control Plan	Submit application 30 days prior to start of construction activities.

8.4.8 References

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8.5 HAZARDOUS MATERIALS HANDLING

This section presents an evaluation of potential impacts to human health and the environment from the storage and use of hazardous materials in conjunction with the Roseville Energy Park (REP). A full description of the project is presented in Chapter 2. Closure of the REP is discussed in Chapter 4.

Section 8.5.1 describes the existing environment that the project may affect. Section 8.5.2 identifies potential impacts on the environment and human health from development of the project. Section 8.5.3 investigates potential cumulative impacts. Section 8.5.4 presents proposed mitigation measures, and Section 8.5.5 presents the laws, ordinances, regulations, and standards (LORS) applicable to hazardous materials. Section 8.5.6 describes the agencies involved and provides agency contacts, and Section 8.5.7 describes permits required. Section 8.5.8 provides the references used to develop this section.

8.5.1 Affected Environment

8.5.1.1 Current Land Use

The project site is located within the City of Roseville, directly north of the Pleasant Grove Waste Water Treatment Plant (PGWWTP). The proposed project site, adjacent City parcels, and the PGWWTP are zoned Public/Quasi-Public. Land use surrounding the project site on the east, north, and west, is agricultural.

There are currently no sensitive receptors (such as schools, hospitals, daycare facilities, convalescent centers, or emergency response facilities) within a 1-mile radius of the REP. Sensitive receptors within a 6-mile radius are depicted graphically in Section 9. The closest rural residence is located 850 feet from the site. The closest residential area is the Sun City retirement community, located approximately 1.2 miles east of the site. The closest school is approximately 2.7 miles east of the project site.

8.5.1.2 West Roseville Specific Plan

As described in detail in Section 8.6, Land Use, the likely adoption of the West Roseville Specific Plan will result in significant changes to land uses to the east, south, and west of the REP. The vicinity will include a mix of public/quasi-public, industrial, light industrial, residential, park, and open space areas within a half-mile of the site. The closest residential area will be a high-density residential development located approximately 0.3-mile west of the project site. The proposed Land Use Plan includes four schools within 1 mile of the project site; these are identified in Table 8.5-1 as potential future sensitive receptors.

Table 8.5-1. Potential future sensitive receptors within one mile of the site.[1]

Name	Address	Distance (miles)
Elementary school	West Side Drive	0.5
Elementary school	Hayden Parkway	0.4
High school	Bob Doyle Drive	0.4
Middle school	Bob Doyle Drive	0.9

[1]Sensitive receptors currently identified in the West Roseville Specific Plan.

Hazardous materials will be stored at the REP during operation of these facilities. Storage locations are described in Table 8.5-2.

Acutely hazardous materials, as defined under California's La Follette Bill (California Health and Safety Code 25531 et seq.), will not be used during construction of the REP or the associated facilities or linear routes. Therefore, no discussion of acutely hazardous materials storage or handling is included in this section.

8.5.1.3 Construction Phase

Hazardous materials used during construction of the REP and associated linear facilities will include gasoline, diesel fuel, motor oil, hydraulic fluid, certain solvents, cleaners, sealants, welding flux, various lubricants, paint, and paint thinner. There are no feasible alternatives to motor fuels and oils for operating construction equipment. The types of paint required are dictated by the types of equipment and structures that must be coated and the manufacturer's requirements for coating.

The most likely incidents involving these hazardous materials would be associated with minor spills or drips. Impacts from such incidents will be mitigated by thoroughly cleaning up minor spills as they occur. In the case of a large spill of hazardous material, contaminated soil will be excavated and stored in drums or roll-off bins for off-site disposal as a hazardous waste.

8.5.1.4 Operation Phase

Power Plant Site

A number of hazardous materials will be stored at the REP site during operation. Some of these materials will be stored at the REP site continuously; others will be brought on-site, used, and not brought back on-site for a number of years. Others will be on-site for startup purposes only. Table 8.5-2 is a comprehensive list of hazardous materials that will be used or stored continuously at the REP site during the operations phase and their storage locations. Material safety data sheets (MSDSs) are included in Appendix 8.5-A.

The following hazardous materials will be used and/or stored at the REP site during the operation phase:

Continuously On-Site

- Aqueous ammonia (28 percent)—to control nitrogen oxides (NO_x) emissions through selective catalytic reduction (10,000 gallons liquid)
- Sulfuric acid—for circulating water pH control (cooling tower treatment) (2,000 gallons, liquid, 93 percent solution)
- Sodium Hypochlorite—biocide for condenser cooling water system (2,000 gallons, liquid, approximately 12-percent solution)
- NALCO 7342 (sodium bromide) - biocide for condenser cooling water system (800 gallons)
- NALCO STABREX ST70 (stabilized bromine) – alternate biocide for condenser cooling water system (2,000 gallons)
- NALCO 7330 (isothiazolin) – non-oxidizing biocide for condenser cooling water system (55 gallons)
- NALCO 7208 (trisodium phosphate)—for boiler water pH and scale control (400 gallons, liquid)

Table 8.5-2. REP hazardous materials storage locations.

Chemical	Use	Storage Location[1]
Aqueous ammonia (28% NH_3 +72% H_2O)	Controls nitrogen oxide (NOx) emissions through selective catalytic reduction	Outdoors in the ammonia unloading/storage area (25)
Sulfuric acid (H_2SO_4) (93%)	Circulating water pH control (cooling water treatment and ZLD area)	Cooling tower chemical feed and ZLD area (28 and 45)
Sodium hypochlorite (NaOCL) (Industrial Bleach)	Circulating water biological control	Cooling tower chemical feed area (28)
Sodium bromide (NALCO 7342)	Circulating water biological control	Cooling tower chemical feed area (28)
NALCO TRASAR 23263	Circulating water mineral dispersant	Cooling tower chemical feed area (28)
Sodium tolyltriazole and Phosphate (NALCO 8305+)	Circulating water corrosion control	Cooling tower chemical feed area (28)
Stabalized bromine (NALCO STABREX ST70)	Circulating water biological control	Cooling tower chemical feed area (28)
Isothiazolin (NALCO 7330)	Circulating water biological control	Cooling tower chemical feed area (28)
Trisodium phosphate (NALCO 7208)	HRSG steam side pH and scale control	Cycle chemical feed building (43)
Sodium sulfate	Brine concentrator water chemistry adjustment	Outdoors in ZLD area (45)
Calcium sulfate	Brine concentrator initial startup seeding	Outdoors in ZLD area (45)
Chelating agents (EDTA)	Brine concentrator cleaner	Outdoors in ZLD area (45)
Anti-foam (e.g., NALCO 71 D5 ANTIFOAM)	Brine concentrator to control foaming	Outdoors in ZLD area (45)
NALCO ELIMIN-OX	Steam side oxygen scavenger for corrosion control	Cycle chemical feed building (43)
Cyclohexylamine and morpholine (NALCO 356)	Condensate and steam pH control	Cycle chemical feed building (42)
Sodium bisulfite	Dechlorination upstream of reverse osmosis unit	Water treatment building (13)
Lubricating oil (synthetic and mineral)	Rotating equipment	Contained within equipment and associated storage tanks (1), (7), etc.
Mineral insulating oil	Step-up and auxiliary transformers	Contained within transformers (9) and (12)
Hydraulic oil	High-pressure combustion turbine starting system, turbine control valve actuators	Contained within equipment and associated storage tanks (1) and (7)
Propylene glycol	Anti-freeze for closed loop cooling water system	Contained within cooling system piping (28)
Sulfur hexafluoride	Switchyard circuit breakers	Switchyard (59)
Diesel fuel	Fuel for engine-driven fire pump and standby generator	Fire pump and standby generator (52) and (21)
Various cleaning chemicals	Periodic chemical cleaning of HRSGs and combustion turbines	Water treatment building (13)/laboratory (42)/maintenance building (14)
Various laboratory reagents	Laboratory water analysis	Water treatment sample lab (42)

[1]The numerical references in parentheses are keyed to the site layout included in Appendix 8.5-B.

- NALCO TRASAR 23263 (non-hazardous)—Circulating water mineral dispersant (400 gallons)
- NALCO 8305+ (phosphate and sodium tolytriazole)—Circulating water corrosion control (800 gallons)
- NALCO ELIMIN-OX (carbohydrazide)—oxygen scavenger in process feedwater to HRSG (400 gallons, liquid)
- NALCO 356 (cyclohexylamine and morpholine)- steam and condensate pH control (400 gallons, liquid)
- Sodium bisulfite—oxygen scavenger upstream of reverse osmosis unit (55 gallons, liquid)
- Mineral Insulating Oil—contained within transformers (55,000 gallons total for all 5 transformers combined, liquid)
- Sodium sulfate – brine concentrator water chemistry adjustment (4,000 pounds, solid)
- Calcium sulfate – brine concentrator start-up seed chemistry (4,000 pounds, solid)
- Chelating agents (EDTA) – brine concentrator cleaning agent (55 gallons, liquid)
- NALCO 71 D5 ANTIFOAM – brine concentrator anti-foam (400 gallons, liquid)
- Mineral lubricating oil—for gas turbine generator and steam turbine generator (12,000 gallons total for all three generators combined, liquid)
- Synthetic lubricating oil—for combustion turbine bearings (300 gallons)
- Hydraulic oil—for combustion turbine starting system (LM6000 only) and steam turbine generator controls (375 gallons)
- Sulfur Hexafluoride – switchyard circuit breakers (200 pounds, liquid)
- Diesel Fuel – fire pump and standby generator fuel (400 gallons, liquid)
- Various Detergents—combustion turbine compressor periodic cleaning (100 gallons, liquid)
- Various Laboratory Reagents—for water analysis

Periodically On-Site

- Hydrochloric acid—for chemical cleaning of heat recovery steam generator (HRSG) (4,500 pounds initially, and once every 3 to 5 years, liquid, <37 percent solution) – A small quantity (<55 gallons) may additionally be kept onsite for minor cleaning purposes
- Ammonium bifluoride—for chemical cleaning of HRSG (100 pounds initially, and once every 3 to 5 years, solid crystals)
- Citric acid—for chemical cleaning of HRSG (50 pounds initially, and once every 3 to 5 years, solid powder)
- Sodium carbonate—for chemical cleaning of HRSG and neutralization (250 pounds initially, and once every 3 to 5 years, solid powder)
- Sodium nitrate—for chemical cleaning of HRSG (250 pounds initially, and once every 3 to 5 years, solid crystals)

On-Site During Commissioning Only

- Hydroxyacetic Acid—for chemical cleaning of HRSG feedwater system (600 pounds prior to start-up, solid crystals) – A small quantity (less than 100 pounds) sometimes kept on-site for minor cleaning purposes
- Formic Acid—for chemical cleaning of HRSG feedwater system (350 pounds prior to start-up, liquid) - A small quantity (less than 100 pounds) sometimes kept on-site for minor cleaning purposes

Information about these materials is presented in Table 8.5-3, including trade and chemical names, Chemical Abstract Service (CAS) numbers, maximum quantities on-site, hazardous characteristics, Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Superfund Amendments and Reauthorization Act (SARA) Title III reportable quantities (RQ), La Follette Bill threshold planning quantities (TPQs), and Proposition 65 listing status. Proposition 65 chemicals are those known to be carcinogenic or to cause reproductive problems in humans. The toxic effects and other characteristics of each hazardous material are summarized in Table 8.5-4.

In addition to the chemicals noted in Table 8.5-3, small quantities of paints, oils, solvent, pesticides, and cleaners, typical of those purchased at a retail hardware store, may also be used at the REP.

The hazardous materials to be stored include such incompatible chemicals as sodium hypochlorite and ammonia, or sodium hydroxide, sodium hypochlorite and sulfuric acid. Mixing of these chemicals could generate toxic gases. Measures to keep incompatible chemicals separated include separate storage and containment areas and/or berms.

Natural Gas Pipeline

With the exception of the natural gas contained within the pipeline, no hazardous materials will be stored at the pipeline facilities during operations.

Recycled Water Supply Pipeline

There are no separate facilities associated with the recycled water supply pipeline; therefore, no hazardous materials will be stored at this location during operations.

Sanitary Sewer Pipeline

There are no separate facilities associated with the waste water discharge pipeline; therefore, no hazardous materials will be stored at this location during operations.

8.5.2 Environmental Consequences

8.5.2.1 Significance Criteria

The project could have a significant effect on the environment if it would do the following (California Energy Commission 2002):

- Create a significant hazard to the public or the environment through the routine transport or use of hazardous materials.
- Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment.

Table 8.5-3. REP chemical inventory.

Trade Name	Chemical Name	CAS[1] Number	Maximum Quantity Onsite	Hazardous Characteristics	RQ[2]	TPQ[3]	Prop 65
Acutely Hazardous Materials:							
NALCO 356	Cyclohexylamine (20 to 40%) Morpholine (5 to 10%)	108-91-8 110-91-8	400gal.	Corrosive	10,000 lb.	10,000 lb.	No
Hazardous Materials:							
Aqueous ammonia (28% solution)	Ammonium hydroxide	1336-21-6	10,000-gal.	Corrosive Volatile	1000 lb.		No
Sulfuric acid	Sulfuric acid	7664-93-9	2,000 gal.	Corrosive	1,000 lb.	1,000 lb.	No
Bleach	Sodium hypochlorite	7681-52-9	2,000 gal.	Corrosive	100 lb.		No
NALCO 7342	Sodium nromide	7647-15-6	800 gal.	Corrosive	(4)		No
NALCO TRASAR 23263		None	400 gal.	Non-hazardous	(4)		No
NALCO 7208	Trisodium phosphate	7601-54-9	400 gal.	Corrosive, toxic	5,000 lb.		No
NALCO STABREX ST70	Sodium hydroxide (1 to 5%) Sodium hyprobromite (10 to 50%)	1310-73-2 13824-96-9	2000 gal.	Corrosive	1000 lb. (4)		No No
NALCO 7330	Isothioazoline	261-72-554	55 gal.	Corrosive	(4)		No
NALCO 8305+	Sodium tolyltriazole	64665-57-2	800 gal.	Toxic	(4)		No
Hydrochloric acid	Hydrochloric acid	7647-01-0	4,500 lbs.	Corrosive	5,000 lb.		No
Citric acid	Hydroxy-propionic-tricarboxylic Acid	77-92-9	50 lbs.	Corrosive	(4)		No
Hydroxyacetic acid	Gyrolic acid	79-14-1	600 lbs.	Corrosive	(4)		No
Formic acid	Methanoic acid	64-18-6	350 lbs.	Corrosive	5,000 lb.		No
NALCO ELIMIN-OX	Carbohydrazide	497-18-7	400 gal.	Non-Hazardous			No
Anti-foam (e.g., NALCO 71 D5 ANTIFOAM)	Hydrotreated light distillate (10-20%) n-Decanol (1 to 5%) n-Octanol (5 to 10%)	6742-47-8 112-30-1 118-87-5	400 gal.	Combustible	(4)		No
Calcium sulfate	Calcium sulfate	10101-41-4	4,000 lbs.	Toxic	(4)		No
Chelating agents	Ethylenediaminetetra-acetic acid (EDTA)	60-00-4	55 gal.	Toxic	5,000 lbs.		No

Table 8.5-3. REP chemical inventory.

Trade Name	Chemical Name	CAS[1] Number	Maximum Quantity Onsite	Hazardous Characteristics	RQ[2]	TPQ[3]	Prop 65
Sodium sulfate	Sodium sulfate	7757-82-6	4,000 lb.	Toxic	(4)		No
Lubrication oil	Oil	None	12,000 gal. (all turbines)	Combustible	42 gal.[5]		Yes
Mineral insulating oil	Oil	None	55,000 gal. (total)	Combustible	42 gal.[5]		Yes
Sulfur hexafluoride	Sulfur hexafluoride	2551-62-4	200 lbs.	Inert	(4)		No
Diesel Fuel	Oil	None	400 gal.	Combustible	42 gal.[5]		Yes
Detergents	Various	None	100 gal.	Toxic	(4)		--
Lab reagents (liquid)	Various	None	10 gal.	Toxic	(4)		--
Lab reagents (solid)	Various	None	50 lbs.	Toxic	(4)		--
Ammonium bifluoride	Ammonium bifluoride	1341-19-7	100 lbs.	Toxic, Corrosive	100		No
Sodium bisulfite	Sodium bisulfite	7631-90-5	55 gal.	Corrosive	5,000 lbs		No
Sodium carbonate	Sodium carbonate	497-19-8	250 lbs.	Corrosive	(4)		No
Sodium nitrate	Sodium nitrate	7631-99-4	250 lbs.	Corrosive	(4)		No

[1] Chemical Abstract Service.
[2] Reportable Quantity per CERCLA. Release equal to or greater than RQ must be reported. Under California law, any amount that has a realistic potential to adversely affect the environment or human health or safety must be reported.
[3] Threshold Planning Quantity. Default TPQ for hazardous materials is 10,000 lb.
[4] No reporting requirement.
[5] Must report if does or will reach California state waters, or if quantity released is a "harmful quantity."

Table 8.5-4. Characteristics of REP hazardous materials.

Hazardous Materials	Physical Description	Health Hazard	Reactive & Incompatibles	Flammability
Aqueous ammonia	Colorless solution with pungent odor	Corrosive. Irritation to permanent damage from vapor inhalation, ingestion, and skin contact.	Acids, halogens, strong oxidizers, salts of silver and zinc.	Vapor combustible, but difficult to burn.
Sulfuric acid	Colorless, dense, oily liquid	Strongly corrosive. Strong irritant to all tissue. Minor burns to permanent damage to tissue.	Organic materials, chlorates, carbides, fulminates, metals in powdered form. Reacts violently with water.	Not combustible
Sodium hypochlorite	Pale green; sweet, disagreeable odor. Usually in solution with H_2O or sodium hydroxide.	Corrosive. Toxic by ingestion. Strong irritant to tissue.	Ammonia and organic materials	Fire risk when in contact with organic materials
Calcium sulfate	White granules; odorless	May cause impaired sense of smell and taste, respiratory tract irritation, dermatitis and conjunctivitis	Diazomethane (vapor) and Phosphorous (red)	Non-flammable
Chelating agent (EDTA)	White powder, odorless	Dust may be irritating to eyes and mucous membranes	None specified	Non-flammable
Sodium sulfate	White granular solid with no odor	Toxic: Causes irritation of skin, eyes, and respiratory tract. May be harmful if swallowed. Potential carcinogen.	Aluminum powder and molten sodium sulfate	Non-flammable
Trisodium phosphate (NALCO 7208)	Colorless crystals	Corrosive and Toxic: Irritant to tissue, toxic if ingested.	Strong acids	Non-flammable
Sodium bromide (NALCO 7342)	Colorless liquid	Harmful if swallowed or absorbed through skin. Eye irritant.	Strong acids, oxidizers, reducing agents	Non-flammable
NALCO TRASAR 23263	Clear amber liquid	None	Non.	Non-flammable
Sodium tolyltriazole (NALCO 8305+)	Light yellow liquid, sweet organic odor	Irritant to eyes, skin, and respiratory tract	Strong oxidizers, strong acids, and reactive metals	Non-flammable
Stabilized bromine	White crystals	Irritant to eyes, skin, and respiratory tract. Can cause damage to central nervous system if ingested.	Acids, heavy metal salts, oxidizers.	Non-flammable
Hydrochloric acid	Colorless, pungent, fuming liquid	Highly corrosive. Toxic by ingestion. Strong irritant to eyes and skin.	Metals, hydroxides, amines, alkalis	Non-flammable
Citric acid	Translucent crystals	None	None	Non-flammable
Hydroxyacetic acid	Colorless crystals	Corrosive Toxic. Toxic by inhalation, ingestion, and dermal contact.	Strong bases, strong reducing and oxidizing agents	Non-flammable

Table 8.5-4. (continued).

Hazardous Materials	Physical Description	Health Hazard	Reactive & Incompatibles	Flammability
Formic acid	Colorless, fuming liquid	Corrosive. Corrosive to skin and tissue.	Strong oxidizers, strong caustics, concentrated sulfuric acid	Combustible
ELIMIN-OX Carbohydrazide	Colorless liquid	Slightly toxic. Low human hazard.	Mineral acids, nitrites, and strong oxidizers	Non-flammable
Cyclohexylamine (NALCO 356)	Colorless to light yellow/green liquid	Corrosive. Irritation to eyes, skin, and lungs. May be harmful if digested. Systemic affects include nausea, vomiting, anxiety, restlessness, and drowsiness.	Strong acids and oxidizers	Flammable
Mineral oil	Oily, clear liquid	Minor	Sodium hypochlorite	May be combustible
Lubrication oil (synthetic and mineral)	Oily liquid	Ingestion hazardous	Sodium hypochlorite	May be combustible
Ammonium bifluoride	White crystals	May be fatal if swallowed or inhaled. Affects respiratory system, heart, skeleton, circulatory system, CNS, and kidneys.	Strong acids	Non-flammable
Sulfur hexafluoride	Colorless and odorless	Hazardous if inhaled	Disilane	Non-flammable
Diesel fuel	Light oily liquid	May be carcinogenic	Sodium Hypochlorite	Flammable
Sodium carbonate	White powder or granules	Harmful if swallowed or inhaled. Irritation to skin and respiratory tract.	Acids	Non-flammable
Sodium nitrate	White crystals	Toxic and corrosive. Irritation to eyes, skin, and lungs. Harmful if digested.	Strong acids	Non-flammable

- Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school.

This portion of the AFC addresses these issues and demonstrates that the REP will not cause a significant adverse impact to the environment in relation to the handling of hazardous materials. The discussion includes the following: a) a description of the plans and procedures that Roseville Electric will implement to ensure the safety of the public and environment during routine transport of hazardous materials (this discussion is found in Section 8.5.4, Proposed Mitigation Measures); b) a description of the off-site consequences analysis (computer model of a worst-case hazardous materials release scenario) that will be conducted to demonstrate the low level of public risk associated with the project's use of hazardous materials; and c) a description of plans and procedures that Roseville Electric will use to ensure that a reasonably foreseeable upset or accident will not create a significant hazard for the public or environment. As discussed in Section 8.5.1, there are no schools within one quarter-mile of the project site (nor will there be following implementation of the West Roseville Specific Plan). The off-

site consequence analysis protocol is described below, followed by discussions of cumulative impacts and the measures to be used during construction and operation to mitigate the risks of using hazardous materials.

8.5.2.2 Aqueous Ammonia Off-site Consequences Analysis Protocol

The only hazardous material that has the potential to result in an off-site impact is aqueous ammonia, which is used in the selective catalytic reduction (SCR) system to control nitrogen oxides (NO_X) emissions. Anhydrous (pure) ammonia (NH_3), which may be used off site to make aqueous ammonia, is an industrial chemical in widespread use in industrial areas, as well as in rural areas for crop fertilization. Ammonia can form a vapor that spreads from a potential release point (tank rupture or tank refilling hose failure, for example), when exposed to the atmosphere. This vapor can be irritating to the mucous membranes in low concentrations and is toxic and potentially fatal in sufficiently high concentrations.

The most commonly accepted method of controlling ammonia vapor is to add water to the undiluted ammonia to make aqueous ammonia. Though more costly to use (energy is expended to evaporate the water), aqueous ammonia greatly reduces the offsite consequences associated with an onsite release. The REP project will use a form of aqueous ammonia that will be 28 percent (by weight) ammonia and 72 percent water in order to reduce ammonia handling hazards. Aqueous ammonia, or ammonium hydroxide, is a water-based solution, which can be mixed and delivered in a wide variety of solution ratios. Solution mix ratios less than 30 percent (weight basis) are the most common.

When spilled, aqueous ammonia solutions will slowly vaporize, releasing ammonia vapors. According to data prepared for the CEC by Ebasco Environmental (Ammonia Release Risk Mitigation Guidance for Power Plants-Draft Report, November 1989), when ammonia is diluted with water to solutions of less than 25 percent by weight, ammonia vapor pressure is reduced to atmospheric pressure, i.e., the evaporation of ammonia gas from the fluid would be negligible.

Accidental releases of ammonia (all forms) in industrial use situations are rare. Statistics compiled on the normalized accident rates for RMP chemicals for the years 1994 to 1999 from Chemical Accident Risks in U.S. Industry-A Preliminary Analysis of Accident Risk Data from U.S. Hazardous Chemical Facilities, J. C. Belke, September 2000, indicate that ammonia averages 0.017 accidental releases per process per year, and 0.018 accidental releases per million pounds stored per year. Data derived from The Center for Chemical Process Safety, 1989, indicates the following accidental release scenarios and probabilities for ammonia in general (Table 8.5-5).

Table 8.5-5. Ammonia accidental release probabilities.

Accident Scenario	Failure Probability
Onsite truck release	0.0000022
Loading line failure	0.005
Storage tank failure	0.000095
Process line failure	0.00053
Evaporator failure	0.00015

An Off-Site Consequence Analysis (OCA) will be performed during the Application for Certification (AFC) process to assess the risk from a potential spill or rupture of an ammonia tank on the project site. This analysis will simulate the release of ammonia from the project's storage tank, assuming a catastrophic containment failure or the rupture of a tanker hose during refilling of the ammonia storage tank and will assesses potential exposures per distance from the accident site and the associated human health risk.

Methods

An OCA will be performed for the release scenario. It will involve the complete failure and discharge of the storage tank contents into the secondary containment area. In addition, an alternative release scenario will also be evaluated, i.e., failure of the truck unloading hose with a resultant spill forming a pool on the truck unloading pad.

Emissions of ammonia from the aqueous ammonia solution will be calculated pursuant to the equations and guidance given in RMP Offsite Consequence Analysis Guidance, EPA, April 1999. Following EPA methodology, the SLAB model (or a similar model) will be used to model the aqueous ammonia release scenarios. Resulting worst-case exposure concentrations and distances will be compared to the following action levels:

- California Accidental Release Program (Cal-ARP) Toxic Endpoint (TE) of 201 ppm (1 hour average)
- Emergency Response Planning Guide, Level 2 (ERPG-2) concentration of 150 ppm (1 hour average)
- California Energy Commission (CEC) Staff's significance level of 75 ppm (30 min average)

8.5.2.3 Fire and Explosion Risk

As shown in Table 8.5-4, many of the hazardous materials to be stored and used at the REP are non-combustible. Aqueous ammonia, which constitutes the largest quantity of hazardous materials on-site (except for the mineral oil in the transformers and lubrication oil for the gas turbine and steam turbine bearings), can release ammonia vapor that is combustible within a very narrow range of concentration and is, therefore, not easy to burn. Both hydroxyacetic acid and formic acid are combustible, but will be used at the site only during commissioning and will be handled by the HRSG chemical cleaning contractor. The lubrication oil may be combustible and will be handled in accordance with a Hazardous Materials Business Plan (HMBP) to be approved by the Roseville Fire Department. With proper storage and handling of flammable materials in accordance with the plan, the risk of fire and explosion at the generating facility should be minimal.

The topics to be covered in the plan are as follows:

- Facility Identification
- Emergency Contacts
- Inventory Information (for every hazardous material)
- Material Safety Data Sheets (MSDSs) for every hazardous material
- Site Map
- Emergency Notification Data
- Procedures to Control Actual or Threatened Releases

- Emergency Response Procedures
- Training Procedures
- Certification

The natural gas fuel for the REP combustion turbines and duct burners is flammable and could leak from the in-plant supply piping or from the gas pipeline. The risk of leakage will be minimized by proper design, construction, and maintenance of the in-plant piping and supply pipeline in accordance with applicable LORS.

8.5.3 Cumulative Impacts

The primary potential cumulative impact from the use and storage of hazardous materials would be from a simultaneous release from of a chemical or chemicals two or more sites. The chemicals could potentially migrate off-site. Potentially, the two or more migrating releases could combine and pose a greater threat to the off-site population than would a single release at any one site.

Hazardous materials that do not migrate, such as sulfuric acid, would not present a potential cumulative impact. The only hazardous material that has the potential to migrate off-site from the REP is ammonia vapor released from spilled aqueous ammonia. Based on typical OCA results for similar facilities, off-site ammonia vapor concentrations are expected to occur only at low levels. In the unlikely event that an aqueous ammonia spill occurred at the REP at the same time as a chemical spill at another nearby industrial facility, off-site ammonia levels from the REP will not be sufficient to cause cumulative impacts.

8.5.4 Proposed Mitigation Measures

The following subsections describe measures that Roseville Electric plans to take during both the construction and operating phases of the project to mitigate the risk in handling hazardous materials, particularly the risk of inadvertent spills or leaks that might pose a hazard to human health or the environment.

8.5.4.1 Construction Phase

During construction, hazardous materials stored on-site will be limited to small quantities of paint and thinner, solvents, cleaners, sealants, lubricants, and 5-gallon emergency fuel containers. Paint, thinner, solvents, cleaners, sealants, and lubricants will be stored in a locked enclosures, handled per the manufacturer's directions, and replenished as needed. The emergency fuel containers will be Department of Transportation (DOT) approved 5-gallon safety containers secured to the construction equipment. The emergency fuel will be used when regular vehicle fueling is unavailable.

Fuel, oil, and hydraulic fluids will be transferred directly from a service truck to construction equipment tanks and will not otherwise be stored on-site. Fueling will be performed by designated and trained service personnel either prior to the start of the work day or at completion of the work day. Service personnel and construction contractors will follow standard operating procedures (SOPs) for filling and servicing construction equipment and vehicles. The SOPs are designed to reduce the potential for incidents involving the hazardous materials and include the following:

- Refueling and maintenance of vehicles and equipment will occur only in designated areas that are either bermed or covered with concrete or asphalt to control potential spills.

- Vehicle and equipment service and maintenance will be conducted only by authorized personnel.
- Refueling will only be conducted with approved pumps, hoses, and nozzles.
- Catch-pans will be placed under equipment to catch potential spills during servicing.
- All disconnected hoses will be placed in containers to collect residual liquids in the hose.
- Vehicle engines will be shut down during refueling.
- No smoking, open flames, or welding will be allowed in refueling or service areas.
- When refueling is completed, the service truck will leave the project site.
- Service trucks will be provided with fire extinguishers and spill containment equipment, such as adsorbents.
- In the event a spill contaminates soil, the soil will be containerized and disposed of as a hazardous waste.
- All containers used to store hazardous materials will be inspected at a minimum of once per week for signs of leaking or failure. All maintenance and refueling areas will be inspected monthly. Results of inspections will be recorded in a logbook, which will be maintained on-site.

Small spills will be contained and cleaned up immediately by trained, on-site personnel. Larger spills will be reported via emergency phone numbers (911) to obtain help from the Roseville Fire Department Hazardous Materials Emergency Response Unit. Spills will be reported in accordance with the Roseville Fire Department Spill Reporting Policy. All personnel working on the project during the construction phase will be trained in handling hazardous materials and the danger associated with hazardous materials.

During construction, contractors intending to use temporary tanks to supply fuel or propane shall obtain permits from the Roseville Fire Department and shall comply with provisions of California Fire Code Article 87, Fire Safety during Construction.

An on-site health and safety person will be designated to implement health and safety guidelines and contact emergency response personnel and the local hospital, if necessary. Material Safety Data Sheets (MSDSs) will be maintained for each on-site chemical. Employees will be made aware of the chemicals and the location of MSDS sheets.

8.5.4.2 Operation Phase

Hazardous materials will be stored and handled at the REP in accordance with local, state and federal regulations and codes. A safety program will be implemented including safety training programs for contractors and operations personnel. A Hazardous Materials Business Plan will be prepared for approval by the CEC CPM and the City of Roseville Fire Department, which is the local Certified Unified Program Agency (CUPA).

A fire protection system will be included to detect, alarm, and suppress a fire, in accordance with the applicable laws, ordinances, regulations, and standards.

Table 8.5-4 describes the characteristics and toxicity of hazardous materials that will be stored at the REP. Of the hazardous materials that are continuously on-site, three merit individual mention because of the quantity of material stored.

Aqueous Ammonia

The aqueous ammonia storage and handling facilities will be equipped with continuous tank level monitors. Secondary containment will be provided by a diked containment basin around the tank. Therefore any potential inadvertent release from the storage tank will be contained. Ammonia vapor detectors will be installed around the aqueous ammonia storage tanks and truck unloading area. They will generate alarm signals in the plant control room, and this will alert the operators to potential leaks.

A 6,500-gallon tanker truck will make approximately two to three deliveries of aqueous ammonia to the REP every month. The 10,000-gallon aqueous ammonia tank will have a useable working capacity of approximately 9,000 gallons.

Cyclohexylamine

Cyclohexylamine (an acutely hazardous material) in the form of NALCO 356 will be fed into the condensate piping to control corrosion. The feed equipment will consist of a storage tank, pumps, leak detection system, alarm system, and a fire detection and protection system. The chemical will be stored in a 400-gallon tank that will be located at the cycle chemical feed building. The tank will be located above concrete, epoxy-lined containment areas with enough capacity to contain the full quantity of a tank in the event of a spill or tank rupture. If exposed to rainfall, the containment areas will be sized additionally to contain the accumulated rainfall for 24 hours from a 25-year storm.

Sodium Hypochlorite

Sodium hypochlorite (NaOCl) will be used as a biocide for the REP condenser cooling water (circulating water) system. The system will consist of a storage tank, two, full-capacity, chemical-feed pumps, and an alarm system.

Other Hazardous Materials

All hazardous materials will be handled and stored in accordance with applicable codes and regulations. Incompatible materials will be stored in separate storage and containment areas. Areas susceptible to potential leaks and/or spills will be paved and bermed. Containment areas may drain to a collection area, such as an oil/water separator or a waste collection sump or tank. Piping and tanks will be protected from potential traffic hazards by concrete or pipe-type traffic bollards.

Tanks intended for permanent storage of hazardous materials will be compatible with the product to be stored and will be equipped with the following: secondary containment, spill control below hose connection valves, liquid level limit control when capacity exceeds 500 gallons, product identification labels, and hazard warning signage (per CFC Articles 79 and 80). All product piping will be labeled by color code to identify contents and have the direction of flow noted.

A worker safety plan, in compliance with applicable regulations, will be implemented and will include training for both contractors and operations personnel. Training programs will include safe operating procedures, the operation and maintenance of hazardous materials systems, proper use of personal protective equipment, fire safety, and emergency communication and response procedures. All plant personnel will be trained in emergency procedures including plant evacuation and fire prevention. In addition, designated personnel will be trained as a plant hazardous material response team and will receive first responder and hazardous material technical training as described in the Hazardous Materials

Business Plan (Section 8.5.6.4). However, in the event of an emergency, plant personnel will defer to the City of Roseville Fire Department Hazardous Materials Response Unit.

8.5.4.3 Transportation/Delivery of Hazardous Materials

Hazardous materials will be periodically delivered to the REP. Transportation will comply with all DOT, U.S. Environmental Protection Agency (EPA), California Department of Toxic Substances Control (DTSC), California Highway Patrol (CHP), and the California State Fire Marshal regulations for the transportation of hazardous materials. Under the California Vehicle Code, the CHP has authority to adopt regulations for the transportation of hazardous materials in California. The CHP can issue permits and specify the route for hazardous material delivery. The only hazardous material posing an inhalation hazard that will be delivered to the REP is aqueous ammonia. The Vehicle Code has special regulations for the transportation of hazardous materials that pose an inhalation hazard (Vehicle Code Section 32100.5). Roseville Electric will require its aqueous ammonia supplier to comply with these regulations.

8.5.4.4 Hazardous Materials Plans

Hazardous materials handling and storage, as well as training in the handling of hazardous materials will be set forth in more detail in hazardous materials plans that the applicant will develop. These plans will be developed in coordination with the Roseville Fire Department.

Hazardous Materials Business Plan

An HMBP is required by the California Code of Regulations (Title 19) and the Health and Safety Code (Section 25504). This plan will include an inventory and location map of hazardous materials on-site and an emergency response plan for hazardous materials incidents. The topics to be covered in the plans are as follows:

- Facility Identification
- Emergency Contacts
- Inventory Information (for every hazardous material)
- Material Safety Data Sheets (MSDSs) for every hazardous material
- Site Map
- Emergency Notification Data
- Procedures to Control Actual or Threatened Releases
- Emergency Response Procedures
- Training Procedures
- Certification
- Standard Operating Procedures for hazardous material unloading

Risk Management Plan

A Risk Management Plan (RMP) will be required pursuant to the Clean Air Act (CAA) and its regulations (40 CFR 68 Subpart G) and under California's Accidental Release Prevention Program (CalARP) pursuant to the Health and Safety Code Sections 25331 through 25543.3.

The Code of Federal Regulations 40 (CFR) Part 68, and the California Code of Regulations (CCR), Division 2, Chapter 4.5, regulate the potential accidental release of hazardous materials. The California

program is similar to the federal program but may be more stringent in some areas. CCR Article 8, Section 2770.5 includes tables of federally and state regulated substances including threshold quantities for regulation under the California Accidental Release Prevention (Cal-ARP) program. Because the REP will store aqueous ammonia in excess of 500 pounds, the facility is required to have a written Risk Management Plan (RMP) and to complete an Off-site Consequence Analysis (OCA) under the Cal-ARP program. Because the aqueous ammonia concentration will exceed the federal threshold of 20 percent, REP will also be required to submit a RMP to EPA following the federal requirements.

The RMP will be filed with and administered by the area's Certified Unified Program Agency (CUPA) which is the City of Roseville Fire Department. The RMP is in addition to the HMBP and covers listed hazardous materials that can produce toxic clouds when inadvertently released. Included in the RMP is a hazard assessment to evaluate the potential effects of accidental releases, a program for preventing accidental releases, and a program for responding to accidental releases in order to protect human health and the environment. The basic elements of a RMP are as follows:

Description of the Facility

- Accident History of the Facility
- History of Equipment Used at the Facility
- Design and Operation of the Facility
- Site Map(s) of the Facility
- Piping and Instrument Diagrams of the Facility
- Seismic Analysis
- Hazard and Operability Study
- Prevention Program
- Consequence Analysis
- Off-site Consequence Analysis
- Emergency Response
- Auditing and Inspection
- Record-Keeping
- Training
- Certification

Spill Prevention Control and Countermeasure Plan

Federal and State of California regulations require a Spill Prevention Control and Countermeasure (SPCC) plan if petroleum products above certain quantities are stored in aboveground storage tanks (ASTs). Both federal and state laws apply only to petroleum products that might be discharged to navigable waters. If quantities equal to or greater than 1,320 gallons total are stored, an SPCC must be prepared. The key elements of a SPCC are as follows:

- Name, location, and telephone number of the facility
- Spill record of the facility and lessons learned
- Analysis of the facility, including the following:

  - A description of the facilities and engineering calculations
  - A map of the site
  - Storage tanks and containment areas
  - Fuel transfer and storage and facility drainage
  - Prediction and prevention of potential spills
- Spill response procedures
- Agency notification
- Personnel training and spill prevention

The REP will have up to 12,000 gallons of turbine lubrication oil and up to 55,000 gallons of mineral insulating oil on-site and will, therefore, have to prepare a SPCC plan.

8.5.4.5 Monitoring

An extensive monitoring program will not be required because environmental effects during the construction and operation phases of the facility are expected to be minimal. However, enough monitoring will be performed during both phases to ensure that the proposed mitigation measures are complied with and that they are effective in mitigating any potential environmental effects.

Visual monitoring during construction and operation will be performed to determine compliance with and the effectiveness of the proposed mitigation measures. Written records of all monitoring events will be kept, including observations, actions taken, persons involved, and any recommendations.

8.5.4.6 West Roseville Not Annexed

If West Roseville annexation is denied or delayed indefinitely, there will be no significant differences in relation to hazardous materials handling. The transportation route for hazardous materials will differ slightly. Under this scenario, deliveries would come east on Blue Oak Boulevard, as with the annexation scenario, but would turn south on Fiddyment Road because the extension west of Blue Oak Boulevard would not be built. At Phillip Road, deliveries would turn west, then north to the project site.

8.5.5 Applicable Laws, Ordinances, Regulations, and Standards

The storage and use of hazardous materials at the REP are governed by federal, state, and local laws. Applicable laws and regulations address the use and storage of hazardous materials to protect the environment from contamination and protection of facility workers and the surrounding community from exposure to hazardous materials. The applicable laws, ordinances, regulations, and standards (LORS) are summarized in Table 8.5-6.

8.5.5.1 Federal

Hazardous materials are governed under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), the Clean Air Act (CAA), and the Clean Water Act (CWA).

Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)

An amendment to CERCLA, the Superfund Amendments and Reauthorization Act of 1986 (SARA), governs hazardous materials. The applicable part of SARA for the NEC is Title III, otherwise known as the Emergency Planning and Community Right-To-Know Act of 1986 (EPCRA). Title III requires states to establish a process for developing local chemical emergency preparedness programs and to receive

Table 8.5-6. LORS applicable to hazardous materials management.

LORS	Applicability	Conformance (Section No.)
Federal:		
CERCLA/SARA		
Section 302	Requires reporting and certain planning activities when EHS are present in excess of TPQs.	An HMBP will be submitted to report EHS.
Section 304	Requires notification when there is a release of hazardous material in excess of its RQ.	An HMBP will be prepared which will describe notification and reporting procedures. (Section 8.5.6.4).
Section 311	Requires MSDS for every hazardous material to be kept on-site and submitted to SERC, LEPC, and the local fire department.	The HMBP that will be prepared will include MSDSs and procedures for submission to agencies. (Section 8.5.6.4).
Section 313	Requires annual reporting of releases of hazardous materials.	The HMBP that will be prepared will describe reporting procedures. (Section 8.5.6.4).
CAA	Requires a RMP if listed hazardous materials at or above a TQ are stored.	An RMP will be prepared. (Section 8.5.6.4).
CWA	Requires preparation of SPCC plan if oil is stored above certain quantities.	An SPCC will be prepared. (Section 8.5.6.4).
California:		
Waters Bill	Requires preparation of a HMBP if hazardous materials are handled or stored in excess of threshold quantities.	An HMBP will be prepared. (Section 8.5.6.4).
La Follette Bill	Requires registration with local CUPA or lead agency and preparation of a RMP if acutely hazardous materials handled or stored in excess of TPQs.	A HMBP will be prepared which will describe procedures for registration with local authorities. (Section 8.5.6.4).
Aboveground Petroleum Storage Act	Requires entities that store petroleum in ASTs in excess of certain quantities to prepare an SPCC.	A SPCC will be prepared. (Section 8.5.6.4).
Safe Drinking Water and Toxics Enforcement Act (Proposition 65)	Requires warning to persons exposed to list of carcinogenic and reproductive toxins and protection of drinking water from same toxins.	The site will be appropriately labeled for chemicals on the Proposition 65 list.
City of Roseville:		
Municipal Code Sections 9.60.010 through 9.60.110	Requires disclosure of hazardous substances and hazardous wastes present in the community.	An HMBP will be prepared and submitted to Fire Department
Municipal Code Sections 9.70.010 through 9.70.030	Roseville has assumed responsibility for enforcement of the State of California Underground Storage Tank and Hazardous Materials Release Response Plan Law.	City of Roseville Fire Department has regulatory authority.

and disseminate information on hazardous materials present at facilities in local communities. The law primarily provides for planning, reporting, and notification concerning hazardous materials. Key sections of the law are as follows:

- Section 302—Requires that certain emergency planning activities be conducted when Extremely Hazardous Substances (EHS) are present in excess of their TPQs. EHSs and their TPQs are found in Appendices A and B to 40 CFR Part 355.
- Section 304—When there is a release of a hazardous material in excess of its RQ, Section 304 requires immediate notification to the local emergency planning committee (LEPC) and the state emergency response committee (SERC). If the release is of a RQ of a CERCLA-listed hazardous substance, notification must also be provided to the National Response Center in Washington, D.C. (RQs are listed in 40 CFR Part 302, Table 302.4). These notifications are in addition to notification provided to the local emergency response team or fire personnel.
- Section 311—Requires that either MSDSs for all hazardous materials or a list of all hazardous materials be submitted to the SERC, LEPC, and the local fire department.
- Section 313—Requires annual reporting of hazardous materials released into the environmental either routinely or as a result of an accident.

Clean Air Act (CAA)

Regulations (40 CFR 68) under the CAA are designed to prevent accidental releases of hazardous materials. These regulations require facilities that store a TQ or greater of listed hazardous materials to develop a RMP, including hazard assessments and response programs to prevent accidental releases of certain chemicals. Section 112(r)(5) of the CAA discusses the chemicals regulated. These chemicals are listed in 40 CFR 68.130 of the regulations. Aqueous ammonia is a listed substance and its TQ for solutions of 20 percent or greater is 20,000 pounds. Therefore, the federal RMP requirement will apply to the REP.

Clean Water Act (CWA)

The SPCC program under the CWA is designed to prevent or contain the discharge or threat of discharge of oil into navigable waters or adjoining shorelines. Regulations (40 CFR 112) under the CWA requires facilities to prepare a written SPCC if they have a single aboveground oil storage tank with a capacity greater than 660 gallons, total aboveground tank storage greater than 1,320 gallons, or underground storage capacity greater than 42,000 gallons and that poses a threat to navigable waters.

8.5.5.2 State of California

California laws and regulations relevant to hazardous materials handling at the REP include the Waters Bill (hazardous materials), the La Follette Bill (acutely hazardous materials), and the Aboveground Petroleum Storage Act (petroleum in aboveground tanks).

Waters Bill

This law is found in the California Health and Safety Code, Section 25500 et seq. and the regulations to the law in 19 California Code of Regulations (CCR) Section 2620 et seq. The law requires local governments to regulate local businesses' storage of hazardous materials if in excess of certain threshold quantities. The law also requires that entities storing hazardous materials be prepared to respond to releases. Those using and storing hazardous materials are required to submit a HMBP to their local

administering agency (AA) and to report releases to their AA and the Governor's Office of Emergency Services. The threshold quantities for hazardous materials are 55 gallons for liquids, 500 pounds for solids, and 200 cubic feet for compressed gases measured at standard temperature and pressure.

La Follette Bill

Found in the California Health and Safety Code, Section 25531 et seq., this law regulates the registration and handling of acutely hazardous materials. Acutely hazardous materials are any chemicals designated as an extremely hazardous substance by the USEPA as part of its implementation of SARA Title III. Health and Safety Code Section 25531 expands the programs mandated by the Waters Bill and overlaps or may duplicate some of the requirements of SARA and the CAA. Facilities handling or storage of acutely hazardous materials at or above TPQs requires registration with local AA and preparation of a RMP, formerly known as a Risk Management and Prevention Program (RMPP).

Aboveground Petroleum Storage Act

This law is found in the Health and Safety Code at sections 25270 to 25270.13 and is intended to ensure compliance with the federal CWA. The law applies if a facility has an aboveground storage tank with combined AST capacity greater than 1,320 gallons and there is a reasonable possibility that the tank(s) may discharge oil in "harmful quantities" into navigable waters or adjoining shore lands. If a facility falls under these criteria, it must prepare a SPCC. The law does not cover AST design, engineering, construction, and other technical requirements, which are usually determined by local fire departments.

Safe Drinking Water and Toxics Enforcement Act (Proposition 65)

This law identifies chemicals that cause cancer and reproductive toxicity, informs the public, and prevents discharge of the chemicals into sources of drinking water. Lists of the chemicals of concern are published and updated periodically. The Act is administered by the California Office of Environmental Health Hazard Assessment. Some of the chemicals planned to be used at the REP are on the cancer causing and reproductive toxicity lists of the Act.

8.5.5.3 Local

Local Administrative Authorities (AAs) usually have the responsibility for administering hazardous materials requirements and ensuring compliance with federal and state laws. The City of Roseville Fire Department is the AA for the REP.

Roseville Hazardous Materials Ordinance

City of Roseville Municipal Code Sections 9.60.010 through 9.60.110, requires disclosure of hazardous substances and hazardous wastes present in the community to firefighters, health officials, planners, elected officials, and residents.

Roseville Municipal Code 9.70

Through passage of Municipal Code Sections 9.70.010 through 9.70.030, the City of Roseville has assumed responsibility for enforcement of 1) the State of California Underground Storage Tank Law (Chapter 6.7 of Division 20 of the California Health and Safety Code [HSC]) and 2) Hazardous Materials Release Response Plan Law (Chapter 6.95 of Division 20 of the California HSC).

8.5.5.4 Codes

The design, engineering, and construction of hazardous materials storage and dispensing systems will be in accordance with applicable codes and standards, including the following:

- The Uniform Fire Code, Article 80—Article 80 is the hazardous materials section of the Fire Code. Local fire agencies or departments enforce this code and can require that a Hazardous Materials Management Plan and a Hazardous Materials Inventory Statement be prepared. This requirement and the Waters Bill requirement for a Hazardous Materials Business Plan can usually be satisfied in a single combined document.
- California Building Standards Code, Health and Safety Code Sections 18901 to 18949—This code incorporates the California Building Code, California Fire Code, and California Plumbing Code.
- The American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code, Section VIII.
- The American National Standards Institute (ANSI) K61.1.

8.5.6 Involved Agencies and Agency Contacts

A number of agencies regulate hazardous materials handled by the REP. At the federal level is the EPA, and at the state level is the California Environmental Protection Agency (CalEPA). The administration and enforcement of the hazardous materials laws, however, are primarily through a local agency. For the REP plant, the local agency is the City of Roseville Fire Department. The persons to contact are shown in Table 8.5-7.

Table 8.5-7. Agency contacts.

Type Material	Agency	Contact	Title	Telephone
All hazardous materials RMP, HMBP	City of Roseville Fire Department	Steve Anderson	Life Safety/ Hazmat Officer	(916) 774-5821
Hazardous Materials Emergency Response Unit	City of Roseville Fire Department	Ken Wagner	Fire Chief	(916) 774-5800

8.5.7 Permits Required and Schedule

Applicable hazardous material permits and plans required for the project are listed in Table 8.5-8. Information required to obtain each permit is also included.

A Welding and Cutting Operations Permit will be required to conduct welding and cutting operations in any occupancy or temporary job site involving construction permitted and regulated by the City. These permits will be obtained prior to initiation of welding or cutting operations. These permits are not submitted to an agency; however, they must be prepared an approved on-site prior to initiation of welding or cutting operations.

Table 8.5-8. Permits required and permit schedule.

Permit/Approval Required	Schedule
Welding and Cutting Operations Permit • Description of work to be performed • Name of company and person(s) performing the job • Availability of fire extinguishers or other fire suppression equipment • Checklist to ensure conditions are safe for the planned activity	Prior to initiation of construction welding or cutting operations
Consolidated Permit/HMBP • Business Owner/Operator Identification Unified Program Consolidated Form (UPCF). Contains owner and operator contact information. • Business Activities UPCF—Provides a summary of hazardous material usage and hazardous waste generation. • Hazardous Materials Inventory—Chemical Description UPCF. Provides detailed information for each hazardous material and hazardous waste on-site above threshold quantities. • Material Safety Data Sheets • Hazardous materials storage location map • Emergency contact information • Emergency response procedures • Training procedures	Prior to storage of hazardous materials at the site
RMP • RMP Certification • Off-Site Consequences Analysis • Prevention Program information • Emergency Response Program information • Hazard assessment	Prior to start-up
SPCC • Facility location and site description • Petroleum storage quantities and areas • Spill scenarios • Spill containment measures • Spill response/contingency plan notification procedures • Emergency response actions • Training plan	Prior to start-up

A Consolidated Permit will cover hazardous materials storage. A Hazardous Materials Business Plan must be submitted as part of the application for the permit. The permit will be obtained prior to storage of hazardous materials at the site.

In addition, several plans must be prepared, including RMP and SPCC plans. These plans will be developed after filing of the AFC and prior to start-up.

8.5.8 References

Belke, J.C. 2000. Chemical accident risks in U.S. industry—A preliminary analysis of accident risk data from U.S. hazardous chemical facilities.

Center for Chemical Process Safety. 1989. http://www.aiche.org/ccps/

Ebasco Environmental. 1989. Ammonia Release Risk Mitigation Guidance for Power Plants-Draft Report. Prepared for the California Energy Commission. Prepared by Ebasco Environmental, a Division of Ebasco Service Incorporated, Sacramento, California.

U.S. Environmental Protection Agency (EPA). 1999. RMP off-site consequence analysis guidance.

8.6 LAND USE

This section provides a discussion of land use at and near the proposed Roseville Energy Park (REP) and assesses the potential effects of REP construction and operation on land use. Section 8.6.1 discusses the regional and local land use setting, focusing on land use within one mile of the project site and one quarter mile of the project's linear facilities. It also discusses applicable land use plans/controls that apply to the project and presents a brief summary of future land use projections for the region. Section 8.6.2 discusses potential environmental effects as they relate to land use compatibility and development. Section 8.6.3 discusses cumulative impacts and Section 8.6.4 presents proposed mitigation measures for any impacts determined to be significant. Section 8.6.5 presents applicable laws, ordinances, regulations, and standards (LORS) related to land use, and Section 8.6.6 references agency contacts. Section 8.6.7 presents permit requirements and schedules, and Section 8.6.8 contains a list of references cited.

8.6.1 Affected Environment

8.6.1.1 Regional Setting

The project is located in the City of Roseville in Placer County, which is situated in the greater Sacramento area of California. The greater Sacramento area includes El Dorado, Placer, Sacramento, Sutter, Yolo, and Yuba counties. Placer County encompasses approximately 946,140 acres (Placer County 2003). Larger county communities include Roseville, Lincoln, Rocklin, Loomis, Auburn, Foresthill, Colfax, Tahoe City, and Kings Beach. The county stretches from the Sacramento area east across the Sierra Nevada mountain range to the Lake Tahoe Basin. Western Placer County is that portion of the county that lies within the Sacramento Valley and lower Sierra Nevada foothills. This area has experienced substantial population growth and development over the past 20 years. Western Placer County has attracted a strong industrial and commercial base,and has developed into a regional employment and retail center.

The City of Roseville is the largest in Placer County with a population of 90,739 as of January 2003 (Department of Finance). The second largest city in population is Rocklin, at 41,100. The incorporated city with the smallest population in the County is Colfax, at 1,650. The population of unincorporated Placer County is 100,500. Between 1990 and 2000, Rocklin was the fastest growing city in Placer County, with a population increase of nearly 91 percent. Roseville was the second fastest growing city with approximately 79 percent growth over its 1990 population (Placer County 2003).

8.6.1.2 Local Setting

The project site is located within the City of Roseville, directly north of the Pleasant Grove Waste Water Treatment Plant (PGWWTP), and on land that is zoned Public/Quasi-Public. Agricultural land to the north of the site is located in unincorporated Placer County. To the west, east, and south of the project and the PGWWTP is a 3,100-acre area called West Roseville, which will be developed for residential, industrial, and commercial uses over 15 years under the West Roseville Specific Plan (WRSP). The City of Roseville recently (September 15, 2003) published the WRSP and an Environmental Impact Report on the development of West Roseville in accordance with the WRSP in addition to a sphere of influence amendment (City of Roseville 2003a,b), and has been holding public meetings to discuss this proposal. The target date for City Council adoption of the West Roseville annexation is December 17, 2003, with relevant zoning ordinance and Development Agreement ordinances becoming effective 30 days after that. The sphere of influence amendment is for land to the north and south of West Roseville. This area is currently open land that has been used for livestock grazing and some orchard crops. The build-out of

West Roseville is planned to begin in 2004. Figure 8.6-1 shows existing land uses in the area surrounding the REP site.

Major surface roads near the proposed project include Interstate 80 (I-80), State Route 65 (SR 65), and State Route 99 (SR 99). There are no railroad facilities within 1-mile of the project site. Section 8.12 discusses transportation facilities in greater detail.

REP Parcel

The parcel of land on which Roseville Electric will construct the REP encompasses 40 acres. Within this parcel of land, the power plant site area will be approximately 12 acres. The area within the power plant and switchyard fencelines will encompass 9.1 acres.

The REP parcel is not currently developed and is only sparsely vegetated. The site was formerly used for rural residential purposes and grazing. The site is currently being used as a construction staging and laydown area for construction of the PGWWTP (construction will be completed late 2003). No residences are located within the site boundaries, though buildings associated with one of the former residences are being used in conjunction with PGWWTP construction management activities.

The REP property is located in Township 11N, Range 5E, Section 23 and comprises three legal parcels. The listed and mapped assessor's parcel numbers for the power plant site are 017-100-017, 017-100-029, and 017-100-030. The project site is zoned Public/Quasi-Public. RE will consolidate these parcels through a voluntary merger before building the REP.

Current land use within a 1-mile radius of the REP site is agricultural and utility (PGWWTP). Other than general agricultural uses in the form of livestock grazing, the current land uses within 1 mile of the project site include the following:

- The PGWWTP, including large settling ponds, clarifiers, treatment equipment, and administrative buildings, extending about 2,000 feet south of the REP site
- Dog kennel/residence located 850 feet to the northwest
- Rural residence and barn located 1,200 feet to the north
- Rural residence and additional buildings 1,500 feet to the northeast
- Rural residence and farmstead buildings located 2,500 feet to the southeast
- Rural residence and outbuilding located 4,100 feet to the northwest

The closest school to the project site is Robert Cooley Middle School, located 2.7 miles due east of the project site. The closest college campus is Sierra College in Rocklin, approximately 9.5 miles to the east. The closest residential area to the project site currently, is Del Webb Roseville Sun City, approximately 1.2 miles east. Under the WRSP, the closest residential area would be 0.2 mile west of the project site. The closest school site planned in the WRSP would be 0.4 mile southwest of the project site.

Current zoning within one mile of the project site, with the exception of the PGWWTP, is Agricultural (Placer County). Land to the north of the REP site that remains in unincorporated Placer County is currently zoned Agricultural. The REP site itself, and the land to the south on which the PGWWTP is located, are zoned Public/Quasi-Public (P/QP). One parcel to the west of the REP site is also zoned P/QP, as are two parcels to the east. The WRSP proposes a variety of urban land uses within this 1-mile area. These include general industrial (located to the west of the PGWWTP); light industrial (west and south of the PGWWTP); commercial, high-density, medium-density, and low-density residential; parks

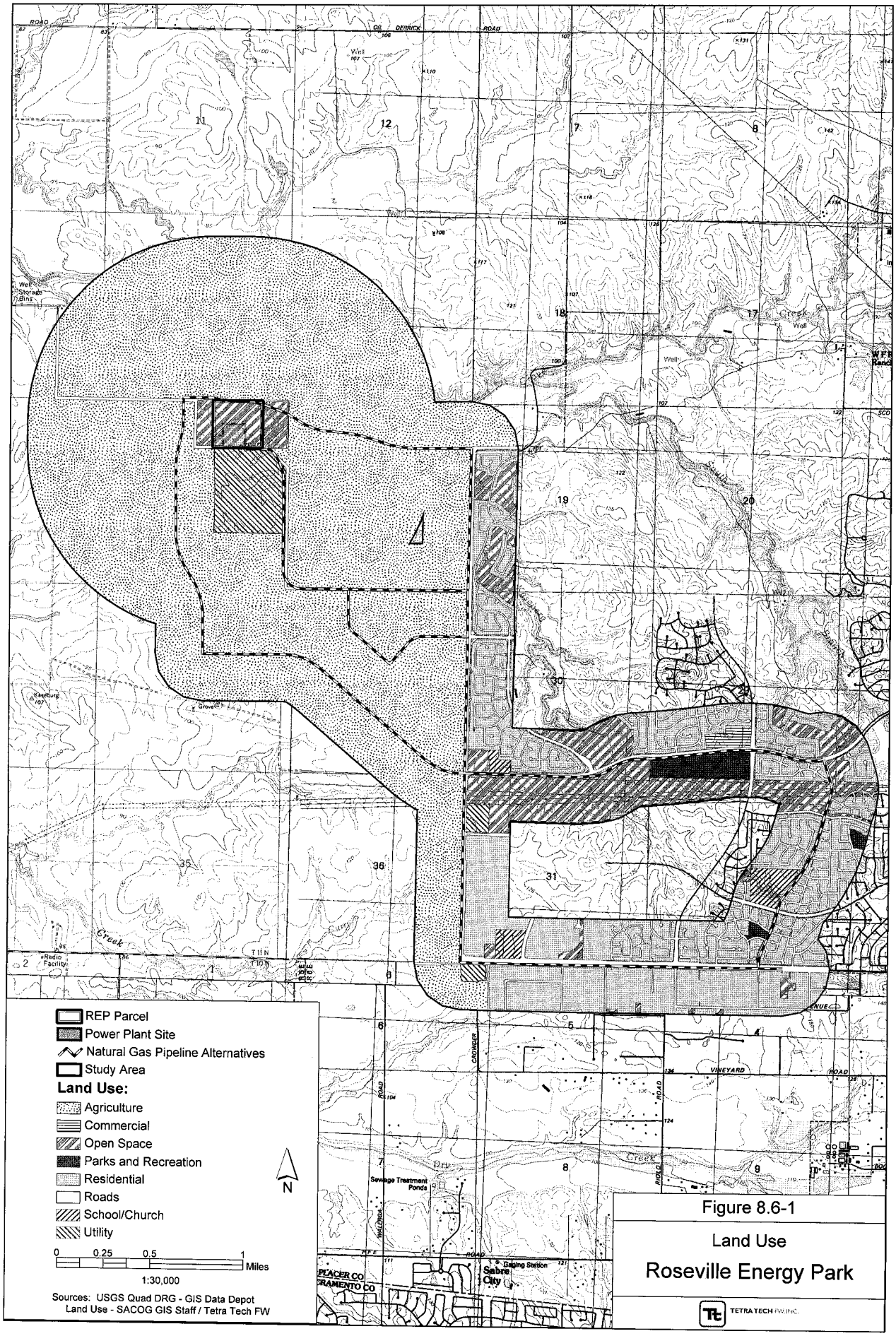


Figure 8.6-1

Land Use

Roseville Energy Park

TETRA TECH FW, INC.

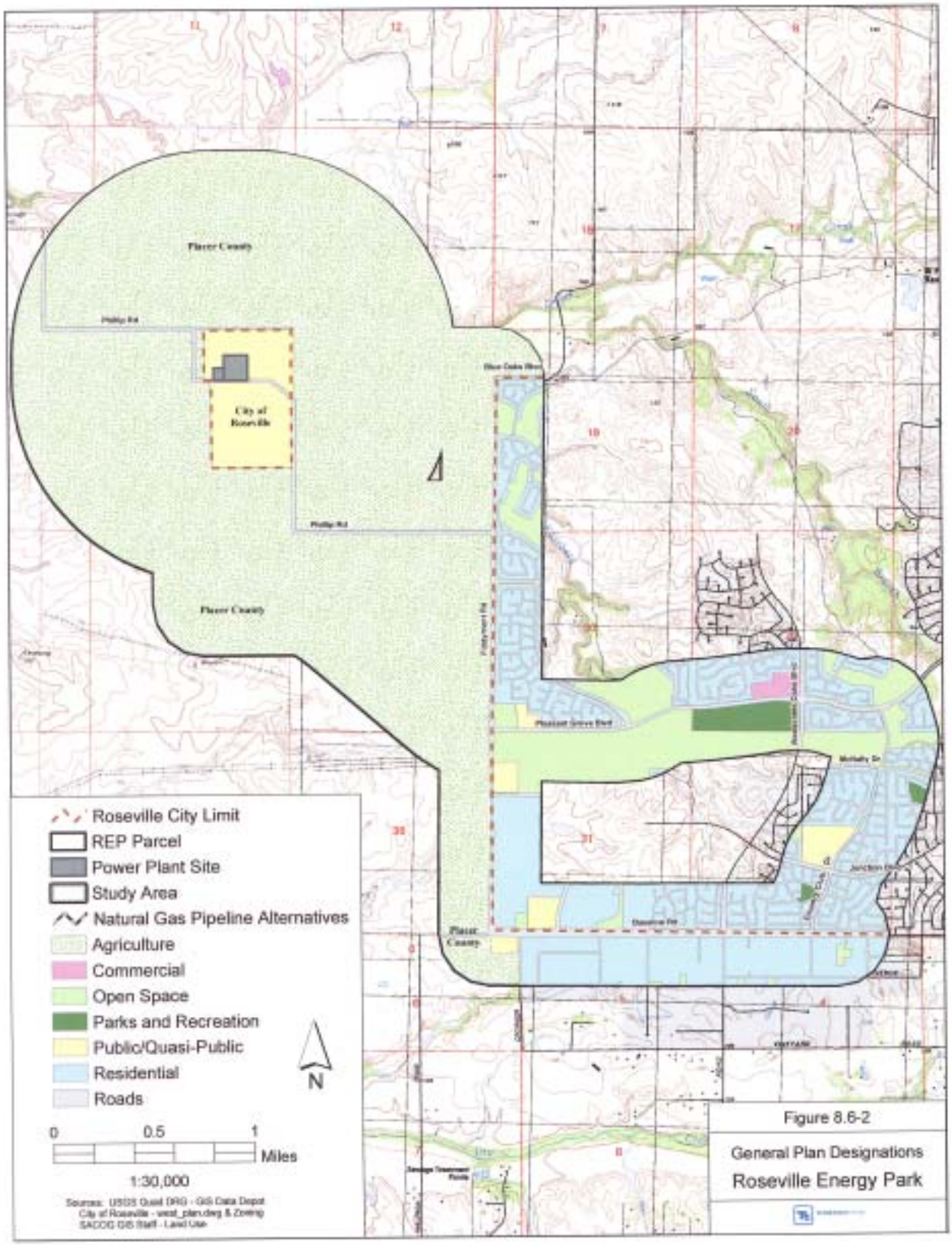


Figure 8.6-2

General Plan Designations

Roseville Energy Park

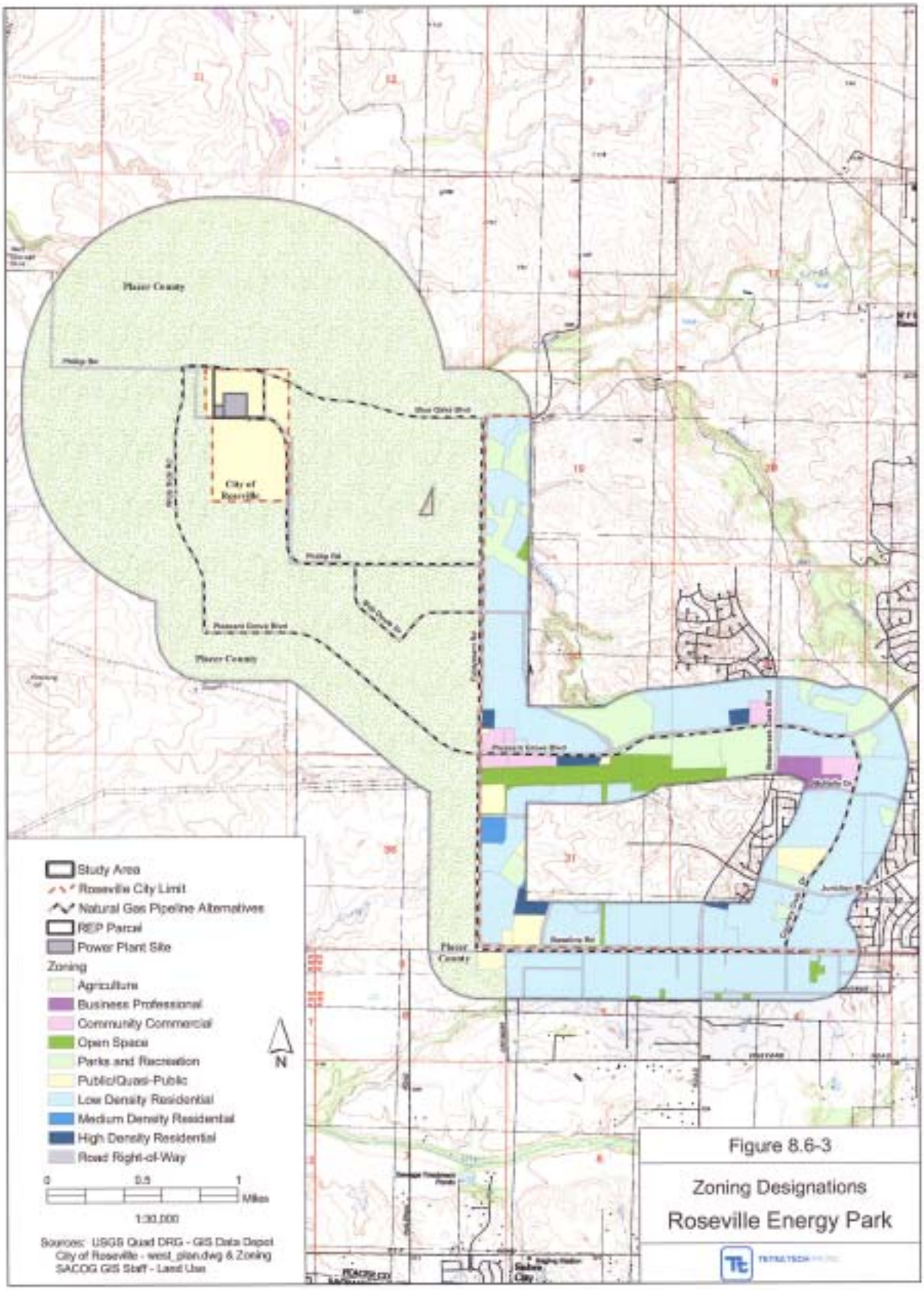


Figure 8.6-3

Zoning Designations

Roseville Energy Park

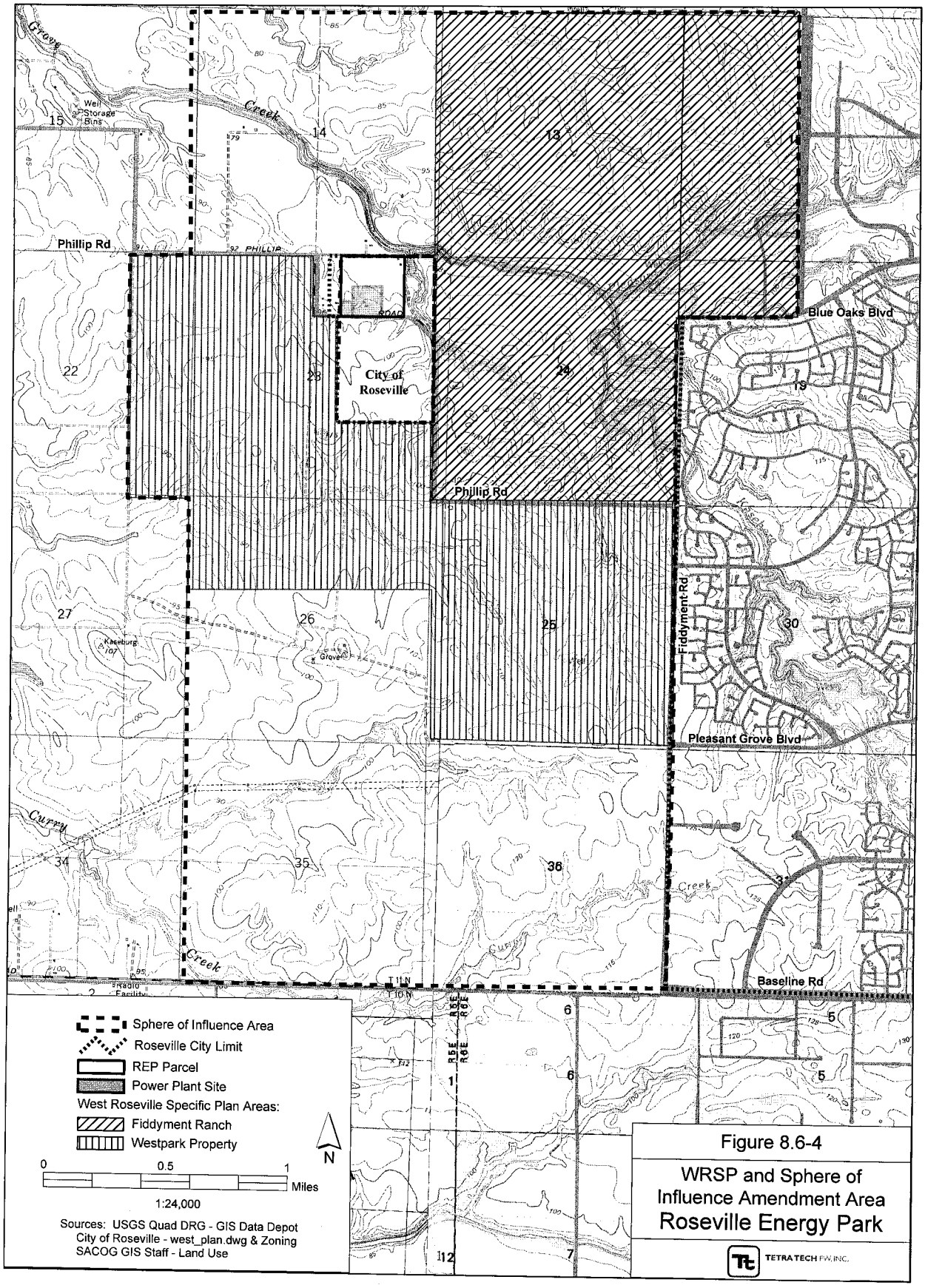


Figure 8.6-4

WRSP and Sphere of Influence Amendment Area
Roseville Energy Park

TETRA TECH EM INC.

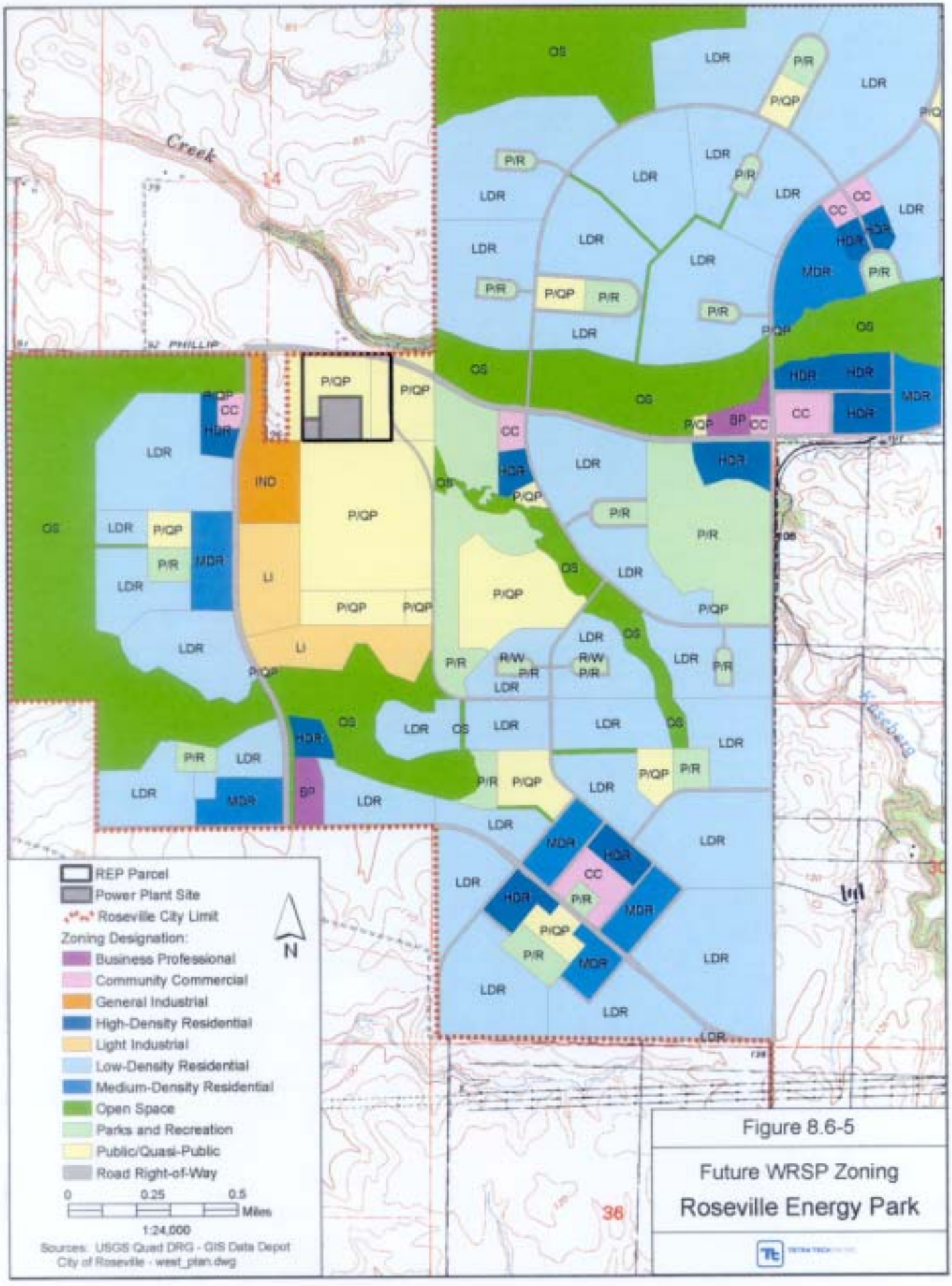


Figure 8.6-5

Future WRSP Zoning

Roseville Energy Park

and recreation; open space; and public/quasi-public. Figure 8.6-2 shows the general plan designations within one mile of the project site and one quarter-mile of the natural gas pipeline and other linear facilities rights-of-way. Figure 8.6-3 shows the corresponding zoning districts, including the WRSP proposed districts. Figure 8.6-4 shows the WRSP annexation and City of Roseville sphere of influence amendment areas. Figure 8.6-5 shows the proposed zoning under the WRSP.

Natural Gas Pipeline

A natural gas pipeline to supply the REP will begin approximately 6 miles southeast of the project site at a tie-in to PG&E line 123 located on Baseline Road just east of Country Club Drive. There are four alternative natural gas pipeline routes. These are alternatives A, B, B1, and C (see Figure 5.1-1 for location).

Pipeline Alternative A

Existing land uses along alternative pipeline Alternative A are entirely residential between the Line 123 tie-in and Fiddyment Road. Along the north side of Baseline Road, the use is low-density residential within the City of Roseville. South of Baseline Road, in unincorporated Placer County, the residential density is much lower and has a semi-rural character, with large lots. A large telecommunications complex and utility yard are located on the south side of Baseline Road at the corner of Fiddyment Road. Existing land uses along Fiddyment Road between Baseline Road and Phillip Road are mostly residential on the east side of Fiddyment Road and entirely agricultural on the west side. Agricultural uses include grazing and some cultivation for hay crops. Residential uses include a small amount of high-density and medium-density residential, as well as low-density residential, including Del Webb Sun City Roseville north of Pleasant Grove Boulevard. The Roseville Electric and Western Area Power Administration Fiddyment Substation is located where Western's transmission corridor crosses Fiddyment Road just south of Pleasant Grove Boulevard. This corridor is managed as open space.

North of Pleasant Grove Boulevard along Fiddyment Road, existing land uses are entirely residential to the east (Del Webb Sun City Roseville) and entirely agricultural to the west. From Fiddyment and Blue Oaks Boulevard, where the route turns west to run along the planned new alignment of Blue Oaks Boulevard, current land uses are agricultural on both sides of the route. A large, abandoned poultry-raising complex is located along the route just west of Fiddyment Road, and a few rural residences and a former poultry shed now used for storage are also located in this area.

Zoning along Route A is consistent with current land use east of Fiddyment Road. Agricultural uses west of Fiddyment Road in this area, however, are within unincorporated Placer County. Zoning west of Fiddyment Road and north of Pleasant Grove Boulevard will be determined through the build-out of the WRSP. Zoning districts in this area under the WRSP include low-, medium-, and high-density residential; commercial; business professional; open space; and park and recreational uses. There are two planned regional parks located along this route: Fiddyment Park, west of Fiddyment Road near Blue Oaks Boulevard, and a regional park to be located south of Blue Oaks Boulevard east of the planned realignment of Phillips Road. Open space along Pleasant Grove Creek borders the route to the north along Blue Oaks Boulevard.

Pipeline Alternative Routes B and B1

Alternatives B and B1 are the same as Alternative A along Baseline Road and Fiddyment Road between Baseline and Del Webb Boulevard, and the land uses are the same. Between Phillip Road and the project site, existing land use includes agricultural (grazing), along both alternatives B and B1. Where Phillip Road turns north, the adjacent land use to the west is the public utility use of the PGWWTP.

Under the WRSP, zoning along this portion of the route will include low-, medium-, and high-density residential; community commercial; open space, public/quasi-public (schools) and parks and recreation. Planned uses in this area include residential and commercial areas surrounding a village center, an elementary school, middle school, and a high school, and a regional park.

Pipeline Alternative C

Land uses along Alternative C are mostly residential between the Line 123 tie-in and Fiddyment Road, though there are commercial uses along Pleasant Grove Boulevard and Country Club Drive. There are also recreational uses along Pleasant Grove Boulevard (City of Roseville Sports Complex) and open space (Western Area Power Administration Transmission Corridor) and a natural preserve, the Woodcreek Oaks biological resources mitigation area. The route passes a school on Country Club Drive and a church on Pleasant Grove Boulevard. From this point, current land use along Alternative C is entirely agricultural (grazing). The public utility use of the PGWWTP is also located within one quarter-mile of the route near the REP site. To the west and north of the REP are three rural residences, including a residence associated with a dog kennel.

Zoning along route C is consistent with current land use east of Fiddyment Road and south of Pleasant Grove Boulevard, with agricultural zoning in Placer County west of Fiddyment Road. Zoning planned for areas west of Fiddyment Road and north of Pleasant Grove Boulevard under the WRSP includes low-, medium-, and high-density residential; public/quasi-public (school); business professional; community commercial; open space; park; light industrial; and general industrial. Areas in unincorporated Placer County that lie north of the REP site and south of Pleasant Grove Boulevard (see Figure 8.6-3) are zoned agricultural.

Recycled Water Pipeline

The recycled water pipeline will run north from the PGWWTP and cross the existing alignment of Phillip Road, which is zoned P/QP. Under the WRSP, this segment will become a private driveway to service the REP and PGWWTP, after Phillip Road is realigned.

Sanitary Sewer Pipeline

The pipeline runs along the current alignment of Phillip Road to the lift station for the PGWWTP. The surrounding area is zoned P/QP.

Storm Water Outfall

The area crossed by the stormwater outfall is currently vacant land that has been taken out of agricultural production. It is zoned P/QP.

8.6.1.3 Land Use Planning and Controls

Placer County General Plan

The Placer County General Plan is the county-level document that pertains to portions of the REP study area. Land within the REP study area lies outside of the Roseville City limit is part of unincorporated Placer County and subject to the policies stipulated in the Placer County General Plan and Zoning regulations. The land use designations in the Placer County General Plan are intended to generally portray overall land use patterns throughout the unincorporated areas of the county. These land use policies are implemented through zoning regulations that impose specific development standards on any proposed land use. Currently, the natural gas pipeline routes all cross unincorporated County areas.

City of Roseville General Plan

The project is located on land owned by the City of Roseville that was annexed to the City in 2001 and is therefore subject to the policies stipulated in the Roseville General Plan. The Land Use Element of the General Plan defines planning districts and establishes the descriptions, limits, and directions for growth (City of Roseville 1992). The Zoning Ordinance of the City of Roseville applies direct zoning to each parcel in the City. It is the intent of the Zoning Ordinance that each parcel be zoned consistent with the General Plan and any applicable Specific Plan. Where inconsistencies exist between the General Plan and the zoning designation for a parcel, the zoning designation takes precedence (City of Roseville Zoning Ordinance Section 19.02.030 B, 1996).

The City of Roseville developed and implemented a General Plan for growth management in 1992; the most recent update of the Plan was in 2003. The first goal of the Growth Management Section of the Land Use Element of the General Plan is to "proactively manage and plan for growth" (City of Roseville General Plan 1992).

West Roseville Specific Plan

The City of Roseville has recently (September 15, 2003) published the WRSP, a plan for the annexation to the City of Roseville and development of the area known as West Roseville as well as an amendment to the City's sphere of influence. The City has also published an Environmental Impact Report on the potential environmental effects of these proposals (City of Roseville 2003a,b). Figure 8.6-5 shows land use designations under the WRSP. The Roseville City Council is scheduled to adopt the WRSP on December 17, 2003. The WRSP is the key planning document to guide the development of West Roseville over the next 15 years. West Roseville lies west of Fiddyment Road and north of Blue Oaks Boulevard. Land uses in West Roseville will include a mixture consisting of including residential, industrial, commercial, open space, parks, and public/quasi-public uses. The WRSP contains planning guidance for areas to the west, east, and south of the REP project site and PGWWTP. Concurrent with the WRSP, the City is processing an expansion of its sphere of influence to the north and south of the WRSP area.

Under the WRSP, land immediately to the west of the project site will be designated "General Industrial" To the east of the REP site, land will be preserved as open space or developed as a regional park. The REP will, thus, be buffered from residential uses proposed under the WRSP by recreational uses, the PGWWTP, and a proposed industrial park.

City of Roseville Zoning Ordinance

The Roseville Zoning Ordinance (Title 19 of the Roseville Municipal Code) designates the proposed site as a P/QP zoning district. The permitted uses within the P/QP district are listed in tabular format in Section 19.16.020 of the zoning ordinance. According to this table, several types of power-generating facilities are permitted uses within Civic and Resource Protection districts such as the P/QP district. These include emergency, general power production, and passive power facilities. According to the zoning ordinance's definition (Section 19.08.070), the REP would qualify as a general power production facility. A general power production facility may be powered by natural gas or any of several other energy sources.

As a general power production facility, the REP, is a conditionally permitted use. Since this is a City project, the City does not issue itself a conditional use permit. Rather, the City has an established process for the review and approval of City projects that mirrors the conditional use permit process for private development projects. The most significant difference is that the City Council, rather than the Planning

Commission, is the approval body for the project. The process for City projects is coordinated by the City's Community Development Department and includes referral of the project to City departments (including water, sewer, solid waste, public works engineering, building, and planning) and applicable outside service providers (e.g. cable and phone). Following this referral, a project evaluation meeting is held to discuss potential conditions of approval and coordinate amongst the various commenting departments and service providers. This results in a comprehensive list of conditions of approval that address the permitting, plan check, and inspection stages of the project. Following project approval by the City Council, and parallel with private projects, the City requires the sponsoring department to submit for building permits, improvement plans (civil plans), and other documents necessary to implement the conditions of approval and assure compliance during construction and operation. The City intends to provide proposed conditions of certification for the REP that the CEC may incorporate as conditions of certification in the REP project license.

Placer County General Plan

The General Plan designation for lands adjacent to the north of the REP site that are not within the Roseville city limit is Agriculture. According to the General Plan, this designation "identifies land for the production of food and fiber, including areas of prime agricultural soils, and other productive and potentially productive lands where commercial agricultural uses can exist without creating conflicts with other land uses, or where potential conflicts can be mitigated" (Placer County 1994). The General Plan states that necessary public utility facilities are a land use compatible with the Agriculture designation.

Placer County Zoning Ordinance

The Placer County Zoning Ordinance designates areas north of the REP project site as being within the Farm (F) district (Agriculture, 80-acre minimum). According to the Zoning Ordinance, the purpose of this zoning district is to provide areas for the conduct of commercial agricultural operations that can also accommodate necessary services to support agricultural uses, together with residential land uses at low population densities. Electric generating plants are considered compatible land uses within the F zoning designation (Placer County Code, Chapter 17) and so would be considered compatible in an adjoining area, as with the REP.

8.6.1.4 Future Land Use Trends

A considerable increase in Greater Sacramento Area growth is expected over the next 22 years with an expected population increase of 49 percent over 2000 population figures. Placer County's population is expected to increase 75 percent over the same time. In addition, the Sacramento Area Council of Governments (SACOG) expects that the Greater Sacramento Area will add 511,129 jobs by 2025. Placer County (excluding the Tahoe Basin) will see one of the largest job increases over SACOG's forecast period: approximately 113,000 (SACOG 2003). Increases in population and jobs will undoubtedly spur further residential development in Roseville and elsewhere in the County.

The most obvious example of a future land use trend in the project area is the proposed WRSP. The WRSP is planned for construction in four phases and will culminate in the development of 3,162 acres for residential, commercial, industrial, and recreational uses, including 8,430 residential units (Figure 8.6-5).

Concurrent with the proposed annexation of West Roseville and adoption of the WRSP, the City of Roseville is also proposing to amend its sphere of influence to include West Roseville, as well as an additional 2,365.3 acres lying outside of the WRSP area to both the north and south of the WRSP area. The City may expand its boundaries into these areas in the future, once it receives an application for their development. However, expansion into the sphere of influence area to the north would require

preparation of a specific plan and additional environmental review. Other possible nearby developments are summarized as follows (City of Roseville 2003b):

- A development called Placer Vineyards is being planned for unincorporated Placer County to the southwest of the REP project area, south of Baseline Road. An EIR is currently under preparation for this project, which would encompass approximately 5,000 acres and include 14,132 residential units and approximately 6 million square feet of commercial use area.
- A pre-application has been made to Placer County for a 2,200-acre development called Placer Ranch, to be located north of the project site in unincorporated Placer County. This development may include a college campus, more than 4,794 residential units, and more than 1,000 acres of retail, office, and industrial uses.
- A development has been filed for the De La Salle University and Community, for the area immediately west of West Roseville in unincorporated Placer County. This 1,100-acre development is proposed to include a private university and 2,342 adjacent residential units and campus housing, together with 954,000 square feet of commercial development.

8.6.2 Environmental Consequences

Potential impacts to land use are evaluated by comparing project characteristics with the regional and local land use environment. A summary of effects to land use and zoning designations within 1 mile of the power plant and within 0.25-mile of the project linear facilities is presented in Table 8.6-1.

Table 8.6-1. Potential effects to land use and zoning designations.

Project Features	General Plan Designation	General Plan Amendment?	Zoning Designation	Rezone Required?	Other Requirements
Power Plant	Public/Quasi-Public	No	Public/Quasi-public	No	Parcel merger Building Permit
Natural gas pipeline	Residential, Agricultural, Public/Quasi-Public, Commercial, Industrial, Open Space, Parks and Recreation	No	Not applicable to public utility easements for pipelines	No	Improvement Plans/Encroachment Permit
Recycled water pipeline	Public/Quasi-Public	No	Public/Quasi-public	No	Improvement Plans/Encroachment Permit
Sanitary sewer pipeline	Public/Quasi-Public	No	Public/Quasi-public	No	Improvement Plans/Encroachment Permit
Storm water outfall	Public/Quasi-Public	No	Public/Quasi-public	No	Improvement Plans/Encroachment Permit

8.6.2.1 Significance Criteria

Criteria used in determining whether project-related land use impacts are significant are consistent with standard industry practice and California Code of Regulations Title 14, SEC 15065. An impact is determined to be significant if it does the following:

- Physically divides an established community
- Conflicts with any applicable land use plans, policies, or regulations of an agency with jurisdiction over the project (including, but not limited to, the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating and environmental effect
- Conflicts with any applicable habitat conservation plan or natural community's conservation plan

8.6.2.2 Potential Effects on Land Use

This section discusses general project effects on land use, followed by the specific potential effects of each project element. As shown in Table 8.6-1, neither the project nor any of its associated facilities will require a General Plan or WRSP amendment or a zoning reclassification. An encroachment permit or utility easement will be required from the City of Roseville for the natural gas pipeline route and the sanitary sewer pipeline.

Consistency with the General Plan and Zoning Ordinance

The proposed REP is consistent with the goals and policies of the City of Roseville General Plan and the proposed WRSP. The power plant was considered as a land-use element in the development of the WRSP and the surrounding WRSP land uses were planned with the understanding that a power plant would be developed on the REP site.

Development of a baseload power plant is consistent with several of the goals in the General Plan. For example, the General Plan's Land Use Element identifies proactive management and planning for growth as a primary Growth Management goal. By constructing the proposed REP, the city will be proactively providing the energy required to meet its existing and anticipated growth. Furthermore, Public Facilities Goal 1 in the General Plan is to "maintain a municipal electric utility that provides an efficient, economical, and reliable electric system." Goal 2 is to "provide electric services to all existing and future Roseville development through the City's electric utility." Goal 3 is to "maintain adequate resource reserves consistent with industry standards, sound utility planning, and applicable contracts." Policy 1 for achieving the goals is to "secure new electric resources and transmission as necessary to meet projected demand levels." Development of the REP will help the City achieve these goals and this and other policies.

The General Plan designation for the proposed project site is public/quasi-public. This designation is intended to be used for municipal, governmental, or public facilities. According to the General Plan, the public/quasi-public designation is used to establish areas for education, religious assembly, governmental offices, municipal corporation yards, and other public uses, including intensive public uses (City of Roseville 1992).

In addition, all planned adjacent land uses are consistent with the Roseville General Plan. According to the General Plan's table on the compatibility of adjacent land use designations (Table II-12, Roseville General Plan), compatible land uses for P/QP districts include neighborhood commercial, community

commercial, and open space, with park and recreation; low-, medium-, and high-density residential uses; business professional; light industrial; and industrial uses as conditionally compatible. Adjacent uses to the REP include P/QP (the PGWWTP), general industrial, and park and open space uses.

Power Plant Site

The proposed project site will not have a significant impact on the surrounding area under the CEQA thresholds presented above. The project will be located in a public/quasi-public utility district that is currently adjacent to a waste water treatment plant, a compatible land use. There are three rural residential uses to the north of the project. One is a dog kennel, and the other two are associated with agricultural uses within unincorporated Placer County. County planning and zoning policies consider industrial uses to be compatible with agricultural uses. All other existing uses near the project site are agricultural.

Project development will be compatible with the general industrial uses that will develop along its western boundary under the WRSP. Regional parkland will separate the project site from residential properties to the east.

Natural Gas Pipeline

The proposed natural gas pipeline routes include placement of the pipeline under Baseline Road, Country Club Drive, Pleasant Grove Boulevard, Fiddyment Road, and Blue Oaks Boulevard or within the public utility easement adjacent to the roadway set aside for such purposes. Since the pipeline will be buried, it will not directly or permanently affect surrounding land uses.

Pipeline construction will occur in segments. As a result, impacts from construction will be of short-term duration, lasting only for the several days required to open the street and lay the line. Temporary, indirect impacts may include traffic slow-downs and/or rerouting; however, plans will be in place to ensure that access is provided for emergency vehicles (police, fire, and ambulances).

Baseline Road functions as a major arterial roadway within the City of Roseville and carries large volumes of traffic during peak hours. To reduce construction impacts, lane closings on Baseline Road will be limited in terms of their timing and distance. Once the pipeline is completed, there will be no impacts to local transportation patterns. Please refer to Section 8.12 for a detailed discussion of traffic and transportation impacts.

Fiddyment Road also functions as a major arterial roadway within the City of Roseville and carries large volumes of traffic during peak hours. To reduce construction impacts, lane closings on Fiddyment Road will be limited in terms of timing and distance. Once the pipeline is completed, there will be no impacts to local transportation patterns. Please refer to Section 8.12 for a detailed discussion of traffic and transportation impacts.

The City of Roseville's General Plan does not specifically address the regulation of underground utilities. Since local zoning regulations do not apply to street rights-of-way, the proposed natural gas pipeline will not conflict with local zoning regulations. The only permit required for construction of the gas pipeline will be an encroachment and street opening permit issued by the City of Roseville.

Recycled Water Pipeline

The recycled water pipeline crosses Phillip Road from the PGWWTP, and its use is compatible with the power plant, the PGWWTP, and the general plan and zoning policies for public utility uses, as discussed above for the power plant. As part of the development of West Roseville, this segment of Phillip Road

will be converted into a private drive that will serve the power plant and PGWWTP. Pipeline construction will be brief; as a result there will be little inconvenience to local traffic during construction of this feature (assuming that this feature is constructed before this portion of Phillips Road becomes a private drive).

Sanitary Sewer Pipeline

The sanitary sewer pipeline serving the power plant will be constructed between the REP site and the PGWWTP lift station along Phillip Road; and its use is compatible with the power plant, the PGWWTP, and the general plan and zoning policies for public utility uses, as discussed above for the power plant. At most, some traffic delays or rerouting may be required for a brief period of time to accommodate the construction work.

Storm Water Outfall

The storm water outfall pipeline serving the power plant will be constructed between the REP site and the unnamed drainage east of the project site; its use is compatible with the power plant, the PGWWTP, and the general plan and zoning policies for public utility uses, as discussed above for the power plant.

Parcel Consolidation

Since the REP is located on three individual and separate legal parcels, all under City ownership, Roseville Electric will convert the separate parcels into one parcel through a voluntary lot merger process pursuant to Section 18.10.010 of the Roseville Subdivision Ordinance. Although the City of Roseville owns all of these parcels, it is not permitted for buildings of any kind to cross parcel boundaries, regardless of ownership. This voluntary merger will be processed by the City Planning Department and is anticipated to be completed in spring of 2004.

Affordable Housing

The proposed project site for the REP is not suitable for residential housing because of the 1000-foot buffer for residential use that surrounds the PGWWTP. The WRSP, however, includes a requirement that 10 percent of all residential units be affordable to low-, very low-, and middle-income households. The site for the REP was included in the WRSP land use plan as a location for power generation facilities. Therefore, the REP will not impact the City of Roseville in meeting its future demand for housing and the regional allocation of housing needs.

8.6.2.3 West Roseville Not Annexed

If the West Roseville annexation is denied or delayed indefinitely, the only significant differences in the project design would be the following: 1) natural gas pipeline alternative B1 would be the preferred route, and 2) RE would construct a double-circuit 60 kV transmission line to connect the project with the Fiddyment Receiving Station. The route for this transmission line would be the same as for gas pipeline route B1. Beginning at the REP site, the route would run south, then east on Phillip Road. It would then turn south on Fiddyment Road and run to the Fiddyment Receiving Station. In terms of land use and local permitting jurisdictions, the natural gas pipeline and the transmission line would be located under Placer County's jurisdiction along Phillip Road between the City's property boundary east of the REP and Fiddyment Road. The gas pipeline and transmission line would be in City jurisdiction along Fiddyment Road, Pleasant Grove Boulevard, Country Club Drive, and Baseline Road. This routing difference would cause no significant adverse impacts to land use.

8.6.3 Cumulative Impacts

The installation of the REP will not cause significant impacts to land use. Neither will it cause land use impacts that would be individually insignificant, but could be cumulatively significant, considered in conjunction with other development in the area. Development most likely to cause significant cumulative effects in conjunction with the REP would be adjacent to the project area. This would include West Roseville, the development of which has been considered carefully under the WRSP with the power plant activity in mind. Though it is possible that the area immediately north of the REP could be developed in the future, this area is proposed to be included in the City of Roseville's sphere of influence. For this reason, it would be developed in accordance with the Roseville General Plan and zoning ordinances and also with the understanding that the REP is a planned use (if planning and development takes place before or during REP construction). Therefore, cumulative impacts are unlikely.

The REP is also not a land use that would induce additional growth, either individually or cumulatively with other energy facility developments. The REP is planned to serve the City of Roseville's existing and anticipated electrical load through the City's municipal electrical utility, Roseville Electric, which has a legal obligation to provide power to the citizens of Roseville. The REP is responding to appropriately planned future growth within the RE's service territory.

8.6.4 Proposed Mitigation Measures

No mitigation measures are necessary for land use compliance.

8.6.5 Applicable Laws, Ordinances, Regulations, and Standards

All applicable laws, ordinances, regulations, and standards, as well as their conformance measures, are detailed in the text below and summarized in Table 8.6-2. Table 8.6-3 presents the involved agencies and agency contacts. Table 8.6-4 summarizes the land use permit schedule.

Table 8.6-2. Laws, ordinances, regulations, and standards (LORS).

Jurisdiction	Authority	Applicability	AFC Section Where Conformance is Discussed
State	CA Streets and Highways Code, Division 2, Chapter 5.5, Sections 1460-1470	Improvement Plan/Encroachment permit may be necessary for construction of portions of the natural gas, recycled water and sanitary sewer pipelines	Section 8.6.2.2
Local	Placer County General Plan	Development within the jurisdiction of the County is subject to provisions in the General Plan.	Section 8.6.2.2
	Roseville Municipal Code, Subdivision Ordinance 18.10.010	Voluntary merger of the REP parcel's three lots	Section 8.6.2.2
	City of Roseville General Plan	Development within the jurisdiction of the city is subject to provisions in the General Plan.	Section 8.6.2.2

8.6.5.1 Federal

There are no federal LORS applicable to land use for this project

8.6.5.2 State

State LORS that apply to this project include the following:

Warren-Alquist Energy Resources Conservation and Development Act

Provisions in the Warren-Alquist Energy Resources Conservation and Development Act (Public Resources Code [PRC] 25000 et seq.) are directly and indirectly related to land use. The provisions state, among other things, the following:

> The following areas of the state shall not be approved as a site for an energy generating facility, unless the commission finds that such use is not inconsistent with the primary uses of such lands and that there will be no substantial adverse environmental effects and the approval of any public agency having ownership or control of such lands is obtained: (a) State, regional, county and city parks; wilderness, scenic or natural reserves; areas for wildlife protection, recreation, historic preservation; or natural preservation areas in existence on the effective date of this division; and (b) Estuaries in an essentially natural and undeveloped state. In considering applications for certification, the commission shall give the greatest consideration to the need for protecting areas of critical environmental concern, including, but not limited to, unique and irreplaceable scientific, scenic, and educational wildlife habitats; unique historical, archaeological, and cultural sites; lands of hazardous concern; and areas under consideration by the state or the United States for wilderness, or wildlife and game reserves. (PRC §25527)

The proposed project will conform to PRC §25527 because project lands are not located in such areas.

California Streets and Highways Code

Under the California Streets and Highways Code, Division 2, Chapter 5.5, Sections 1460-1470, an encroachment permit is required if there is an opening or excavation for any purpose in any street or highway. As a City project, the REP will conform to Section 1460-1470 by securing approval of improvement plans and obtaining an encroachment permit from the Roseville Public Works Department before pipeline construction.

California Subdivision Map Act

In order to merge the lots associated with the REP project site, the city must follow the Subdivision Map Act, (Sections 66428(a)(2) and 66499.20 ¾) and the City's Subdivision Map Ordinance (Section 18.10.010), as applicable.

8.6.5.3 Local

Local LORS that will apply to the project include the following:

General Plan(s)

Land use provisions must be included in every California city and county General Plan (Government Code §65302). Local governments may also adopt plans for sub-areas such as communities and neighborhoods (for example, the WRSP) and may adopt "special area plans" that detail implementation measures for an area requiring concentrated planning attention (e.g., an historical district).

The proposed project is located in an area zoned for P/QP use; it is consistent with the intended uses, plans, and policies of the PQ/P land use designation; and will conform to the Roseville General Plan. The generation facility will be the only use visible after construction (because the pipelines will be buried). The project will not affect existing uses or opportunities in the areas designated P/QP because it will be located on land that is currently designated P/QP by the general plan.

Zoning Ordinance

Zoning is the regulatory mechanism used to implement land use policy. Most city planning and building departments enforce zoning ordinances. The proposed project is subject to the Roseville Zoning Ordinance and will comply with it. Both Roseville and Placer County zoning designations in the project area are shown on Figure 8.6-2. The project site is currently zoned under the City of Roseville Zoning Ordinance as Public/Quasi-Public, a district that allows general power production facilities, such as the REP as a permitted use.

8.6.6 Involved Agencies and Agency Contacts

Table 8.6-3 contains a list of agencies and contact persons.

Table 8.6-3. Agencies and contact persons.

Agency	Contact	Title	Telephone
City of Roseville	Paul Richardson	Planning Director	(916) 774-5276
City of Roseville	Mark Shellito	Parks and Recreation Director	(916) 774-5249

8.6.7 Permits Required and Schedule

Table 8.6-4 outlines the permit schedule related to land use issues for the REP. Information required to obtain each permit is also included.

Table 8.6-4. Permit/application schedule for land use.

Permit/Application	Schedule
Structural/Building Permit	30 days
Plumbing Permit	30-60 days
Electrical Permit	30-60 days
Grading Permit	30-60 days
Improvement Plans/Encroachment permit for pipelines: • Site specific plan • Pipeline routes • Road rights-of-way where pipelines will be constructed	1 to 2 weeks from application submittal to approval by Public Works Department

8.6.8 References

City of Roseville. 2003a. West Roseville Specific Plan Draft, September 15, 2003. Prepared by EIP Associates. Prepared for City of Roseville.

——2003b. Draft Environmental Impact Report for the West Roseville Specific Plan and Sphere of Influence Amendment. Prepared by EIP Associates. Prepared for City of Roseville.

——1996. City of Roseville Zoning Ordinance. Roseville Municipal Code.

——1992. General Plan. Last updated January 2003.

Placer County. 2003. Office of Economic Development. Placer County Economic and Demographic Profile 2003. Internet site: www.placer.ca.gov/business/2003-edp/econ-demo-profile.htm Accessed July, 2003.

——1994. Placer County General Plan.

SACOG. 2003. 2003/05 Metropolitan Transportation Improvement Program. Internet site: http://www.sacog.org/mtip/mtip_detail.pdf. Accessed July, 2003.

8.7 NOISE

This section presents an assessment of potential noise effects related to the Roseville Energy Park (REP). This assessment includes an evaluation of the potential effects on the closest sensitive receptors and plant operations personnel. Conformance of the project to the City of Roseville's Noise Ordinance and General Plan Noise Element standards, as well as the Placer County General Plan noise standards, is also assessed. Section 8.7.1 discusses the affected environment, including baseline noise level survey methodology and results. Section 8.7.2 discusses the environmental consequences from construction and operation of the power plant and associated facilities. Section 8.7.3 discusses cumulative impacts. Section 8.7.4 discusses mitigation measures. Section 8.7.5 presents applicable laws, ordinances, regulations, and standards. Section 8.7.6 presents agency contacts, and Section 8.7.7 presents permit requirements and schedules. Section 8.7.8 contains references.

8.7.1 Affected Environment

The proposed REP site is located within the city limits of Roseville in an area zoned Public/Quasi Public immediately north of the Pleasant Grove Waste Water Treatment Plant (PGWWTP). The surrounding area sustains rural agricultural uses including three rural residences within a 0.5-mile radius of the site. All three of these residences are outside the Roseville city limits in Placer County. The closest suburban residential area, Del Webb Sun City Roseville, is about 1.25 miles to the east. Future plans for the area include a mixture of high- and low-density residential, commercial, industrial, recreational parks and schools, as described in the West Roseville Specific Plan Draft (WRSP) (City of Roseville 2003a).

Ambient noise levels in the project area are currently relatively low, due to the current lack of residential, commercial, and industrial development. Future ambient noise levels near the site should be higher than current levels (even without the REP), because PGWWTP will begin operation and because the build-out of the WRSP in the areas to the west, east, and south of the REP for industrial, commercial, and residential uses will bring traffic and other human activity to the area.

The CEC's power plant certification regulations require that noise measurements be made at noise-sensitive locations near the project site. Locations chosen for noise monitoring included places near the three rural residences that are located within 0.5-mile of the power plant site. Ambient noise level measurements were also made at one location on the power plant site boundary not located near any sensitive receptor. There are no other sensitive receptors within 0.5-mile of the project.

The survey was conducted at the four locations on July 10 and 11, 2003. The monitoring locations are shown in Figure 8.7-1. A brief description of each monitoring location and the types of sounds heard during the survey are presented below. Photographs of each location are presented in Figures 8.7-2 through 8.7-5.

Location 1—This site is located near a residence and dog kennel northwest of the REP site at 5480 Phillip Road (Figure 8.7-2). The microphone was mounted on a fence post about 100 feet south of the house and 330 feet east of Phillip Road (Lat. N 38°47'39.3"; Long. W 121°23'06.8"). The primary source of noise in this location is the barking of dogs housed in an on-site kennel. Indoor kennel spaces are located near to the northern property boundary, 300 or more feet from the microphone. Outdoor pens are located relatively close to the microphone (within 50 feet). Secondary sources include intermittent traffic on Phillip Road, occasional aircraft, and infrequent noise related to construction of the PGWWTP.

The residence at Location 1 is approximately 1,115 feet northwest of a point midway between the two heat recovery steam generator (HRSG) stacks of the power plant.

Location 2—This site is located near a residence due north of the REP site at 5490 Phillip Road (Figure 8.7-3). The microphone was mounted on a fence post about 280 feet south of the house and about 0.25-mile from Phillip Road (Lat. N 38°47'43.0"; Long. W 121°22'54.3"). The primary source of noise in this location is the barking of dogs housed in the kennel at Location 1. Secondary sources include intermittent traffic on Phillip Road, occasional aircraft, and infrequent noise related to construction of the PGWWTP. The residence at Location 2 is approximately 1,125 feet north of a point midway between the two HRSG stacks of the power plant.

Location 3—This site is located near a residence northeast of the REP site at 4900 Phillip Road (Figure 8.7-4). The microphone was mounted on a fence post about 200 feet southwest of the house near the owner's gate and over 0.25-mile north of Phillip Road (Lat. N 38°47'43.2"; Long. W 121°22'42.3"). The primary sources of noise in this location are birds and insects. Secondary sources include intermittent traffic on Phillip Road, occasional aircraft, and infrequent noise related to construction of the PGWWTP. The residence at Location 3 is approximately 1,815 feet northeast of a point midway between the two stacks of the power plant. Large trees in the Pleasant Grove Creek riparian corridor are located between the monitoring location and the residence.

Location 4—This site is located on the center point of the south boundary of the site about 50 feet north of Phillip Road (Figure 8.7-5). It is not located near any sensitive receptor and was selected to provide data representative of traffic on Phillip Road. The microphone was mounted on a fence post 50 feet north of Phillip Road (Lat. N 38°47'30.3"; Long. W 121°22'54.3"). The primary source of noise in this location is intermittent traffic on Phillip Road. Secondary sources include low-level pump noise at the PGWWTP, air conditioning units on distant construction trailers, birds, insects, occasional aircraft, and infrequent noise related to construction of the PGWWTP. The monitoring location is approximately 440 feet south of a point midway between the two HRSG stacks of the power plant.

8.7.1.1 Noise Survey Methodology

Continuous measurements of the A-weighted sound levels were made simultaneously over a complete 25-hour period using four (4) Larson-Davis Laboratories Model 820 sound level meters (LDL 820) with integral data loggers. The instruments meet the requirements of ANSI S1.4-1983 for Type I precision sound level meters. The Larson-Davis Model 2561 half-inch prepolarized random incidence microphones were remotely mounted (via a 10-foot microphone extension cable and preamplifier) approximately 5 feet above the ground. Foam windscreens, 3½ inches in diameter, were used to reduce wind-generated noise.

The calibration levels of the instruments were checked before and after the 25-hour monitoring period using a B&K Type 4231 sound level calibrator. The analyzers were internally timed to turn on and off automatically at the same time on the start and stop days, respectively. They were generally unattended during the monitoring period, but the monitoring technician did visit each site four times to make observations of sounds heard and general weather conditions. Observations were made during the first hour between 1100 and 1200, in the afternoon between 1630 and 1730, late at night between 0200 and 0300, and late-morning between 1100 and 1130.

The LDL 820s were programmed to measure and record the equivalent sound level (L_{eq}) for each minute of the 25-hour period as well as tp compute and store the statistical sound levels exceeded 10, 50, and 90 percent of each hour (L_{10}, L_{50} and L_{90}). The L_{eq} for each hour of the period was also computed and recorded. At the end of the 25-hour period, the data were downloaded directly into a laptop computer for storage and further analysis, including computation of the 24-hour L_{eq}, day/night level (L_{dn}), and the community noise equivalent level (CNEL). A spreadsheet program was used to generate graphs of the data. One graph was produced of the 1-minute L_{eq} levels to show the often rapid variation in sound levels experienced in outdoor environments. Another graph was produced of the hourly L_{eq} levels and the L_{10}, L_{50} and L_{90} statistical sound levels, showing all four curves in the same plot.

8.7.1.2 Noise Survey Results

Weather conditions during the survey were mild to hot, with temperatures ranging from 69 degrees at night to 101.5 degrees during the day. Relative humidity levels ranged from 20 percent during the day to 58 percent during the night. Winds were light, ranging from 1 to 5 mph, and the direction varied from southeast to west. The skies were clear throughout the survey period.

The hourly L_{eq} levels along with the three commonly used 24-hour composite noise descriptors of the continuous A-weighted sound levels are presented in Table 8.7-1 for the four monitoring locations. The average nighttime L_{90} for the locations is also presented on the bottom row of the table. The 24-hour L_{eq} or ambient levels, which represent all the noise present, range from 40.8 to 47.1 dBA at the residences. The L_{90} or background levels range from 35.6 to 37.6 dBA at the three residential receptors.

Graphs showing noise levels at the four monitoring stations are presented in Figures 8.7-6 through 8.7-9. The first graph in each figure is a plot of the 1-minute L_{eq} levels. The effects of individual noise events, such as the passage of trucks on Phillip Road, jet aircraft, and dogs barking can be seen as tall spikes in these graphs. The second graph for each location shows the hourly equivalent noise levels and the statistical levels exceeded 10, 50 and 90 percent of each hour (L_{eq}, L_{10}, L_{50} and L_{90}). The L_{90} pattern at all four monitoring locations (lower curve of the lower graphs) is typical of remote areas distant from significant traffic and other manmade noises. The level does not decrease significantly at night because there is relatively little human activity during the day. The noise levels actually rise a little at night and rise additionally in the early morning.

In the upper graphs, the frequency of occurrence of the tall spikes indicating traffic on Phillip Road and aircraft flying over diminishes at night. The impact of these short-duration, higher-level events affects the hourly L_{eq} levels in the lower graphs much more than the L_{90} levels. In fact, there appears to be no correlation between these spikes and the L_{90} levels. This is because the L_{90} levels are defined by the underlying continuous low-level noise caused by insects and distant sources of noise, rather than by nearby intermittent sources.

The L_{eq} level, from which the L_{dn} and CNEL measures are derived, is almost entirely driven by the intrusive noise events created by traffic and aircraft. The L_{dn} levels at the three residences ranged from 46.5 to 50.4 dBA.

The 1/3 octave band data are presented in Figure 8.7-10 for all four monitoring locations. These data were obtained during the late-night period when ambient noise was at a minimum and again during mid-morning. Levels were integrated over 30-second measurement periods when intrusive noises were at a minimum to the extent practicable. As expected, the nighttime levels are lower than the daytime levels.

The tall peak on the right side of each chart is the C-weighted sound level followed by the A-weighted level computed from the 1/3 octave band data. The high frequency peaks seen near 5,000 Hz are due to insect noise near the microphones.

In summary, the area is relatively quiet at the present time because of its distance from typical urban activities. With the completion of the construction phase of the PGWWTP and the full-time operation of the facility, however, as well as the proposed build-out of the WRSP, noise levels will rise, with or without the proposed power plant. There currently are only three residences within 0.5-mile of the site.

8.7.2 Environmental Consequences

The power plant equipment and construction equipment will generate noise at known levels and the noise generated will dissipate at a predictable rate over distance. A computer model has been used to determine the expected noise levels at sensitive receptor locations around the site. These expected noise levels are then compared to the applicable regulatory standards and impact assessment criteria.

8.7.2.1 Significance Criteria

Following the California Environmental Quality Act (CEQA) guidelines (California Code of Regulations, Title 14, Appendix G, Section XI), the project would cause a significant impact if it would result in the following:

- Exposure of people to noise levels in excess of standards established in the local General Plan or noise ordinance
- Exposure of people to excessive ground-borne noise levels or vibration
- Substantial permanent increase in ambient noise levels in the project vicinity
- Substantial temporary or periodic increase in ambient noise levels in the project vicinity

For the REP site, there are three sets of Laws, Ordinances, Regulations, and Standards (LORS) that may apply. The first, for receptors located in the city limits of Roseville, is the City of Roseville General Plan Noise Element performance standards for fixed sources, which limit L_{eq} noise levels to 50 dBA during the day and 45 dBA at night at residences. The second is the City of Roseville Noise Ordinance, which has legally enforceable limits that are 7 dBA above those of the General Plan (i.e., 57 dBA and 52 dBA, respectively) where an industrially zoned area borders a residential area. The third set, for receptors located in County jurisdiction outside the City of Roseville, is the Placer County General Plan noise guidelines that limit L_{dn} noise levels to outdoor exposure levels of 70 dBA for single-family residences in a Farm district. The County General Plan also limits L_{dn} noise levels to 60 dBA in a residential district located adjacent to an industrial district. These L_{dn} levels equate to L_{eq} levels of 63.6 and 53.6 dBA, respectively, for continuous steady-state noise sources such as those approached by the REP. The plan also limits indoor noise levels to an L_{dn} of 45 dBA in such areas. The County does not currently have a noise ordinance. All of these criteria are presented in greater detail in Section 8.7.5, "Applicable Laws, Ordinances, Regulations and Standards."

To be in full compliance with LORS, the plant must be designed to meet the most stringent applicable level. Since the closest sensitive receptors are all located within unincorporated portions of Placer County, the County's noise standards would apply. The most stringent Placer County General Plan outdoor criterion is an L_{dn} of 60 dBA. Thus, the plant must be designed to meet a level of 53.6 dBA L_{eq}

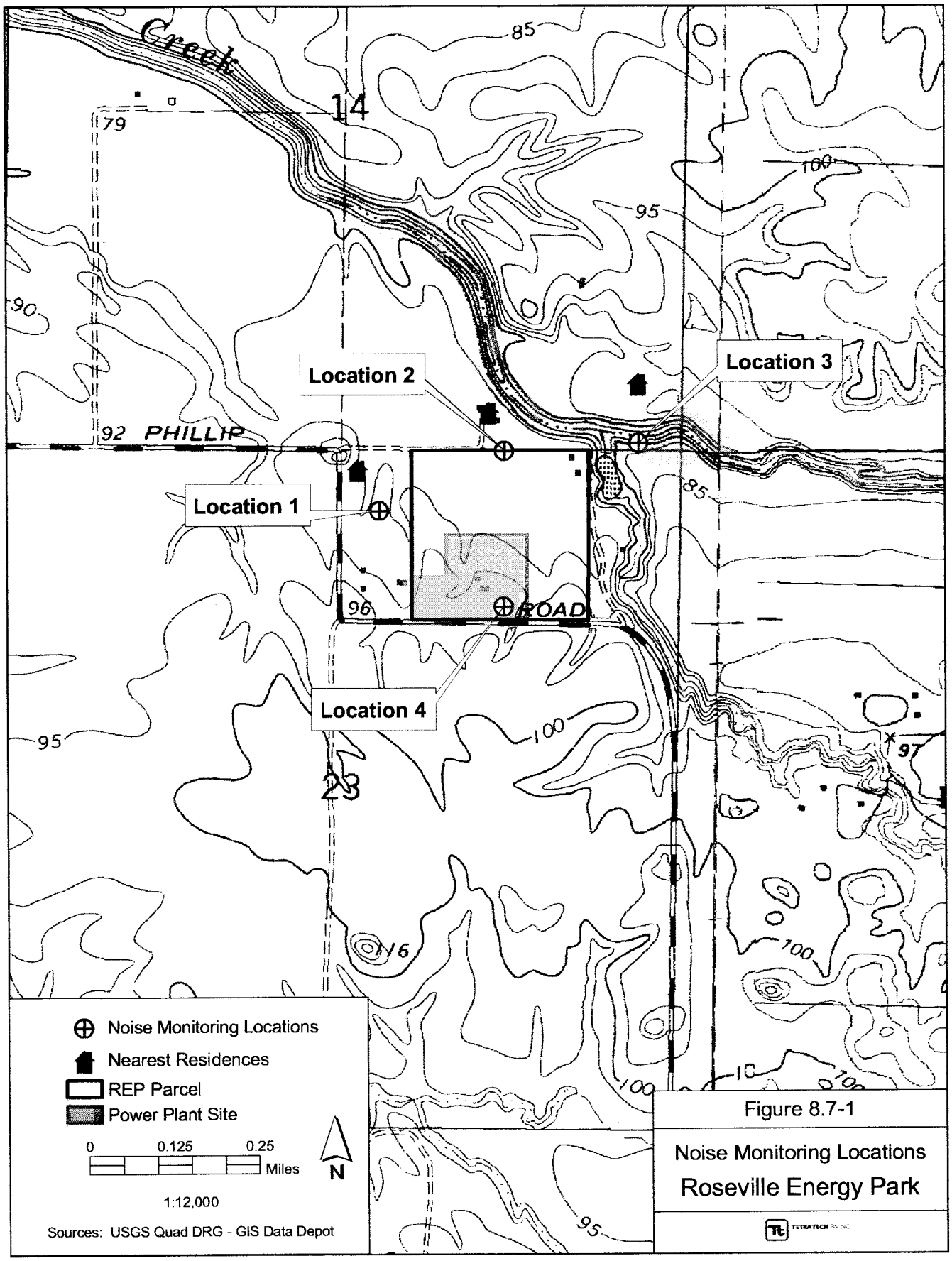


Figure 8.7-1

Noise Monitoring Locations

Roseville Energy Park

Figure 8.7-2. Noise monitoring Location 1.

Figure 8.7-3. Noise monitoring Location 2.

Figure 8.7-4. Noise monitoring Location 3.

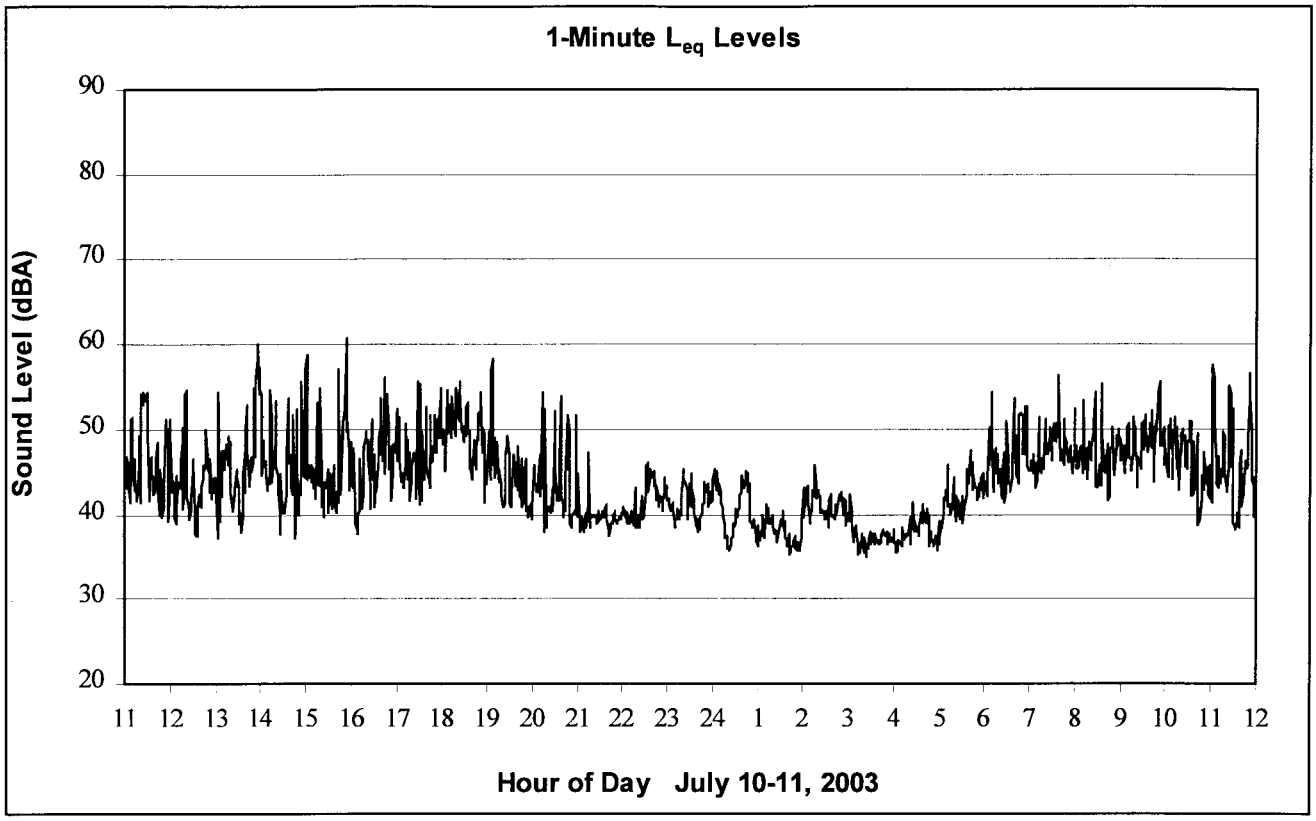
Figure 8.7-5. Noise monitoring Location 4.

Table 8.7-1. Summary of hourly sound levels.

		Location 1 Dog Kennel 5480 Phillip Rd 1115 ft NW				Location 2 Residence 5490 Phillip Rd 1125 ft North				Location 3 Residence 4900 Phillip Rd 1815 ft NE				Location 4 South Boundary of Site 50 ft North of Phillip Rd			
Date	**Hour**	**Leq**	**L10**	**L50**	**L90**	**Leq**	**L10**	**L50**	**L90**	**Leq**	**L10**	**L50**	**L90**	**Leq**	**L10**	**L50**	**L90**
7/10/03	1100	48.3	52.3	44.0	39.6	39.2	39.6	34.0	32.3	44.3	44.7	38.6	35.5	45.8	43.9	39.2	37.5
"	1200	45.8	48.7	42.6	38.4	37.8	38.5	33.9	32.0	43.3	41.3	36.6	32.9	46.0	46.1	39.4	37.4
"	1300	49.8	53.2	44.2	38.9	37.9	38.6	33.9	32.2	43.2	39.1	34.7	32.3	46.4	44.6	38.5	37.1
"	1400	48.0	51.9	43.8	39.2	40.2	40.8	34.8	32.4	42.8	42.7	36.7	33.6	47.0	46.7	39.4	37.5
"	1500	50.2	52.6	43.5	39.6	38.3	40.3	34.7	32.2	41.9	40.4	34.8	32.3	47.2	50.0	39.9	37.5
"	1600	47.9	50.8	43.9	39.0	39.6	42.1	34.8	32.4	38.2	40.2	34.5	32.2	50.2	50.5	40.8	38.5
"	1700	49.0	51.5	45.3	40.6	39.5	39.3	34.8	33.1	39.1	39.6	34.1	32.3	47.4	48.6	40.8	39.0
"	1800	50.7	54.1	48.2	43.1	45.2	42.8	37.0	34.3	37.3	38.5	34.7	33.1	45.2	44.5	41.1	39.5
	1900	47.1	49.4	42.7	40.1	43.2	42.5	38.3	35.8	43.8	39.5	35.6	33.4	46.4	46.8	42.1	40.4
"	2000	46.6	50.6	41.0	38.7	41.8	43.6	37.9	36.0	39.7	39.9	36.4	34.5	48.0	48.9	43.9	41.8
"	2100	40.0	40.8	39.4	38.0	38.0	39.0	37.3	36.2	43.2	40.6	38.9	36.5	45.4	45.6	42.7	41.2
"	2200	42.0	44.9	40.7	38.4	36.4	37.3	36.3	35.2	36.4	37.4	36.3	35.2	46.8	44.6	42.2	40.9
"	2300	41.7	44.2	40.9	38.4	36.2	37.3	36.0	35.1	38.3	38.0	36.7	35.4	42.7	43.9	42.1	40.9
7/11/03	0000	41.6	44.6	40.3	36.6	35.9	37.1	35.7	34.5	36.2	37.4	35.9	35.0	44.1	45.2	41.7	40.1
"	0100	38.1	39.9	37.6	35.5	35.4	36.7	35.3	34.2	35.6	36.8	35.2	34.2	41.9	43.2	41.1	39.6
"	0200	41.2	43.4	40.7	38.4	35.7	36.7	35.6	34.5	37.6	37.2	35.6	34.4	43.1	43.9	41.7	40.1
"	0300	37.5	39.1	36.9	35.4	35.8	36.8	35.6	34.5	35.4	36.5	35.3	34.3	41.4	43.0	41.0	39.5
"	0400	38.1	40.0	37.5	35.7	36.5	37.8	36.2	34.7	36.2	37.7	35.8	34.3	41.9	43.0	40.9	39.4
"	0500	42.5	44.9	41.5	38.3	44.4	46.1	40.4	37.2	49.1	51.7	42.1	39.3	45.3	44.8	42.5	40.8
"	0600	48.0	51.7	44.8	41.7	45.0	45.1	41.7	40.1	46.5	46.4	43.0	40.6	50.3	50.3	44.2	42.2
"	0700	48.1	50.7	46.4	43.8	44.1	44.2	41.6	40.1	45.4	46.7	42.6	41.0	50.3	51.7	44.6	42.7
"	0800	48.1	50.7	45.8	42.9	43.1	43.4	39.2	37.5	43.1	44.4	41.0	38.9	50.1	50.4	43.6	41.3
"	0900	49.3	52.3	47.5	43.4	39.5	41.8	36.7	34.4	42.0	44.5	39.0	36.3	47.4	47.8	41.3	39.3
"	1000	47.2	50.6	45.0	39.6	39.1	41.5	36.3	33.2	39.3	41.7	36.8	33.9	49.6	50.4	42.2	38.9
"	1100	48.7	52.5	44.0	38.9	37.5	37.7	34.5	32.6	39.4	40.3	36.0	32.7	53.7	52.9	41.3	37.0
	Leq(24)	47.1				40.8				42.0				47.8			
	Ldn	50.4				46.5				48.9				52.4			
	CNEL	50.8				46.8				49.1				52.7			
24-hr average			48.0	42.7	39.3		40.3	36.6	34.8		40.8	37.0	34.9		47.0	41.6	39.7
Ave. nighttime hours			43.6	40.1	37.6		39.0	37.0	35.6		39.9	37.3	35.9		44.7	41.9	40.4

Note 1: Nighttime hours are shaded.

Note 2: Hour indicates the hour monitoring begins.



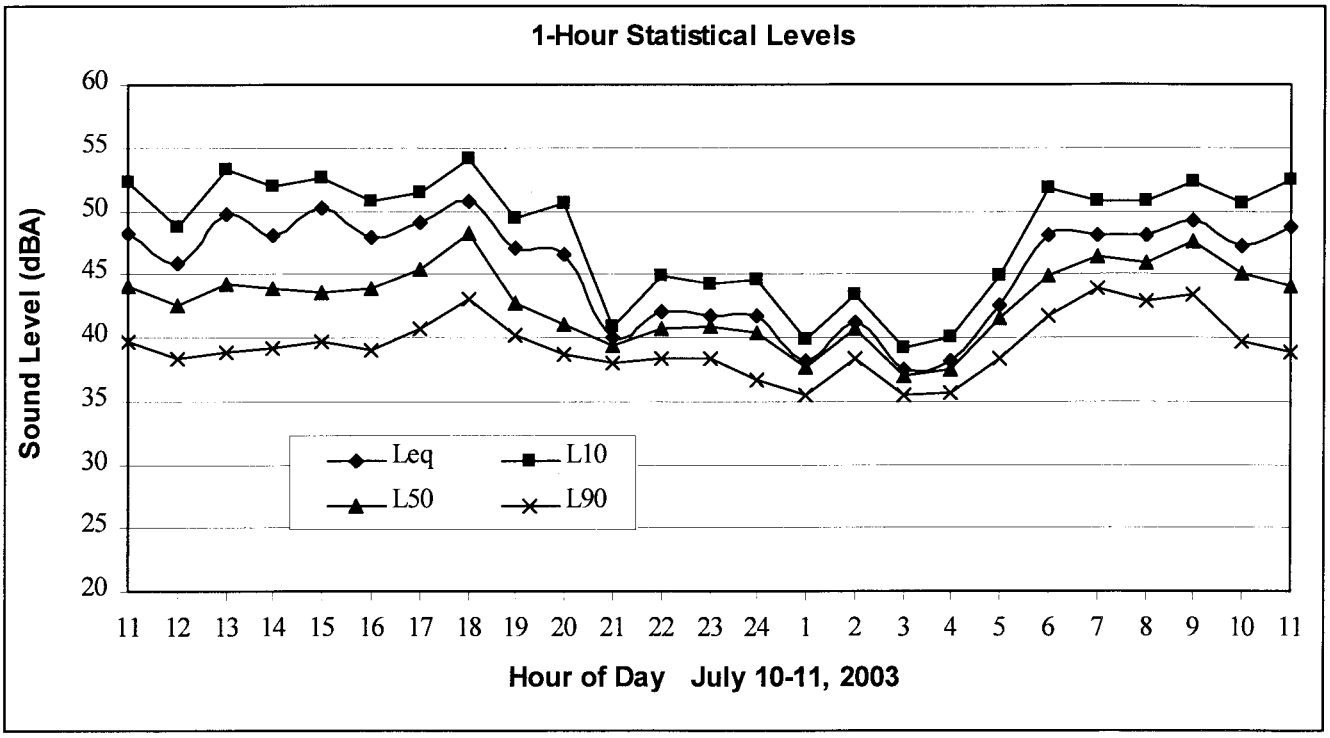
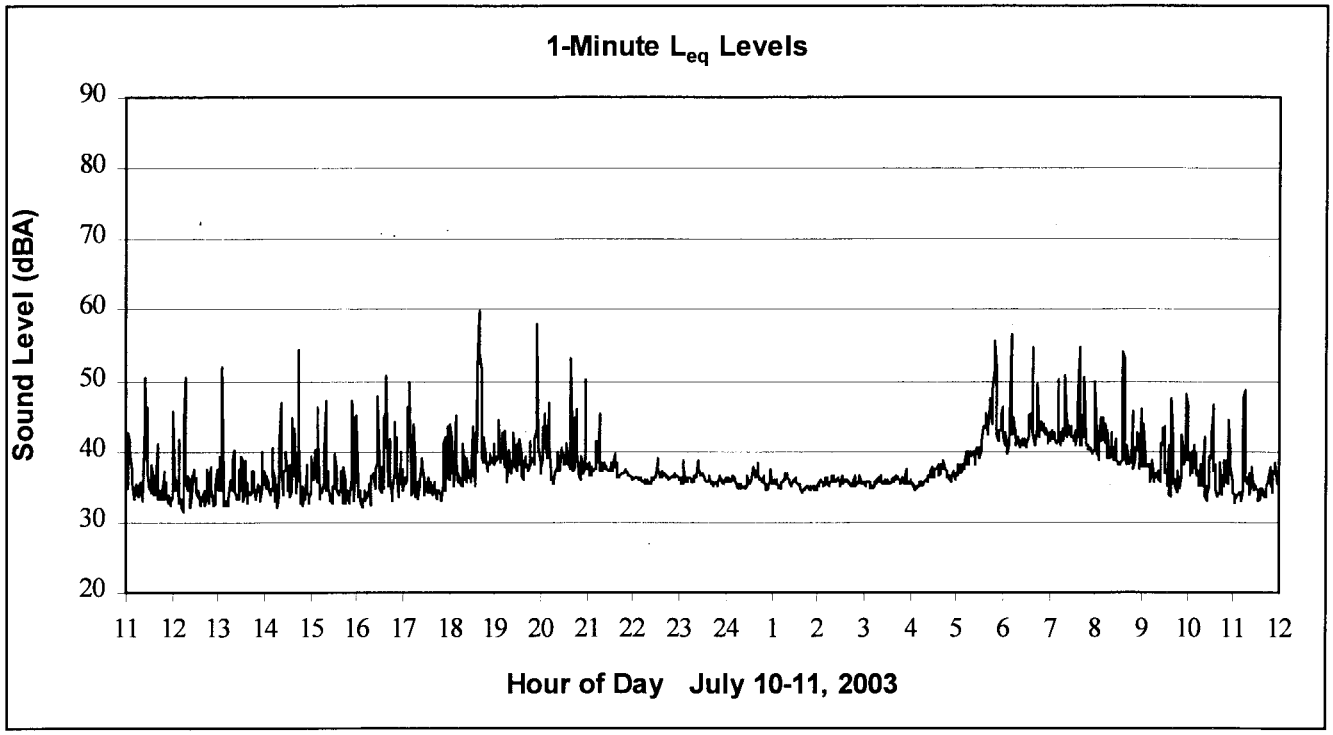


Figure 8.7-6. Location 1: Nearest residence northwest of REP site at 5480 Phillip Road.



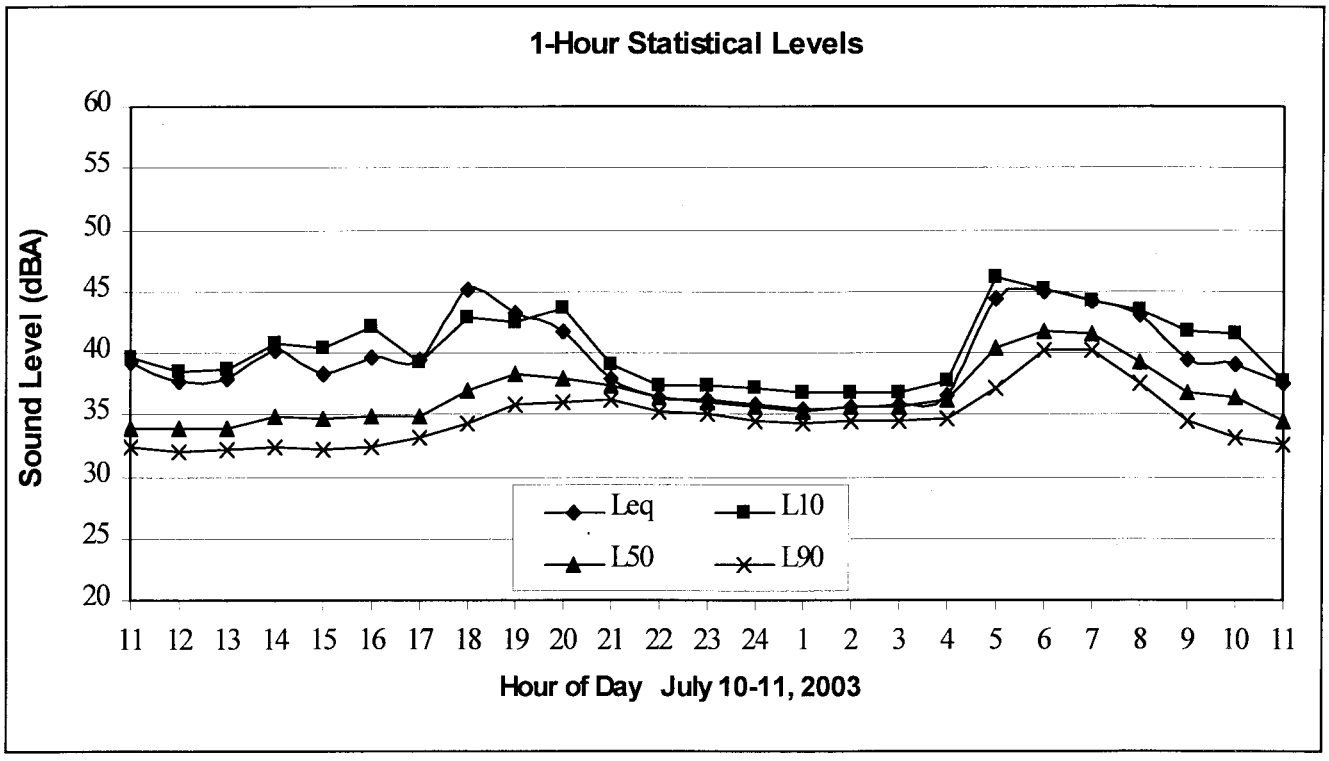
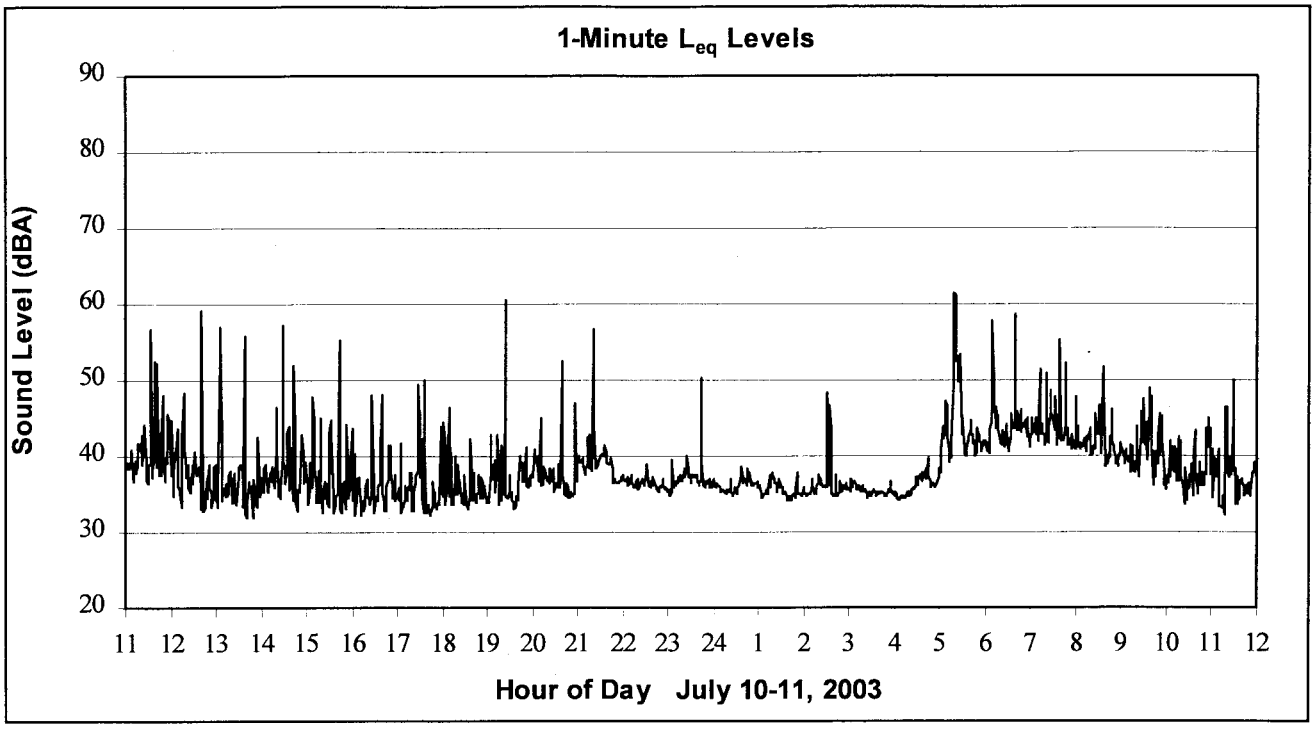


Figure 8.7-7. Location 2: Residence north of REP site at 5490 Phillip Road.



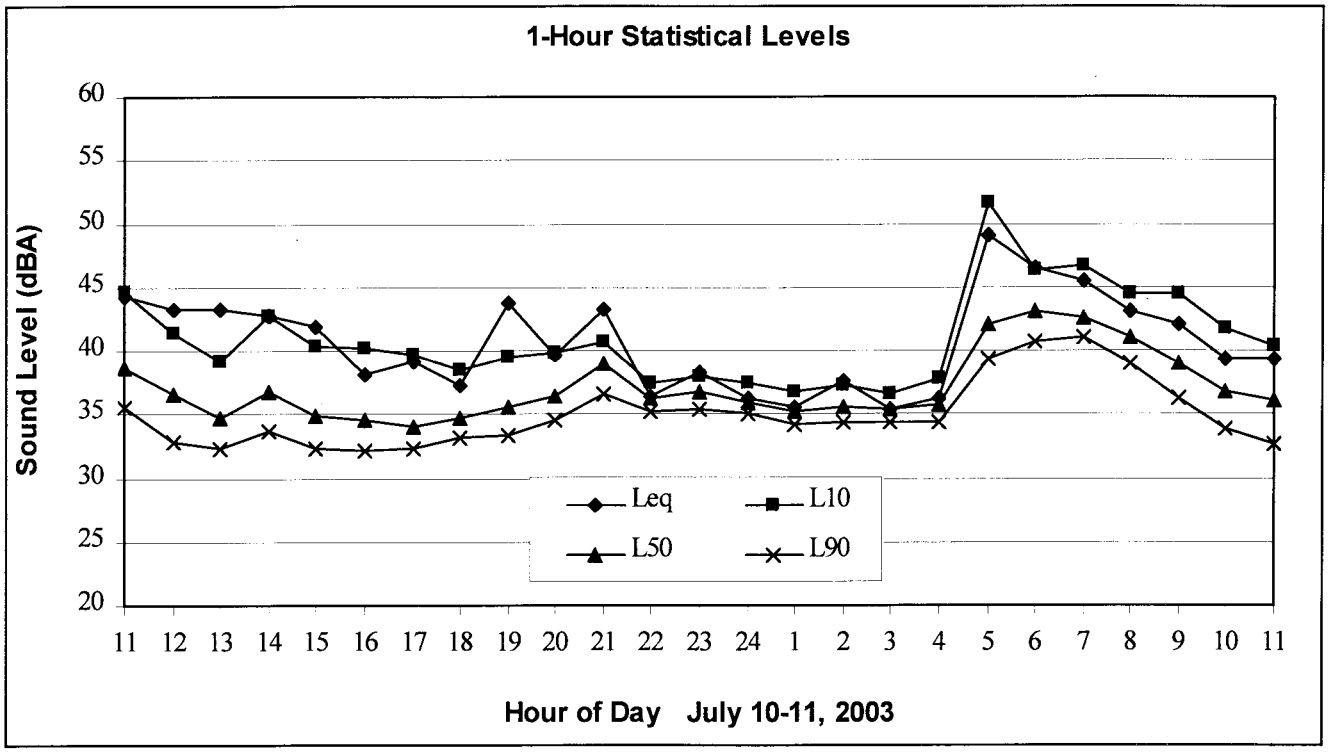
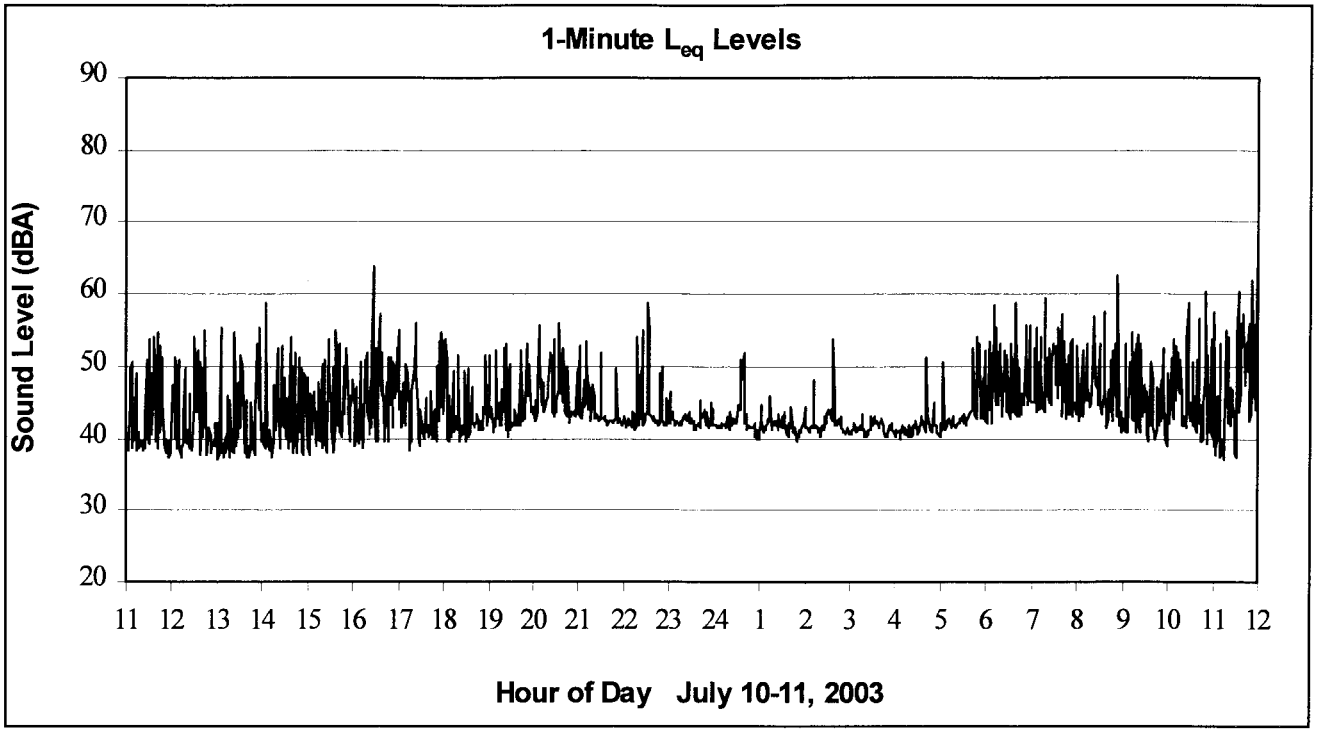


Figure 8.7-8. Location 3: Residence northeast of REP site at 4900 Phillip Road.



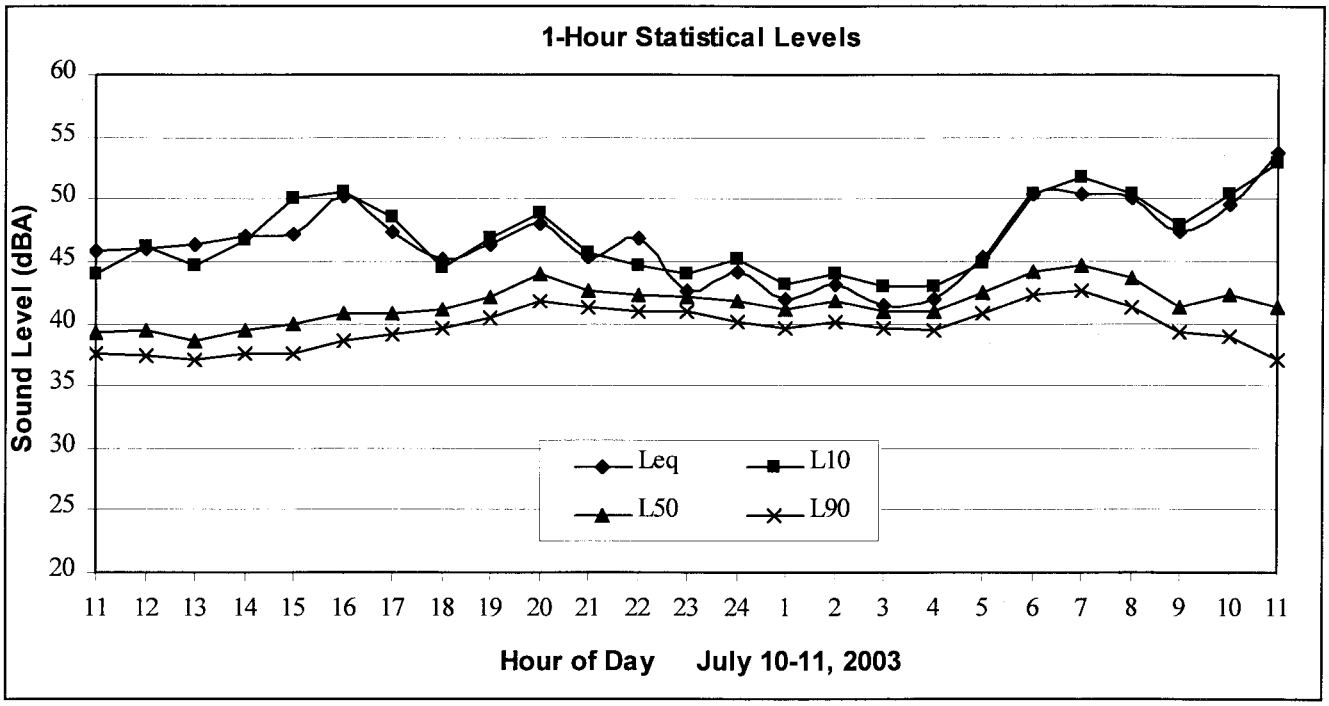
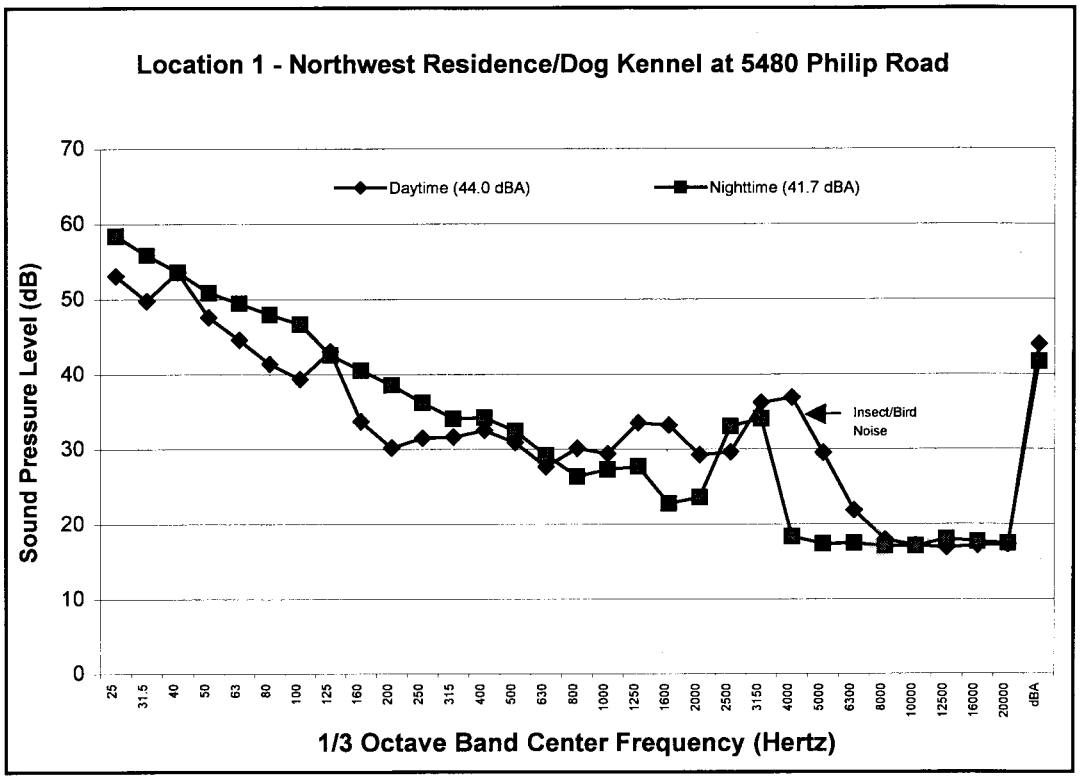


Figure 8.7-9. Location 4: Near south boundary of site.



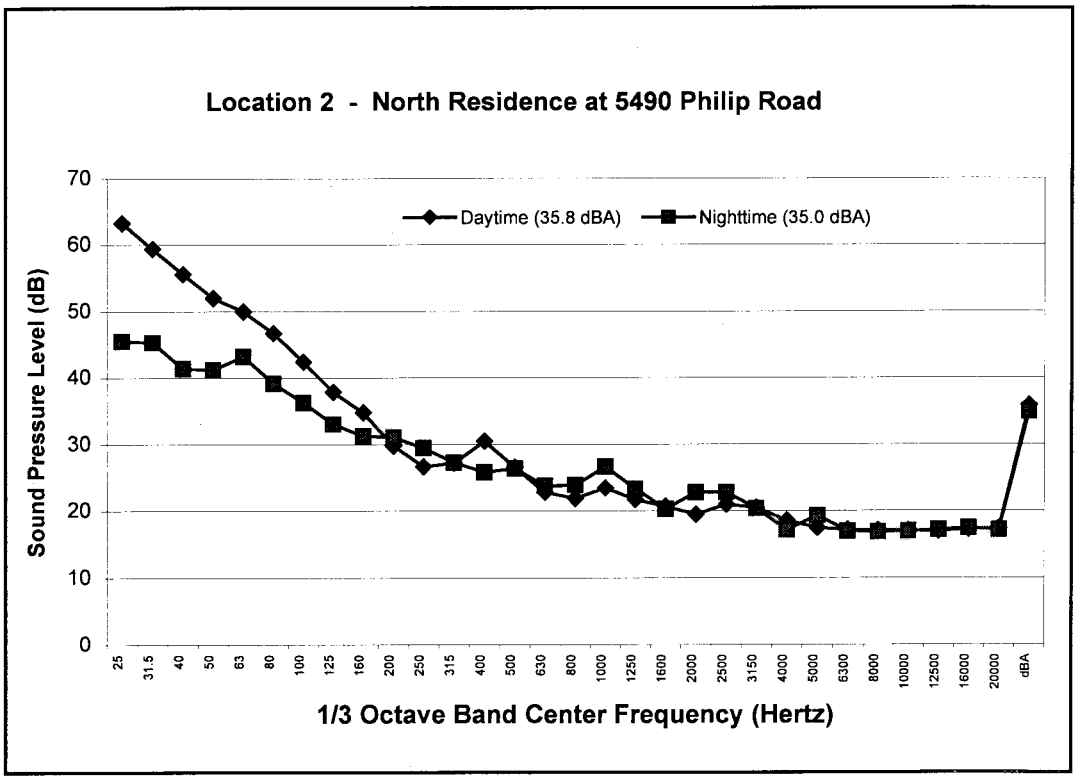
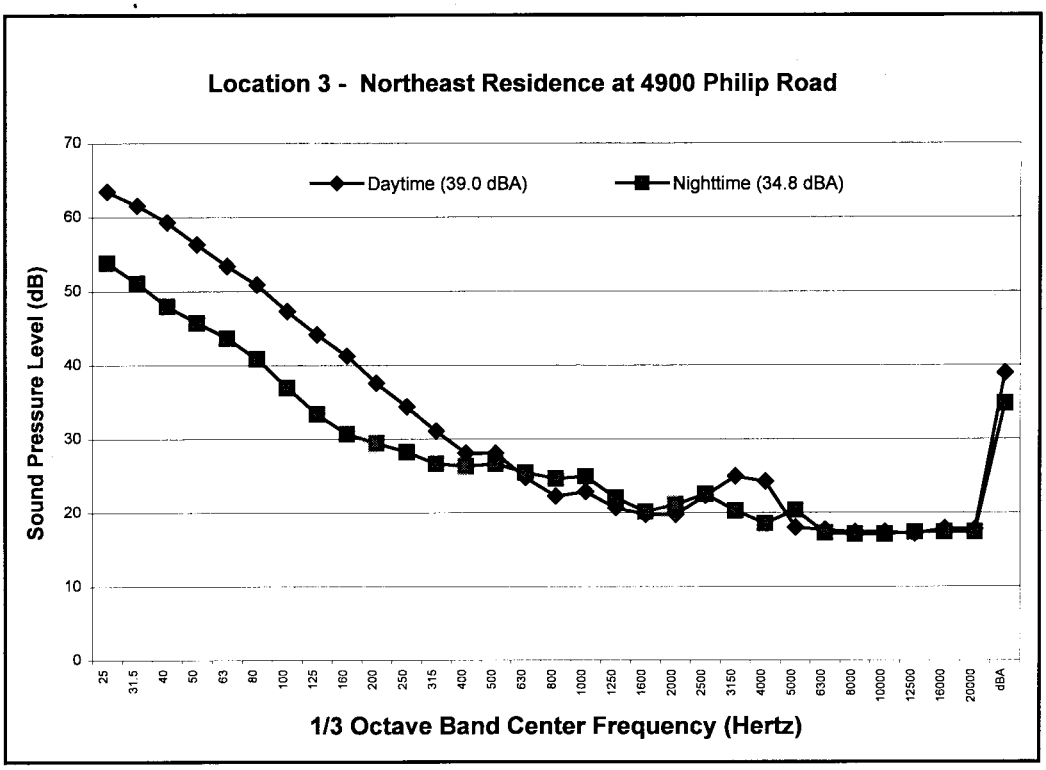


Figure 8.7-10a. One-third octave band levels.



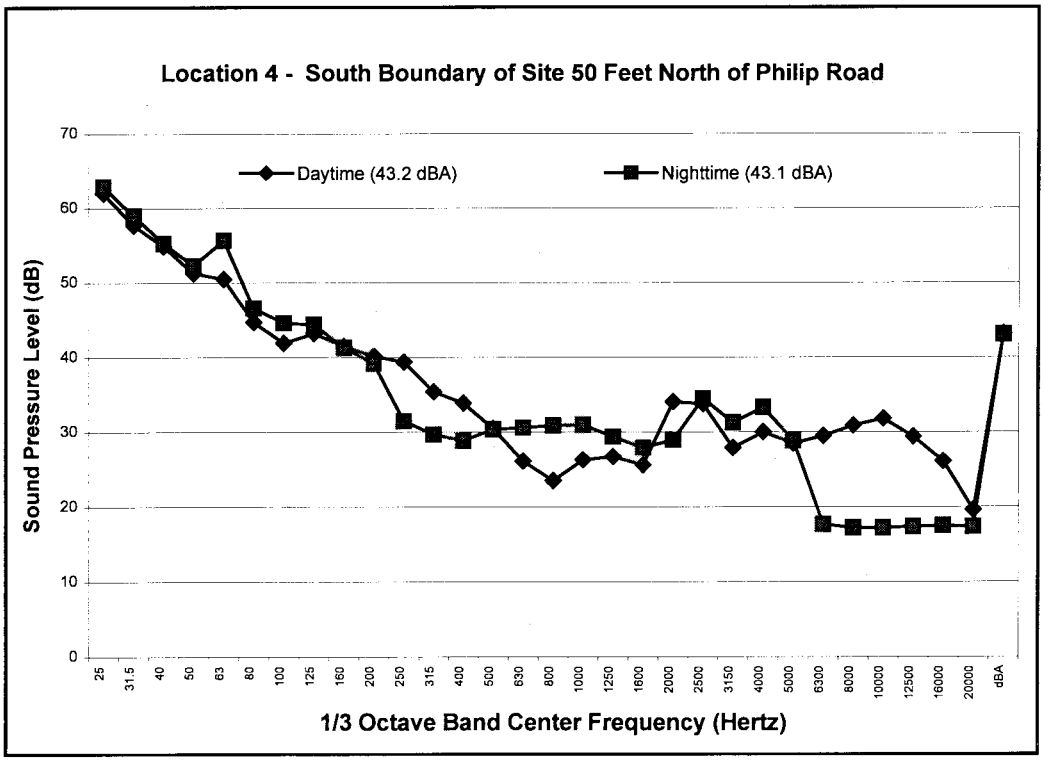


Figure 8.7-10b. One-third octave band levels.

(equivalent to an L_{dn} of 60 dBA) at any existing nearby residence or other sensitive receptor that is located in Placer County (as are all three residences near the project site).

8.7.2.2 Construction Phase Impacts

Noise will be produced at varying levels during the 18- to 21-month-long construction period, depending upon the construction phase. Construction of power plants and other industrial facilities can generally be divided into five phases, which involve different types of construction equipment and produce different amounts of noise. The phases are as follows: 1) excavation, 2) concrete pouring, 3) steel erection, 4) mechanical activity, and 5) cleanup (Table 8.7-2). One of the last activities, steam blowing, will be analyzed separately because of the potential for producing higher noise impacts. Construction of the natural gas pipeline is also analyzed.

Table 8.7-2. Construction equipment and composite site noise levels.

Construction Phase	Loudest Construction Equipment	Equipment Noise Level at 50 feet (dBA)	Composite Site Noise Level at 50 feet (dBA)
Site clearing and excavation	Dump Truck	91	89
	Backhoe	85	
Concrete pouring	Truck	91	78
	Concrete Mixer	85	
Steel erection	Derrick Crane	88	87
	Jack Hammer	88	
Mechanical activity	Derrick Crane	88	87
	Pneumatic Tools	86	
Clean-up	Rock Drill	98	89
	Truck	91	
High-pressure steam blow with silencer	Steam Blow	106	Not Applicable
Low-pressure steam blow	Steam Blow	80	Not Applicable

Source: USEPA 1971; Barnes, Miller and Wood 1976.

Typical construction hours will be between 7 am and 7 pm on weekdays and 8 am and 8 pm on weekends. Additional hours may be necessary to complete critical construction activities. During these periods, some activities will continue 24 hours per day, 7 days per week.

Power Plant Site

Both the Environmental Protection Agency Office of Noise Abatement and Control and the Empire State Electric Energy Research Company have extensively studied noise from individual pieces of construction equipment, as well as from construction sites of power plants and other types of facilities (EPA 1971; Barnes, Miller and Wood 1976). For the purpose of analyzing construction noise levels for the REP, assumptions regarding the types, quantities, and operating schedules of construction equipment are based on information from these documents for similar-sized industrial projects. Use of these data, which are between 25 and 30 years old, is conservative since construction equipment now has more effective noise abatement.

The noisiest equipment types generally operating at a site during each phase of construction are presented in Table 8.7-3. The composite average or equivalent site noise level, representing noise from all equipment, is also presented in the table for each phase. Rock drills, at 98 dBA, produce the highest noise levels of any individual piece. The use of rock drills is very unlikely at the REP site, however, due to the lack of bedrock in the construction zone. Heavy trucks operating at maximum engine speed are the second loudest equipment items, at 91 dBA. Pile driving will not be necessary to construct the REP.

Table 8.7-3. Average expected construction noise levels at sensitive receptor locations[1].

Construction Phase	Location 1: Dog Kennel & Residence 1115 feet NW	Location 2: Residence 1125 feet North	Location 3: Residence 1815 feet NE
Excavation	62	62	58
Concrete pouring	51	51	47
Steel erection	60	60	56
Mechanical	60	60	56
Clean-up	62	62	58
HP steam blow with silencer[1]	79	79	75
LP steam blow without silencer (36-hr duration)	53	53	49

[1]High pressure steam blow levels are instantaneous rather than averaged.

The steam blow, with an unsilenced level of 110 dBA at 1,000 feet (or 136 dBA at 50 feet), is an activity rather than a piece of equipment. This activity is designed to clean scale and other debris from the boiler tubes and steam lines before admitting any steam to the steam turbines where the foreign material would damage the blades. A temporary bypass line to the atmosphere is connected to the main steam line upstream of the steam turbines to divert the steam. Multiple short blows of approximately 2-minute duration each will be performed each day, and the entire process generally takes several weeks. It has become relatively common in recent years to fit the steam blow pipe with a temporary silencer at sites near populated areas. These silencers have the capability to reduce levels by approximately 30 dBA. Such a silencer will be employed at the REP site.

In recent years, an alternative process using continuous blows of low-pressure steam over a several-day period has been developed and is inherently quieter. Noise levels are approximately 80 dBA at 50 feet from the silenced discharge pipe. Use of this method may be used in addition to or instead of the high-pressure, intermittent-blow method.

Average or equivalent construction noise levels projected for three closest residences are presented in Table 8.7-4. These results are conservative because the only attenuating mechanism considered was divergence of the sound waves over the distances traveled.

Levels during the loudest normal construction activities are projected to be between 58 dBA and 62 dBA at the sensitive receptor locations at distances ranging from 1,115 to 1,815 feet. These levels are 15 to 20 dBA above the existing daytime L_{eq} levels. Thus, average construction noise will cause a temporary adverse noise impact. Levels of 75 to 79 dBA during muffled steam blowing will also create a temporary adverse noise impact. High-pressure steam blowing, if used, will be restricted to the City's

Table 8.7-4. Summary of noise modeling results.

Receptor Position	Placer County General Plan (L_{dn} of 60 converted to L_{eq}) (dBA)	Modeled plant noise level (dBA)	Difference between LORS and expected (dBA)
Location 1: Dog Kennel & Residence 1115 feet NW of stacks	53.6	50.6	-3.0
Location 2: Residence 1125 feet north of stacks	53.6	50.0	-3.6
Location 3: Residence 1815 feet NE of stacks	53.6	46.6	-7.0

designated construction hours to avoid nighttime impacts. If the lower-pressure, continuous-blow method is selected for cleaning the steam pipes, noise levels at the sensitive receptors would range from 49 to 53 dBA and would represent a less than significant noise impact. Under these conditions, steam blow activities would be conducted 24 hours per day.

Natural Gas Pipeline

Natural gas pipeline construction equipment will include concrete saws, backhoes, trenchers, pipe layers, dump trucks, pavers, compactors, and other miscellaneous equipment. All of this equipment produces noise levels between approximately 80 and 91 dBA at 50 feet. Workers operating the equipment and other workers within approximately 50 feet of the equipment will wear hearing protection. Persons outside the work area should never be exposed to levels above approximately 85 dBA. Daytime noise levels near residential areas could increase to approximately 70 dBA, which is similar to existing daytime L_{eq} and L_{10} noise levels. Since this activity is of short duration at any given location, and will only occur during the day in noise-sensitive areas, any noise impact created will not be significant.

8.7.2.3 Operational Phase Impacts

Operational noise will result from using power plant equipment including the gas and steam turbines, cooling tower, and HRSGs. A noise modeling program, Cadna/A, ver. 3.0 (developed by the German firm DataKustik specifically for power plant applications), was used to evaluate the noise emissions of the facility. Based on the sound power levels input for each source, the program maps the noise contours of the overall plant in accordance with a variety of standards, primarily VDI 2714 Outdoor Sound Propagation and ISO 9613. All sound propagation losses such as geometric spreading, air absorption, ground absorption, and barrier shielding are calculated automatically in accordance with these recognized standards. The model realistically accounts for internal shielding within the plant; for example, by the large HRSG structures, because the physical dimensions of each source are also input into the model and considered in the calculations. Appendix 8.7-A contains input data for the model.

Sound power levels of equipment used as input to the noise model were obtained from the equipment manufacturers, first-hand measurements of similar equipment, or from the literature. Noise control features accounted for in the modeling included the combustion turbine air inlet silencers, acoustical enclosures over the combustion turbines, and attenuation of combustion exhaust noise by the HRSGs. Noise producing equipment used in the modeling included the following:

- Two GE LM6000 or 2 Alstom GTX100 gas turbine/generators
- Two heat recovery steam generators (HRSG)
- Two HRSG exhaust stacks
- Two boiler feed pumps per HRSG, with one normally in service
- One steam turbine/generator and condenser
- Cooling tower
- Two circulating water pumps
- Three gas compressors, with two normally in service
- Three main transformers
- One zero liquid discharge facility

Alstom GTX100 Option

The noise modeling studies conducted for this AFC are based on the General Electric LM 6000 combustion turbine generator. Roseville Electric is considering using the Alstom GTX100 as an alternative technology. There would be no significant difference in noise generation between the two technologies, however. The LM6000 and the GTX100 gas turbines are very similar in power output and physical size. The sound levels of both packages would be specified for a near-field level of 85 dBA at 3 feet, with similar physical dimensions, the expected total sound power level would be the same. The sound levels of the exhausts feeding into the HRSGs vary slightly in the frequency makeup, but the overall levels are within 1 decibel when the high frequency bands above 1 kHz are excluded. The values for the high frequency bands in the turbine exhaust are greater for the Alstom units, but the difference is not meaningful in the final analysis, since these frequencies are attenuated by such a high degree within the HRSG and the atmosphere.

Noise Modeling Summary

Noise modeling results for the REP in comparison to the relevant noise standards are summarized in Table 8.7-4. These results indicate that noise produced by the plant will be below the most stringent Placer County General Plan limits at the three residences near the plant in the county (this is the standard for residential districts adjacent to industrial districts, not for residences in the Farm district). At each receptor, the expected noise levels with the project are 3 to 7 dBA below the General Plan standard. Power plant noise at the closest receptor would be 50.6 dBA. Thus, the expected levels are in compliance with applicable LORS and the regulatory significance criterion is not met. Figure 8.7-11 presents a noise contour map of the REP showing the distribution of sound in the vicinity of the plant.

The background noise levels in the project vicinity are currently relatively low, since this is a rural area with few inhabitants and little activity. These background levels will increase with the start of PGWWTP operation and the build-out of the WRSP. For example, the PGWWTP contains mechanical equipment such as pumps, clarifiers, and large fans that may generate noise levels between 60 and 88 dBA near the source (City of Roseville 1996, 2003). Though these will be located several hundred feet from the REP and nearby sensitive receptors, they will increase the ambient noise level.

In addition, the WRSP infrastructure development will include the addition of six-lane arterial roadways at the north boundary of the REP parcel (Blue Oaks Boulevard) and to the west of the project site (West

Side Drive). Phillip Road will be realigned east of the REP parcel as a two-lane modified collector. Noise modeling studies conducted for the WRSP EIR (City of Roseville 2003b) predict noise contours for West Side Drive, Blue Oaks Boulevard, and Phillip Road in terms of the distance from centerline to the 60 dBA and 65 dBA (L_{dn}) noise contours. For Blue Oaks Boulevard between West Side Drive and Hayden Parkway (north side of the REP Parcel), the distances are 165 feet for 60 dBA and 77 feet for 65 dBA. It is clear that traffic on WRSP roadways will increase the ambient noise levels in the project vicinity to levels that are common in suburban areas and that will help to mask the REP's noise.

In addition, an industrial district will be located to the west of the project, and will lie between the REP site and the nearest residential area. Noise sources in this area will include loading docks, on-site truck circulation, rooftop heating and ventilation, heavy equipment, and processing equipment (City of Roseville 2003b). On the east side of the REP, the planned land uses under the WRSP include an outdoor recreational sports complex that will generate noise during team and spectator sporting events.

Increased human activity will raise the background noise in the project area substantially such that REP noise will be less apparent. Though predicting the exact levels of future noise with the WRSP is a speculative exercise and cannot be done with accuracy, such an estimate was made response to a CEC Staff Data Request on behalf of the Roseville Energy Facility project, a previous power plant proposal for the REP site. Based on an estimated 7,500 dwelling units in the West Roseville Area (the WRSP proposes 8,430), an average household size in Placer County of 2.63 persons, and an area population of 19,725, URS Corporation (2002) estimated future average ambient noise levels in the WRSP area at approximately 58 dBA.

The WRSP design guidelines include measures to control noise and protect noise-sensitive land uses. These include the construction of a 6-foot-high masonry sound wall along the western boundary of the PGWWTP (City of Roseville 2003a, Figure 12-30). This sound wall would extend northward, west of the REP site, to Blue Oaks Boulevard. A sound wall will also be constructed between the nearest residential use to the REP, a high-density residential zone southwest of the project, and West Side Drive. The WRSP design guidelines also call for a sound wall on the southern boundary of the nearest residential area to the northeast, a low-density residential area located on future Hayden Parkway. This wall would help to block sound from the REP.

Vibration

Potential vibration levels were not specifically analyzed for the project because combined-cycle power plants do not typically produce the significant low-frequency noise that is generally responsible for causing airborne vibration. The HRSG tube bundles and selective catalytic reduction (SCR) modules act as silencers that effectively eliminate this potential problem. Ground-borne vibration is not a significant problem because all of the heavy machinery is finely balanced to minimize wear on bearings and other parts. In fact, vibration sensors are permanently attached to the turbines and generators specifically to detect any out-of-balance condition. When vibration levels exceed the very low threshold levels set for the detectors, the equipment is shut down for repairs. It is unlikely that any vibration would be felt beyond 100 feet or so from the equipment.

8.7.2.4 West Roseville Not Annexed

The project design as it relates to noise would be no different without the West Roseville annexation. Though the transmission and natural gas pipeline routes would differ somewhat from the expected

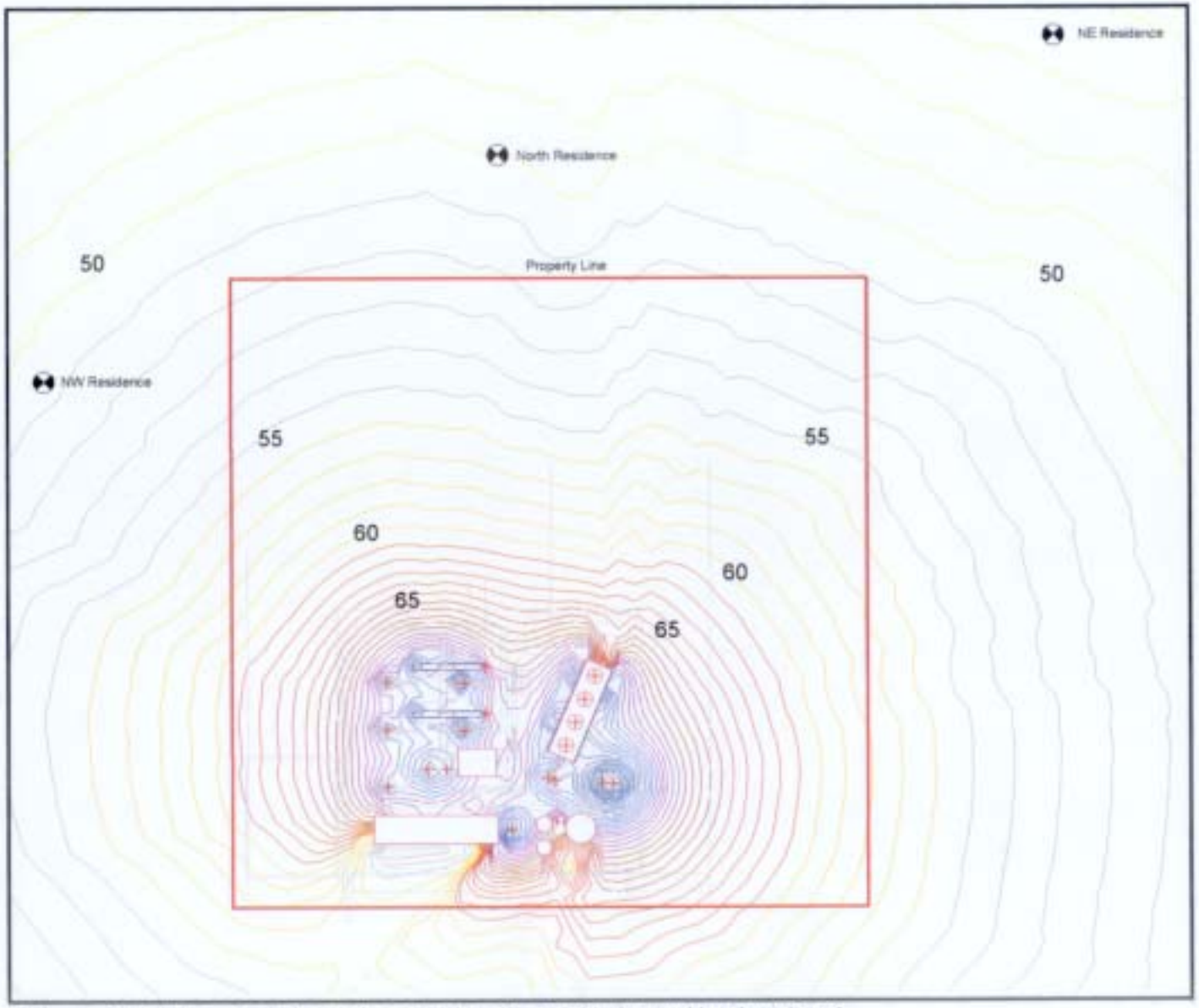


Figure 8.7-11. Expected plant noise emissions (A-weighted sound level contours).

scenario under which the annexation of West Roseville takes place, these changes would have little or no effect on the levels of noise generated during project construction and operation.

8.7.3 Cumulative Impacts

Increases in noise levels above existing ambient levels during construction and operation will generally not be noticeable beyond 0.5-mile from the site. Thus, direct cumulative impacts with other projects will only occur if the other new projects are located within a 05-mile radius of the site. The PGWWTP to the south will be completed and operating before the REP construction begins. Noise levels from this facility are not expected to be significant at the three residences analyzed in this study, but they will raise the ambient noise levels some. These higher ambient levels would help to mask noise from the REP.

Under the WRSP, additional light industrial, commercial, and residential uses are planned for the areas around the REP site, except directly to the north and northwest outside of the Roseville City limits. For example, Blue Oaks Boulevard will be extended and will run north of the project site as a major arterial. A new arterial, West Side Drive, will be created as an extension of Watt Avenue to the west. Traffic on these arterials will gradually increase along with the build-out of West Roseville, raising the ambient levels and helping to mask the noise that the REP generates.

The Environmental Impact Report (EIR) on the WRSP (City of Roseville 2003) considered the REP in its cumulative analysis and assumed that the Roseville Energy Park would be a source of noise in the WRSP. The WRSP land use plan, however, anticipated noise from a much larger 900 MW plant, such as the one previously proposed by the Enron Corporation for the REP site. The WRSP EIR found that a plant the scale of the Enron proposal would meet the City's standards for the nearest WRSP residential land use. Considering that the REP is on a much smaller scale (150 MW compared with 900 MW), it will generate the same or lower noise levels and would be in compliance with City standards after build-out of the WRSP. The EIR also found that cumulative noise impacts from stationary sources would be less than significant.

The WRSP employs industrial and commercial areas, as well as recreational parks, as buffers between the REP and the PGWWTP and the more noise-sensitive residential areas and schools. The closest proposed residential areas appear to be beyond the 45 dBA noise contour from the REP. Due to the logarithmic nature of decibel addition, the additive effect will be very small, but the masking effect will be greater such that noise from the REP will be less noticeable. In general, then, though cumulative background noise in the project area will increase with the build-out of West Roseville, the noise levels will not increase beyond reasonably acceptable levels considered healthy and safe, since development will adhere to the City's noise control ordinances and standards.

8.7.4 Mitigation Measures

Construction noise will be mitigated to the extent feasible through the use of quieter construction equipment, proper use and maintenance of noise control features of the equipment, and limiting periods of especially noisy activities to the daylight hours. The steam blowing analysis was based on use of a silencer that produced 30 dBA attenuation. Residents of the three nearby residences will be advised to expect greater noise levels during the periodic steam blows to alleviate any anxiety they may have about safety or the permanence of noise.

The noise control measures described above will be installed in the plant to mitigate operational noise impacts. During construction and after the plant is built, complaints received would be handled in the

manner in which the City handles stationary source noise complaints. The City's code enforcement staff provides first response to noise complaints during normal business hours, and the Roseville Police Department provides response after business hours. The City's first response would include investigation and monitoring to determine noise levels and the source of noise. Where it is determined by Code Enforcement or the Roseville Police that the noise complaint is a result of REP construction or operations, the complaint would be forwarded to the Electric Department's REP Project Manager. Where the noise complaint is operational, it would be referred to the Plant Manager. The Code Enforcement staff would monitor the response from the Electric Department until the issue is resolved, or until it is determined that there is no violation of the City's noise ordinance or the conditions of certification.

The complaint resolution procedure presented in the following paragraphs will provide an efficient and effective means of receiving and resolving any noise complaints. A sample form for the procedure is provided in Appendix 8.7-B.

Any noise complaints received during construction and operation of the facility will be entered in a Noise Complaint Logbook. The date, time, name, address, and phone number of the complainant, the nature of the complaint and the name of the person receiving the call will be recorded. The logbook entries will always be chronological and will provide evidence that a complaint was received. The complainant will then be contacted by the Project Manager or the Plant Manager who will obtain a thorough account of the complaint so that appropriate action can be taken. The manager will briefly explain the resolution procedure to the caller and will provide assurance that the problem will be investigated in a timely manner and corrected to the fullest extent practicable.

The manager will then record the information from the logbook on a blank Noise Complaint Resolution form. The form provides additional space for a description of the problem and measures taken to resolve the problem. These loose-leaf-preprinted forms will be kept in a three-ring binder maintained by the plant manager or a designee.

If the complaint does not appear to be justified, as based on measured levels or other criteria, or if the plant manager believes the problem to be corrected but the complainant is not satisfied, additional recourse measures will be provided to the complainant. These will include the name and phone number of the City of Roseville noise code enforcement official responsible for ensuring compliance with conditions of certification of the project. The Noise Complaint Logbook, the loose-leaf book of noise forms, copies of letters sent to complainants, and any other material documenting changes in procedure or installation of noise control materials will be made available to the appropriate officials, as requested.

In addition, as related above, high-pressure steam blows will be restricted to the daytime hours, since they would otherwise cause a substantial increase in noise at the nearby residential receptors.

8.7.5 Applicable Laws, Ordinances, Regulations, and Standards

The controlling criterion in the design of the noise control features for the project is the minimum, or most stringent, noise level required by any of the applicable LORS. Since the site is in the City of Roseville, it must satisfy the City regulations. Because the only sensitive receptors are located in Placer County and outside of the City of Roseville, it must satisfy the standards in the County General Plan.

The following are the LORS that apply to noise generated by the REP. These LORS are summarized in Table 8.7-5.

Table 8.7-5. LORS applicable to noise.

Law, Ordinance, Regulation, or Standard	Applicability	Mitigation Effective?	AFC Reference
Federal Offsite: USEPA	Guidelines for state and local governments	Not applicable	Not applicable
Federal Onsite: OSHA 29 CFR 1910.95 Occupational noise exposure	Exposure of workers over 8-hour shift limited to 90 dBA	Yes	Section 8.7.5.1. See also Worker Safety section of AFC.
State Onsite: Cal-OSHA 8 CCR Article 105, Sections 5095 et seq.	Exposure of workers over 8-hour shift limited to 90 dBA	Yes	Section 8.7.5.2. See also Worker Safety section of AFC.
State Offsite: California Vehicle Code, Sections 23130 and 23130.5	Regulates vehicle noise limits on California highways	Yes	Delivery trucks and other vehicles will meet Code requirements.
Local: California Government Code, Section 65302	Requires local government to prepare plans that contain noise provisions	Yes	City of Roseville conforms
City of Roseville General Plan Chapter IX "Noise Element"	Limits noise to 50 dBA L_{eq} daytime, 45 dBA L_{eq} nighttime and 70 dBA max daytime, 65 dBA max nighttime at residences	Yes	Section 8.7.5.3.
City of Roseville Noise Ordinance Chapter 9.24 Noise Regulation	Limits L_{eq} noise to 57 dBA daytime, 52 dBA nighttime at residences adjoining industrially zoned property or ambient plus 7 dBA, whichever is greater; sets maximum limits of 72 dB A nighttime and 77 dBA daytime; and establishes construction hours and a process for exceptions to construction hour limitations	Yes	Section 8.7.5.3.
Placer County General Plan, Section 9 "Noise"	Limits outside L_{dn} level to 60 dBA at residences adjoining industrial. Limits indoor L_{dn} to 45 dBA	Yes	Section 8.7.5.3

8.7.5.1 Federal

The federal government has no standards or regulations applicable to off-site noise levels from the project. However, guidelines are available from the U.S. Environmental Protection Agency (EPA) (1974) to assist state and local government entities in development of state and local LORS for noise.

On-site noise levels are regulated, in a sense, through the Occupational Safety and Health Act of 1970 and through the Occupational Safety and Health Administration (OSHA). The noise exposure level of

workers is regulated at 90 dBA over an 8-hour work shift to protect hearing (29 Code of Federal Regulations [CFR] 1910.95). On-site noise levels will generally be in the 70 to 85 dBA range. Areas above 85 dBA will be posted as high-noise-level areas, and hearing protection will be required. The power plant will implement a hearing conservation program for applicable employees and maintain exposure levels below 90 dBA.

8.7.5.2 State

Two state laws address occupational noise exposure and vehicle noise and apply to the REP. The California Department of Industrial Regions, Division of Occupational Safety and Health, enforces California Occupation Safety and Health Administration (Cal-OSHA) regulations, which are the same as the federal OSHA regulations described above. The regulations are contained in 8 California Code of Regulations (CCR), General Industrial Safety Orders, Article 105, Control of Noise Exposure, Sections 5095, et seq. Noise limits for highway vehicles are regulated under the California Vehicle Code, Sections 23130 and 23130.5. The limits are enforceable on the highways by the California Highway Patrol, the Placer County Sheriff's Office, and the City of Roseville Police Department.

8.7.5.3 Local

City of Roseville General Plan

The California State Planning Law (California Government Code Section 65302) requires that all cities, counties, and entities such as multi-city port authorities prepare and adopt a General Plan to guide community change. Chapter IX, Noise Element, of the City of Roseville General Plan contains the policies and guidelines for development of noise-producing facilities, as well as for noise-sensitive uses exposed to fixed-noise sources. Performance standards for fixed sources such as power plants are contained in Table IX-3 of the Noise Element. Allowable hourly L_{eq} levels, as measured at the property line of noise-sensitive receptors, are 50 dBA and 45 dBA for daytime (7 am to 10 pm) and nighttime (10 pm to 7 am) periods, respectively. Maximum short-duration levels are 70 and 65 dB for the two time periods, respectively. The General Plan also mentions (Page IX-2, Community Noise) that "typical noise levels in noise-sensitive areas of Roseville are in the range of 45 dBA to 68 dBA L_{dn}." The General Plan standards do not apply to the REP, because the only close residential receptors are rural/agricultural uses that are not contemplated within the City of Roseville and because these receptors are located outside of the City limits in unincorporated Placer County.

City of Roseville Noise Ordinance

The City of Roseville Noise Ordinance regulates the City's community noise thresholds and establishes thresholds of enforcement. Where the City General Plan is a policy document that is used for general planning purposes, the Noise Ordinance provides the regulatory authority to implement the General Plan goals. The City's Noise Ordinance specifies that, where an industrially zoned area borders a residential area, the noise limits increase by 7 dBA over the General Plan goals. That is, hourly L_{eq} level limits would be 57 dBA during the day and 52 dBA at night (Section 9.24.020, paragraph B), and the maximum short-duration noise levels would be 77 and 72 dBA for the two time periods, respectively.

The City's Noise ordinance also requires that private construction be limited to the hours of 7 am to 7 pm on weekdays and 8 am to 8 pm on weekends. Though these restrictions do not apply to City projects, the City follows them as a matter of practice. The ordinance also allows for the City Manager to make exceptions to this rule under special circumstances.

Placer County General Plan

The Roseville City Limits are immediately north and west of the project site and all three residences are beyond these limits in the County. The Placer County General Plan Section 9, Noise, contains guidelines that limit noise to an L_{dn} of 70 dBA L_{dn} for single-family residences in Farm districts and 60 dBA in residential districts adjoining industrial districts. For an essentially continuous, steady-state noise source like a power plant, this equates to an L_{eq} level of 63.6 dBA continuous for Farm districts, and 53.6 dBA continuous for residential districts adjoining industrial districts. The plan also limits indoor noise levels to an L_{dn} of 45 dBA. In the case of the REP, however, the outdoor standard would be more stringent, given the attenuation of sound from indoors to outdoors (even assuming open windows). The County General Plan standards are the LORS that are most applicable to the REP project, since the closest residential receptors are all within unincorporated Placer County.

8.7.5.4 California Environmental Quality Act (CEQA)

CEQA requires that significant environmental impacts be identified and mitigated to the extent feasible CEQA significance standards (cited above) focus on compliance with City and County LORS and environmental health standards with the goal of preventing people's exposure to excessive or unhealthful levels of noise and vibration.

8.7.6 Involved Agencies and Agency Contacts

The agency responsible for enforcement of noise levels at the REP is the City of Roseville Planning Department. The people to contact regarding noise emission levels from the plant are shown in Table 8.7-6.

Table 8.7-6. Involved agencies and agency contacts.

Permits/Reason for Involvement	Contact	Title	Telephone
Information regarding noise policy	Paul Richardson	City of Roseville Planning Director	916-774-5276
Information regarding noise policy	Roger Davis	Placer County Environmental Health	530-889-7335

8.7.7 Permits Required and Permit Schedule

No noise permits are required.

8.7.8 References Cited

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——1974. *Levels of environmental noise requisite to protect public health and welfare with an adequate margin of safety*. 550/9-74-004. Office of Noise Abatement and Control, Washington, DC.

8.8 PALEONTOLOGICAL RESOURCES

Paleontological resources (fossils) are the remains or traces of prehistoric animals and plants. This section assesses the potential that earth-moving activities associated with construction of the proposed Roseville Energy Park (REP) and associated linear facilities will impact scientifically important fossil remains. Section 8.8.1 discusses the existing environmental setting. Section 8.8.2 discusses the potential environmental effects of construction and operation. Section 8.8.3 evaluates any cumulative impacts to paleontological resources due to other simultaneous projects. Section 8.8.4 describes proposed mitigation measures during construction. Section 8.8.5 presents applicable laws, ordinances, regulations and standards (LORS). Section 8.8.6 references agency contacts. Section 8.8.7 presents permit requirements and schedules. Section 8.8.8 contains a list of references cited.

The analysis presented in this section meets all requirements of the California Energy Commission Appendix B Section (g)(16) and incorporates the Society of Vertebrate Paleontology (1995, 1996) standard measures for mitigating adverse construction-related environmental impacts on paleontological resources.

8.8.1 Affected Environment

8.8.1.1 Geographic Location and Physiographic Environment

The REP project area is located on the eastern edge of the lower Sacramento Valley in Sacramento County. The Sacramento Valley comprises the northern part of the Great Valley physiographic province. The Great Valley is bounded by the Sierra Nevada on the east and the Coast Ranges on the west.

The Sacramento Valley consists chiefly of a number of confluent alluvial fans and floodplains formed by deposits from numerous streams that enter the valley from both mountain ranges and major alluvial deposits from rivers such as the Sacramento and Feather rivers that flow down the valley axis.

The project area is located entirely within Sacramento County and within the U.S. Geological Survey (USGS) Pleasant Grove and Roseville Quadrangles (1:24,000).

8.8.1.2 Regional Geologic Setting

The Sacramento Valley is a part of the Central Valley that, together with the San Joaquin Valley to the south, forms an asymmetric structural trough. This trough or basin is bounded on the east by the Sierra Nevada and on the west by the Coast Ranges. This basin contains thick sequences of sedimentary rocks that range from Jurassic to Recent in age (Hackel 1966). Sedimentary depths of over 60,000 feet are recorded, although there is less sedimentary depth over the Stockton Arch which, in the subsurface, separates the Sacramento Valley to the north from the San Joaquin Valley to the south (Hackel 1966).

The Sierra Nevada is a composite batholith approximately 600 km long and 93 km wide. Uplift of the range to its present elevation and configuration occurred from approximately 10 to 3.5 million years ago (Chase and Wallace 1988). The granitic rocks of the batholith were intruded into a variety of oceanic sediments that are now metamorphosed and exposed along the western part of the range (Wagner et al. 1987). Additionally, volcanically derived rocks and sediments covered the range before its uplift and before glaciations of the Quaternary period (Wagner et al. 1987).

8.8.1.3 Local Geologic Setting

The project area is composed of alluvial deposits of a range of ages. The surficial portions of the Sacramento Valley include a variety of sedimentary fill deposits related to alluvial fans, river channels, and flood basins. These deposits represent a complex sequence of fill and cut and fill sedimentary deposits sometimes with associated geomorphic surfaces. Broadly, these fills are related to river systems that drain from the Coast Ranges (Lettis 1985) and from the Sierra Nevada (Marchand and Allwardt 1981; Harden 1987; Busacca et al. 1989; Unruh 1991) as well as the through-going drainage of the Sacramento River. Investigations of these deposits throughout the eastern side of the Sacramento and San Joaquin valleys indicate that erosion and depositional events throughout the Quaternary ice ages have been related to episodes of alluvial fan building, river incision, and soil formation that correlates with glacial and interglacial climatic events in the Sierra Nevada (Marchand and Allwardt 1981). Because these river-derived sedimentary deposits were prograding (or progressively extending) into the valley, there is a tendency for the younger deposits to incise into older deposits nearer the Sierra Nevada while burying the older deposits further into the valley (Marchand and Allwardt 1981; Harden 1987; Busacca et al. 1989; Unruh 1991). Where exposed at the surface, the older deposits have progressively better-developed soils, and soil characteristics are one of the criteria used in their identification and differentiation (Harden 1987; Busacca et al. 1989).

Numerous Quaternary (Pleistocene and Holocene) sedimentary formations have been identified and mapped in the region (Marchand and Allwardt 1981; Helley and Harwood 1985; Wagner et al. 1987; Busacca et al. 1989). From oldest to youngest (with standard map symbol codes) these are Turlock Lake Formation (Qtl, approximately 600,000 years old), Riverbank Formation (Qr, 300,000 to 100,000 years old), Modesto Formation (Qm, 40,000 to 10,000 years old), and modern or Holocene deposits (Q, less than 10,000 years old) (Harden 1987; Busacca et al. 1989; Wagner et al. 1987). The project area is underlain by the Turlock Lake and Riverbank Formations (Helley and Harwood 1985; Wagner et al. 1987). Helley and Harwood (1985) have mapped the Riverbank Formation with an upper and lower unit (Qru and Qrl). Figure 8.4-1 (in Section 8.4, Geological Hazards and Resources) depicts the boundaries between the Riverbank, Turlock Lake, and Holocene alluvial deposits at and near the project site and along the natural gas pipeline routes.

Older, pre-Quaternary, formations in the valley and immediate Sierra Nevada foothills have a similar geomorphology and general distribution to those of the Quaternary sedimentary fill (Hackel 1966; Unruh 1991). These older formations tend to be more widely distributed into the mid-elevations of the Sierra Nevada and are often derived from volcanic events that included combinations of volcanic mudflows along with river transportation and deposition. In the mid-elevations of the Sierra Nevada these deposits are found as erosional remnants on the upland surfaces between the incised modern river canyons (Unruh 1991). As these formations are traced into the eastern valley, they are found as erosional remnants that have been incised into by the Quaternary river deposits described above. Further into the valley, these formations are buried beneath the younger Quaternary alluvial deposits (Unruh 1991). To the east of the project area is the volcanically derived Mehrten Formation (Oligocene) (Wagner et al. 1987).

To the east of these Quaternary and older volcanic deposits is granitic basement rock mapped as Mesozoic diorite rocks (Wagner et al. 1987).

8.8.1.4 Paleontological Resource Inventory Methods

A stratigraphic inventory and a paleontological resource inventory were completed to develop a baseline

paleontological resource inventory of the project site and surrounding area by rock unit and to assess the potential paleontological productivity of each rock unit. Research methods included a review of published and unpublished literature and a cursory field survey. These tasks complied with CEC (2000) and Society of Vertebrate Paleontology (1995) guidelines.

Stratigraphic Inventory

Geological maps and reports covering the geology of the project site and area were reviewed to determine the exposed rock units and to delineate their respective aerial distributions in the project area. Geologic mapping of the project site and vicinity is presented in Helley and Harwood (1985) and Wagner et al. (1987).

Paleontological Resource Inventory

Published and unpublished geological and paleontological literature was reviewed to document the number and locations of previously recorded fossil sites from rock units exposed in and near the project site and surrounding area and the types of fossil remains each rock unit has produced. The literature review was supplemented by an archival search conducted at the University of California Museum of Paleontology in Berkeley, California, on July 16, 2003. No fossil localities within 2 miles of the project site were identified in that search (Holroyd 2003). However, field reconnaissance conducted for a previous power plant application in the area identified paleobotanical fossils in the Riverbank Formation (URS Corporation 2001; Lawler 2003) (see description and map in Appendix 8.8-A, filed separately under a request for confidentiality).

Surveys of Late Cenozoic land mammal fossils in the region have been provided by Hay (1927), Stirton (1939), Savage (1951), and Jefferson (1991). On the basis of his survey of vertebrate fauna from the non-marine Late Cenozoic deposits of the San Francisco Bay region, Savage (1951) concluded that only two divisions of Pleistocene time could be recognized in this region. He named the earlier Pleistocene fauna the Irvingtonian and the later Pleistocene and Holocene fauna the Rancholabrean. The age of the later Pleistocene, Rancholabrean fauna was based on the presence of bison and on the presence of many mammalian species which are inhabitants of the same area today. In addition to bison, larger land mammals identified as part of the Rancholabrean fauna include mammoths, mastodons, camels, horses, and ground sloths. These terms are applied regionally. Reynolds (2001) provides information on fossil finds related to construction monitoring in California during recent years.

Field Survey

The field reconnaissance was conducted on October 18, 2003, to document the presence of any previously unrecorded fossil sites and of strata that might contain fossil remains. The field survey was conducted by Tom Stewart, Ph.D., a qualified paleontologist with several publications in refereed scientific journals addressing fossils and paleoenvironmental analysis. Reconnaissance was conducted at the REP site, as well as the construction laydown and worker parking areas, natural gas pipeline alternative routes, recycled water pipeline, sanitary sewer pipeline, and storm water outfall. A complete survey was conducted of the entire project area of potential effect for paleontological resources. Exposures of potentially fossiliferous sedimentary deposits were identified in areas where streams had incised into the alluvial surface. Approximately half of the area located along the natural gas pipeline alternative routes is currently developed city and residential area with minimal to no exposure of the original ground surface.

8.8.1.5 Paleontological Resource Assessment Criteria

The potential paleontological importance of the project area can be assessed by identifying the paleontological importance of exposed rock units within the project area. Since the aerial distribution of a rock unit can be easily delineated on a topographic map, this method is conducive to delineating parts of the project that are of higher and lower sensitivity for paleontological resources and to delineating parts of the project that may, therefore, require monitoring during construction.

A paleontologically important rock unit is one that has a high potential paleontological productivity rating, and is known to have produced unique, scientifically important fossils. The potential paleontological productivity rating of a rock unit exposed at the project site refers to the abundance/densities of fossil specimens and/or previously recorded fossil sites in exposures of the unit in and near the project site. Exposures of a specific rock unit at the project site are most likely to yield fossil remains representing particular species in quantities or densities similar to those previously recorded from the unit in and near the project site. However, well-developed and documented fossil-bearing formations are unlikely to yield a unique paleontological resource.

An individual vertebrate fossil specimen may be considered unique or significant if it is 1) identifiable, 2) complete, 3) well preserved, 4) age diagnostic, 5) useful in paleoenvironmental reconstruction, 6) a type or topotypic specimen, 7) a member of a rare species, 8) a species that is part of a diverse assemblage, and/or 9) a skeletal element different from, or a specimen more complete than, those now available for its species. For example, identifiable vertebrate marine and terrestrial fossils are generally considered scientifically important because they are relatively rare. The value or importance of different fossil groups varies, depending on the age and depositional environment of the rock unit that contains the fossils, their rarity, the extent to which they have already been identified and documented, and the ability to recover similar materials under more controlled conditions such as part of a research project. Marine invertebrates are generally common, well developed, and well documented. They would generally not be considered a unique paleontological resource.

The following tasks were completed to establish the paleontological importance of each rock unit exposed at or near the project site:

- The potential paleontological productivity of each rock unit exposed at the project site was assessed, based on the density of fossil remains previously documented within the rock unit.
- The potential for a rock unit exposed at the project site to contain a unique paleontological resource was considered.

8.8.1.6 Paleontological Resource Inventory Results and Assessment by Rock Unit

Stratigraphic Inventory

This section presents an overview of the mapped geology of the project area and vicinity. Geologic mapping of the project site and vicinity is presented in Helley and Harwood (1985) and Wagner et al. (1987).

Granitic Basement (Mzd)

Granitic rocks are present at greater than 800 feet depth below the REP area and 4 miles east of the REP area (Hackel 1966; Harwood and Helley 1987; Wagner et al. 1987). These rocks have no fossil sensitivity and would not be affected by the project.

Mehrten Formation (Tm)

The Mehrten Formation is a cemented volcanic mudflow and andesitic volcanic ash deposit with included sandstone, siltstone, conglomerate and tuff. The formation's age is Miocene to Pliocene. The Merhten Formation has known vertebrate fossils and has a high sensitivity rating; however, it would not be affected by the project because the closest outcrop is approximately 5 miles from the project site. Consequently no detailed inventory of its fossil content is included here.

Turlock Lake Formation (Qtl)

The Turlock Lake Formation is a fluvial and alluvial fan deposit composed of relatively consolidated horizontally to gently sloping deposits of gravel, sand, and silt. It is a Pleistocene age deposit that is approximately 600,000 years old. The Turlock Lake Formation has known vertebrate fossils (Janda 1965, 1966) and has a high sensitivity rating. This formation underlies natural gas pipeline alternative routes east of Fiddyment Road (routes along Pleasant Grove Boulevard, Country Club Land, and Baseline Road).

Riverbank Formation (Qr)

The Riverbank Formation is also a fluvial and alluvial fan deposit composed of semi-consolidated poorly-bedded layers of gravel, sand, and silt. It is younger than the Turlock Lake Formation and was deposited during the Pleistocene from approximately 300,000 to 100,000 years ago. Helley and Harwood (1985) mapped upper and lower members of this formation, that they identified as Qru and Qrl, respectively.

Equivalent or similar age deposits or deposits of similar depositional environment in the Sacramento region have yielded a variety of Pleistocene age fossils. Hansen and Begg (1970) identified a variety of Pleistocene age fossils in extensive gravel pit excavations in east Sacramento. They report a variety of Rancholabrean fossils collected *in situ* from two gravel quarries in the Riverbank Formation. These fossils include: *Archoplites* (sunfish), two bird species (including one goose wing bone), *B. antiquus* (bison), *Camelops hesternus* (camel), *Canis dirus* (dire wolf), *Canis latrans* (coyote), *Clemmys marmorata* (pond turtle), *Colubridae* (clubrid snake), *Cyprinidae* (carp), *Equus* (horse), *Mammuthus* (mammoth), *Microtus* (meadow mouse or vole), *Neotoma* (wood rat), *Odocoileus* (deer), *Paramylodon harlani* (ground sloth), *Perognathus* (pocket mouse), *Scapanus latimanus* (mole), *Spermophilus* cf. *S. beecheyi* (ground squirrel), *Sylvilagus* (rabbit), *Thomomys bottae* (gopher), as well as remains of Douglas fir, sycamore, and willow trees. These fossils were recovered from stratigraphic sections that were well exposed in the gravel quarries and that could, therefore, be related to specific stratigraphic positions.

Dundas and Cunningham (1993) collected Pleistocene-age ground sloth (*Glossotherium harlani*) and Columbian mammoth (*Mammuthus columbi*) remains in Putah Creek west of Davis in Yolo County. Hilton et al. (2000) collected a variety of fossils including ground sloth (*Glossotherium harlani*), bison (*Bison antiquus*), horse (*Equus* sp.), camel (*Camelops hesternus*), mammoth (*Mammuthus* sp.) and plant fossils in the Riverbank Formation during excavations for Arco Arena in Sacramento. These fossils were found in excavations about 13 to 30 feet below the ground surface. Additionally, field reconnaissance conducted for a previous power plant application in the area identified paleobotanical fossils in the Riverbank Formation that had been exposed in trench spoils (URS Corporation 2001; Lawler 2003).

The Riverbank Formation has a high sensitivity rating based on its extensive fossil content. The Riverbank Formation underlies the REP project site and most of the natural gas pipeline alternative routes that lie west of Fiddyment Road.

Basin Deposits (Qb)

Basin deposits are materials deposited in overbank flood basins or topographic lows by major rivers in the area. These sediments tend to be fine-grained silts and clays and are Holocene in age or less than 11,000 years old. These sediments are located about 8 miles west of the REP site and would not be affected by the project.

Recent Alluvium (Qa)

Recent alluvium consists of sediments from recent river deposition. The deposits are unconsolidated and are deposited along rivers and streams. These materials range in age from about 11,000 years to present (i.e., Holocene). There is localized unmapped Recent alluvium to the north of the REP site along Pleasant Grove Creek and to the east of the REP site along Kaseberg Creek. Natural gas pipeline Alternative A crosses Kaseberg Creek and the unnamed tributary to Pleasant Grove Creek that runs east of the REP project site. Otherwise, Recent alluvium is not affected by the project. These limited areas of Recent alluvium have a low sensitivity.

8.8.2 Environmental Consequences

The potential environmental effects from construction and operation of the REP on paleontological resources are presented in the following subsections.

8.8.2.1 Significance Criteria

In its standard guidelines for assessment and mitigation of adverse impacts to paleontological resources, the SVP (1995) established three categories of sensitivity for paleontological resources: high, low, and undetermined. Areas where fossils have been previously found are considered to have a high sensitivity and a high potential to produce fossils. In areas of high sensitivity that are likely to yield unique paleontological resources, full-time monitoring is typically recommended during any project ground disturbance. Areas that are not sedimentary in origin and that have not been known to produce fossils in the past, typically are considered to have low sensitivity and monitoring is usually not needed during project construction. Areas that have not had any previous paleontological resource surveys or fossil finds are considered undetermined until surveys and mapping are done to determine their sensitivity. After reconnaissance surveys, observation of exposed cuts, and possibly sub-surface testing, a qualified paleontologist can determine whether the area should be categorized as having high, low, or undermined sensitivity. In keeping with the significance criteria of the SVP (1995), all vertebrate fossils are categorized as being of potential significant scientific value.

Appendix G of CEQA addresses significance criteria with respect to paleontological resources (Public Resources Code Sections 21000 et seq.). Appendix G(V)(c) asks if the project will "directly or indirectly destroy a unique paleontological resource or site or unique geologic feature."

8.8.2.2 Construction

This section presents the potential adverse impacts on the paleontological resources resulting from construction of each portion of the REP.

Power Plant Site

Deposits of the Riverbank Formation underlie the power plant site. The occurrence of previously recorded vertebrate fossil sites in deposits of similar age suggests that there is a potential for uncovering additional similar fossil remains during earth-moving activities related to construction of the power plant.

Natural Gas Pipeline Alternative Routes

Deposits of the Riverbank and Turlock Lake formations underlie the natural gas pipeline routes. Roughly speaking, the route segments east of Fiddyment Road are located in areas mapped as Turlock Lake Formation, and deposits along Fiddyment Road and further west are located in areas mapped as Riverbank Formation. The occurrence of previously recorded vertebrate fossil sites in deposits of similar age suggests there is a potential for uncovering additional similar fossils during earth-moving activities related to trenching for installation of the natural gas pipeline alternative routes in both the Turlock Lake and the Riverbank formations.

Recycled Water Pipeline

Construction of the recycled water pipeline would involve trenching across Phillip Road for a short distance and would take place in deposits of the Quaternary Riverbank formation. The occurrence of previously recorded vertebrate fossil sites in deposits of similar age suggests there is a potential for uncovering additional similar fossils during earth-moving activities related to trenching for installation of this feature.

Sanitary Sewer Pipeline

Construction of the sanitary sewer pipeline between the REP and the PGWWTP's influent junction structure east of the project site will use the same trenching methods as for the natural gas pipeline (see Chapter 5) and would take place in deposits of the Riverbank Formation. The occurrence of previously recorded vertebrate fossil sites in deposits of similar age suggests there is a potential for uncovering additional similar fossils during earth-moving activities related to trenching for installation of the sanitary sewer pipeline.

Storm Water Outfall

Construction of the storm water outfall would involve trenching methods and would take place in deposits of the Riverbank formation. The occurrence of previously recorded vertebrate fossil sites in deposits of similar age suggests there is a potential for uncovering additional similar fossils during earth-moving activities related to trenching for installation of the storm water outfall.

Construction Laydown and Worker Parking Areas

The construction laydown and worker parking areas are located on developed land on previously disturbed ground. There may be minor and shallow grading to level these areas, but this grading will not reach into underlying deposits in which significant fossils might occur. No significant adverse impacts to paleontological resources are expected.

8.8.2.3 Operation

Project operation will not cause additional ground disturbance, and therefore will not affect paleontological resources.

8.8.2.4 West Roseville Not Annexed

If West Roseville were not annexed, the natural gas pipeline and electrical transmission routes would follow Phillip Road from the project to Fiddyment Road. From Fiddyment Road, the natural gas transmission line would follow Baseline Road to PG&E Line 123. The electrical transmission line would connect with the Fiddyment Receiving Station on Fiddyment Road near Pleasant Grove Boulevard. The potential effects of these alternatives on paleontological resources would be the same as those of natural gas alternative B1.

8.8.3 Cumulative Impacts

If paleontological resources were encountered during REP-related ground disturbance, the potential cumulative effect on paleontological resources will be low, as long as the mitigation measures proposed in Section 8.8.4 are implemented to recover any significant paleontological resources. When properly implemented, these mitigation measures will effectively recover the scientific value of significant fossils encountered during REP construction. Thus, the proposed REP will not cause or contribute to significant cumulative impacts to paleontological resources.

8.8.4 Proposed Mitigation Measures

This section describes measures that Roseville Electric proposes to reduce or mitigate potential project-related adverse impacts to significant paleontological resources, should any such resources be discovered during construction.

- **Paleontological Mitigation Plan**—The paleontological resource mitigation program will include the preparation of a mitigation and monitoring plan for construction monitoring; emergency discovery procedures; sampling and data recovery, if needed; museum storage coordination for any specimen and data recovered; preconstruction coordination; and reporting.
- **Paleontological Monitoring**—Before construction, Roseville Electric will retain a qualified paleontologist to design and implement a mitigation program during project-related, earth-moving activities for deep excavation at the power plant site and for construction of the water and natural gas pipelines. The paleontologist will monitor earth-moving construction activities where this activity will disturb previously undisturbed sediment. Monitoring will not take place in areas where the ground has been previously disturbed, in areas underlain by artificial fill, or in areas where exposed sediment will be buried, but will not otherwise be disturbed.
- **Construction Personnel Education**—Before starting construction, personnel involved with earth-moving activities will be informed of the possibility of encountering fossils, how to identify them, and proper notification procedures. This worker training will be prepared and presented by a qualified paleontologist.

Implementation of these mitigation measures will reduce the potentially significant adverse environmental impact of project earth-moving activities on paleontological resources to an insignificant level. These measures will allow for the recovery of fossil remains and associated specimen data and corresponding geologic and geographic site data that otherwise might have been destroyed by construction and unauthorized fossil collecting.

8.8.5 Laws, Ordinances, Regulations, and Standards (LORS)

Paleontological resources are classified as non-renewable scientific resources and are protected by several federal and state statutes, most notably by the 1906 Federal Antiquities Act and other subsequent federal legislation and policies and by the State of California's environmental regulations (CEQA, Section 15064.5). Professional standards for assessment and mitigation of adverse impacts on paleontological resources have been established for vertebrate fossils by the Society of Vertebrate Paleontology (1995, 1996). Design, construction, and operation of the REP, including pipelines and ancillary facilities, will be conducted in accordance with all LORS applicable to paleontological resources. Federal and state LORS applicable to paleontological resources are summarized in Table 8.8-1 and discussed briefly below, along with SVP professional standards.

Table 8.8-1. Applicable LORS regarding paleontological resources.

LORS	Applicability	AFC Reference	Project Conformity
Antiquities Act of 1906	Protects objects of antiquity from vandalism and unauthorized collecting on federal lands (currently no federal land)	Section 8.8.5	yes
CEQA, Appendix G	Fossil remains may be encountered by earth-moving activities	Section 8.8.4, Section 8.8.5	yes
Public Resources Code, Sections 5097.5/5097.9	Would apply only if some project land acquired by state (currently no state land)	Section 8.8.5	yes

8.8.5.1 Federal LORS

Federal protection for significant paleontological resources would apply to the REP if any construction or other related project impacts take place on federally owned or managed lands. Federal legislative protection for paleontological resources stems from the Antiquities Act of 1906 (PL 59-209; 16 United States Code 431 et seq.; 34 Stat. 225), which calls for protection of historic landmarks, historic and prehistoric structures, and other objects of historic or scientific interest on federal land. The project does not cross such lands. Federal requirements would apply if a Federal agency obtained ownership of project lands during the term of the project license.

8.8.5.2 State LORS

The CEC environmental review process under the Warren-Alquist Act is considered functionally equivalent to that of CEQA (Public Resources Code Section 15000 et seq.) with respect to paleontological resources. CEQA's Appendix G (Public Resources Code Section 21000 et seq.) lists among its significant effects when a project will "disrupt or adversely affect...a paleontological site except as part of a scientific study."

Other state requirements for paleontological resource management are in Public Resources Code Chapter 1.7, Section 5097.5, Archaeological, Paleontological, and Historical Sites. This statute specifies that state agencies may undertake surveys, excavations, or other operations as necessary on state lands to

preserve or record paleontological resources. It would apply to the REP only if the state or a state agency were to obtain ownership of project lands during the term of the project license.

8.8.5.3 Local LORS

The Placer County General Plan includes Goal 5.D, "To identify, protect, and enhance Placer County's important historical, archaeological, paleontological, and cultural sites and their contributing environment (Placer County 1994)." Under this policy, County staff are directed to require that discretionary development projects be designed to avoid potential impacts to significant paleontological resources where possible and to reduce impacts to a level below significance if avoidance is not possible by mitigation in the form of data recovery.

8.8.5.4 Professional Standards

The Society of Vertebrate Paleontology (1995, 1996), a national scientific organization of professional vertebrate paleontologists, has established standard guidelines that outline acceptable professional practices in the conduct of paleontological resource assessments and surveys, monitoring and mitigation, data and fossil recovery, sampling procedures, specimen preparation, analysis, and curation. Most practicing professional paleontologists in the nation adhere to the Society of Vertebrate Paleontology assessment, mitigation, and monitoring requirements, as specifically spelled out in its standard guidelines.

8.8.6 Involved Agencies and Agency Contacts

The lead agency for the protection of paleontological resources for this project will be the lead agency under CEQA, which is the CEC in this case.

8.8.7 Permits Required and Permit Schedule

No state or county agency requires a paleontological collecting permit to recover fossil remains discovered by construction-related earth moving on either state or private land in the project site. The project does not cross or occupy federal land.

8.8.8 References

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8.9 PUBLIC HEALTH

This section presents the methodology and results of a human health risk assessment performed to assess potential impacts and public exposure associated with airborne emissions from the construction and routine operation of the proposed Roseville Energy Park (REP).

Air will be the dominant pathway for public exposure to chemical substances released by the project. Emissions to the air will consist primarily of combustion by-products produced by the natural gas-fired turbines and HRSG duct burners. Potential health risks from combustion emissions will occur almost entirely by direct inhalation. To be conservative, additional pathways were included in the health risk modeling; however, direct inhalation is considered the most likely exposure pathway. The risk assessment was conducted in accordance with guidance established by the California Air Pollution Control Officers' Association (CAPCOA 1993).

Combustion byproducts with established CAAQS or NAAQS, including oxides of nitrogen (NO_X), carbon monoxide and fine particulate matter are addressed in the Ambient Air Quality section (see Section 8.1). However, some discussion of the potential health risks associated with these substances is presented in this section. Human health risks potentially associated with accidental releases of stored hazardous materials at the proposed facility (aqueous ammonia) are discussed in Section 8.5.

8.9.1 Affected Environment

The proposed REP will be located in the City of Placerville, Placer County. Surrounding land uses are described in Section 8.6, Land Use. The nearest residences are located 1,115, 1,125, and 1,815 feet, respectively, from the power plant (measured from a point located between the two stacks). The nearest residential neighborhood is 1.25 miles east of the project site. Under the West Roseville Specific Plan (WRSP), schools are planned for constructed at distances from the REP of approximately 0.38, 0.45, and 0.57 miles, respectively.

Terrain within a 10-mile radius of equal or greater elevation than the stack exhaust exit point (i.e., stack height plus grade elevation) is shown in Figure 8.9-1. This figure is available by request at a 1:24,000 scale.

Sensitive receptors are defined as groups of individuals that may be more susceptible to health risks due to chemical exposure. Schools (public and private), day care facilities, convalescent homes, and hospitals are of particular concern. The sensitive receptors within six miles of the REP site are listed in Table 8.9-1 below. Figure 8.9-2 shows sensitive receptors within six miles of the project site. This figure is available by request at a 1:24,000 scale.

8.9.2 Environmental Consequences

8.9.2.1 Significance Criteria

Cancer Risk

Cancer risk is the probability or chance of contracting cancer over a human life span (assumed to be 70 years). Carcinogens are not assumed to have a threshold below which there would be no human health impact. In other words, any exposure to a carcinogen is assumed to have some probability of causing cancer; the lower the exposure, the lower the cancer risk (i.e., a linear, no-threshold model). Under

various state and local regulations, an incremental cancer risk of 10-in-one million due to a project is considered to be a significant impact on public health. In addition, the 10-in-one-million risk level is used by the Air Toxics Hot Spots (AB 2588) program and California's Proposition 65 as the public notification level for air toxic emissions from existing sources.

Non-Cancer Risk

Non-cancer health effects can be either chronic or acute. In determining potential non-cancer health risks (chronic and acute) from air toxics, it is assumed there is a dose of the chemical of concern below which there would be no impact on human health. The air concentration corresponding to this dose is called the Reference Exposure Level (REL). Non-cancer health risks are measured in terms of a hazard quotient, which is the calculated exposure of each contaminant divided by its REL. Hazard quotients for pollutants affecting the same target organ are typically summed with the resulting totals expressed as hazard indices for each organ system. A hazard index of less than 1.0 is considered to be an insignificant health risk. For this health risk assessment, all hazard quotients were summed regardless of target organ. This method leads to a conservative (upper bound) assessment. RELs used in the hazard index calculations were those published in the CAPCOA AB 2588 Risk Assessment Guidelines (CAPCOA 1993).

Chronic toxicity is defined as adverse health effects from prolonged chemical exposure, caused by chemicals accumulating in the body. Because chemical accumulation to toxic levels typically occurs slowly, symptoms of chronic effects usually do not appear until long after exposure commences. The lowest no-effect chronic exposure level for a non-carcinogenic air toxic is the chronic REL. Below this threshold, the body is capable of eliminating or detoxifying the chemical rapidly enough to prevent its accumulation. The chronic hazard index was calculated using the hazard quotients calculated with annual concentrations.

Acute toxicity is defined as adverse health effects caused by a brief chemical exposure of no more than 24 hours. For most chemicals, the air concentration required to produce acute effects is higher than levels required to produce chronic effects because the duration of exposure is shorter. Because acute toxicity is predominantly manifested in the upper respiratory system at threshold exposures, all hazard quotients are typically summed to calculate the acute hazard index. One-hour average concentrations are divided by acute RELs to obtain a hazard index for health effects caused by relatively high, short-term exposure to air toxics.

8.9.2.2 Construction Phase Impacts

The construction phase of the REP is expected to take approximately 18 to 20 months. No significant public health effects are expected during the construction phase. Strict construction practices that incorporate safety and compliance with applicable laws, ordinances, regulations, and standards (LORS) will be followed (see Section 8.9.5). In addition, mitigation measures to reduce air emissions from construction impacts will be implemented as described in Section 8.1.

Temporary emissions from construction-related activities are discussed in Section 8.1. Ambient air modeling for PM_{10}, CO, SO_2 and NO_X was performed as described in Section 8.1. Construction-related emissions are temporary and localized, resulting in no long-term impacts to the public.

Small quantities of hazardous waste may be generated during the construction phase of the project. Hazardous waste management plans will be in place so the potential for public exposure is minimal.

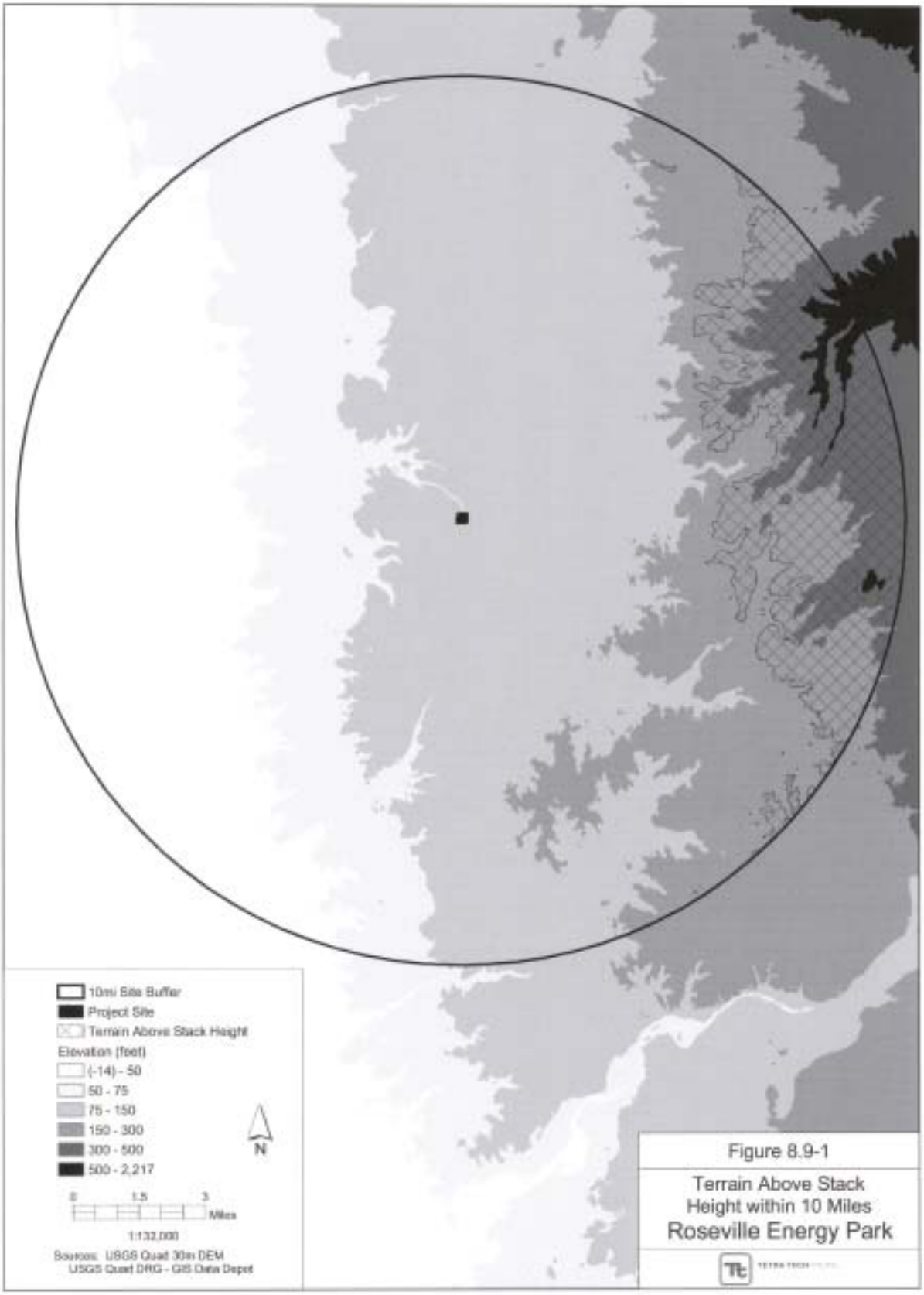

Figure 8.9-1

Terrain Above Stack Height within 10 Miles

Roseville Energy Park

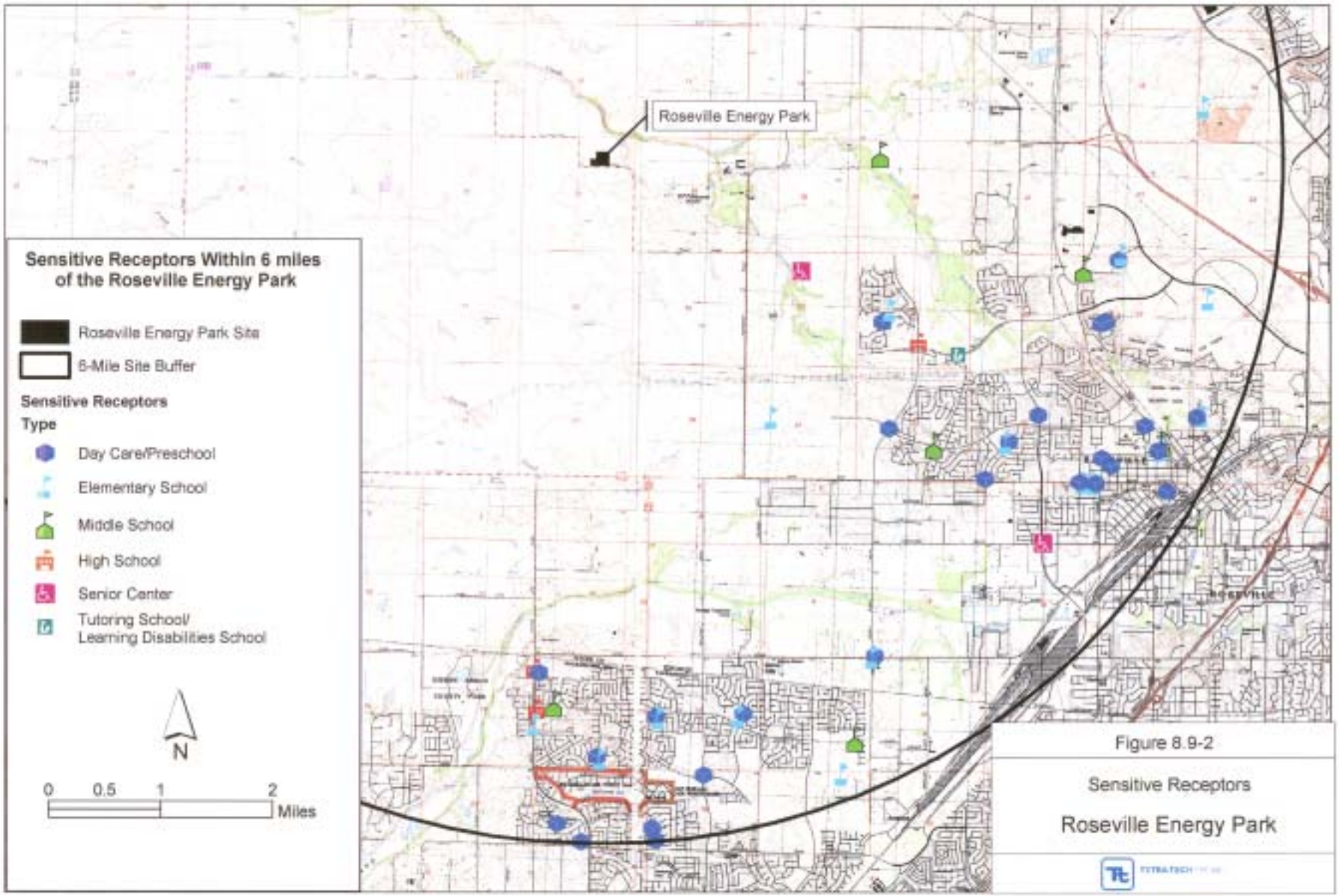
Roseville Energy Park
Sensitive Receptors Within 6 miles of the Roseville Energy Park
Roseville Energy Park Site
6-Mile Site Buffer
Sensitive Receptors
Type
Day Care/Preschool
Elementary School
Middle School
High School
Senior Center
Tutoring School/ Learning Disabilities School
N
0 0.5 1 2
Miles
Figure 8.9-2
Sensitive Receptors
Roseville Energy Park

Table 8.9-1. Sensitive receptors within six miles of the Roseville Energy Park Project.

Facility	Address	City	Miles to REP
Senior Centers			
Sun City Roseville	7050 Del Webb Boulevard	Roseville	2.2
Cordia Senior Residence	5161 Foothills Drive	Roseville	4.6
Day Care/Preschool			
Adventure Clubs	1250 Canevari Drive	Roseville	3.0
Heritage Park Pre-School	1098 Woodcreek Oaks, Blvd #201	Roseville	3.5
Childtime Children's Center	1267 Pleasant Grove Boulevard	Roseville	3.7
Merryhill Country Schools	1370 Baseline Road	Roseville	4.4
Roseville Adventure Clubs	2271 Americana Drive	Roseville	4.5
Antelope Preschool	8725 Watt Avenue	Antelope	4.5
Kinder Care Learning Center	5141 Foothills Boulevard	Roseville	4.5
Adventure Clubs	250 Trestle Road	Roseville	4.7
Sunrise Kids Club Oakhill	3909 N Loop Boulevard	Antelope	5.0
Adventure Clubs	1040 Main Street	Roseville	5.0
Antelope Meadows Sunrise Kids	8343 Palmerson Drive	Antelope	5.1
Street John's Christian School	1090 Main Street	Roseville	5.2
Adventure Clubs	2955 PFE Road	Roseville	5.2
Happy Hearts Home Daycare	907 Lawtone Avenue	Roseville	5.2
Adventure Clubs	1071 Trehowell Drive	Roseville	5.3
Arthur Dudley Child Devel.Center	8000 Aztec Way	Antelope	5.3
Roseville Community Pre-school	50 Corporation Yard Road	Roseville	5.4
Phoenix Schools	1071 Trehowell Drive	Roseville	5.4
Phoenix Schools	4110 Skyland Court	Antelope	5.5
Adventure Clubs	515 Niles Avenue	Roseville	5.6
Adventure Clubs	699 Shasta Street	Roseville	5.8
Head Start	201 N Grant Street	Roseville	5.8
Cyril Spinelli Child Devel. Center	3401 Scotland Drive	Antelope	5.9
North Country Child Devel. Ctr	3901 Little Rock Drive	Antelope	5.9
Elementary Schools			
Coyote Ridge Elementary School	1751 Morningstar Drive	Roseville	2.7
Quail Glen Elementary School	1250 Canevari Drive	Roseville	3.0
Antelope View Charter School	8725 Watt Avenue	Antelope	4.4
Heritage Oak Elementary School	2271 Americana Drive	Roseville	4.5
Antelope Meadows Elementary	8343 Palmerson Drive	Antelope	4.6
Brown Grammar School	250 Trestle Road	Roseville	4.7
Dry Creek Elementary School	2955 PFE Road	Roseville	5.0
Oak Hill Elementary School	3909 N Loop Road	Antelope	5.1

Table 8.9-1. Sensitive receptors within six miles of the Roseville Energy Park Project.

Facility	Address	City	Miles to REP
Street John's Christian School	1090 Main Street	Roseville	5.2
Kaseberg Elementary School	1040 Main Street	Roseville	5.2
Dudley Elementary School	8000 Aztec Way	Antelope	5.3
Rock Creek Elementary School	2140 Collet Quarry Drive	Rocklin	5.4
Cathryn Gates School	1051 Trehowell Drive	Roseville	5.5
Woodbridge Elementary School	515 Niles Avenue	Roseville	5.6
Roseville Community School	800 All America City Boulevard	Roseville	5.6
Spanger School	699 Shasta Street	Roseville	5.8
Olive Grove Elementary School	7926 Firestone Way	Antelope	5.9
Spinelli Elementary School	3401 Scotland Drive	Antelope	5.9
North Country Elementary School	3901 Little Rock Drive	Antelope	5.9
Middle Schools			
Cooley Middle School	9300 Prairie Woods Way	Roseville	2.7
Silverado Middle School	2525 Country Club Drive	Roseville	3.9
Buljan School	100 Hallissey Drive	Roseville	4.4
Center Junior High School	3243 Center Court Lane	Antelope	4.8
Antelope Crossing Middle School	9200 Palmerson Drive	Antelope	5.6
Alpha Intermediate School	8920 Elwyn Avenue	Elverta	6.3
High Schools			
Woodcreek High School	2551 Woodcreek Oaks Boulevard	Roseville	3.5
McClellan High School	8725 Watt Avenue	Antelope	4.6
Center High School	3111 Center Court Lane	Antelope	4.9
Other			
BIP Program	1263 Pleasant Grove Blvd #100	Roseville	3.6

Refer to Section 8.14 (Waste Management) for more information. No acutely hazardous materials will be used or stored on-site during construction (see Section 8.5, Hazardous Materials Handling). To ensure worker safety during construction, safe work practices will be followed (see Section 8.16, Worker Safety).

8.9.2.3 Operational Phase Impacts

Environmental consequences potentially associated with the project are potential human exposure to chemical substances emitted into the air. The human health risks potentially associated with these chemical substances were evaluated in a health risk assessment. The chemical substances potentially emitted to the air from the proposed facility include ammonia, volatile organic compounds (VOCs) and polycyclic aromatic hydrocarbons (PAHs) from the combustion turbines, and metals from the cooling tower. These chemical substances are listed in Table 8.9-2.

Table 8.9-2. Chemical substances potentially emitted to the air from the REP.

Criteria Pollutants

- Carbon monoxide
- Oxides of nitrogen
- Particulate matter
- Oxides of sulfur
- Volatile organic compounds

Noncriteria Pollutants (Toxic Pollutants)

- Ammonia
- Acetaldehyde
- Acrolein
- 1,3-Butadiene
- Benzene
- Ethylbenzene
- Formaldehyde
- Hexane
- Propylene
- Propylene oxide
- Toluene
- Xylene
- Polycyclic aromatic hydrocarbons (PAHs):
  - Benzo(a)anthracene
  - Benzo(a)pyrene
  - Benzo(b)fluoranthene
  - Benzo(k)fluoranthene
  - Chrysene
  - Dibenz(a,h)anthracene
  - Indeno(1,2,3-cd)pyrene
- Naphthalene
- Arsenic
- Cadmium
- Chromium
- Copper
- Lead
- Mercury
- Nickel
- Silver
- Zinc

Emissions of criteria pollutants will adhere to NAAQS or CAAQS as discussed in the Ambient Air Quality section (see Section 8.1). The proposed facility also will include emission control technologies necessary to meet the required emission standards specified for criteria pollutants under Placer County Air Pollution control district (PCAPCD) rules. Offsets will be required for emissions of criteria pollutants that exceed specified thresholds, to assure that the project will not result in an increase in total emissions in the vicinity. Finally, air dispersion modeling results (presented in the Ambient Air Quality section, Section 8.1) show that emissions will not result in concentrations of criteria pollutants in air that exceed ambient air quality standards (either NAAQS or CAAQS). These standards are intended to protect the general public with a wide margin of safety. Therefore, the project is not anticipated to have a significant impact on public health from emissions of criteria pollutants.

Potential impacts associated with emissions of toxic pollutants to the air from the proposed facility were addressed in a health risk assessment, presented in Appendix 8.1-G. The risk assessment was prepared using guidelines developed under the AB 2588 Air Toxics "Hot Spots" Information and Assessment Act (CAPCOA 1993).

8.9.2.4 Public Health Impact Study Methods

Emissions of toxic pollutants potentially associated with the facility were estimated using emission factors approved by CARB, and the U.S. Environmental Protection Agency (USEPA). Concentrations of

these pollutants in air potentially associated with the emissions were estimated using dispersion modeling. Modeling allows the estimation of both short-term and long-term average concentrations in air for use in a risk assessment, accounting for site-specific terrain and meteorological conditions. Health risks potentially associated with the estimated concentrations of pollutants in air were characterized in terms of excess lifetime cancer risks (for carcinogenic substances), or comparison with reference exposure levels for non-cancer health effects (for non-carcinogenic substances).

Health risks were evaluated for a hypothetical maximum exposed individual (MEI) located at the MIR (maximum impact receptor). The hypothetical MEI is an individual assumed to be located at the point (MIR) where the highest concentrations of air pollutants associated with facility emissions are predicted to occur, based on air dispersion modeling. Human health risks associated with emissions from the proposed facility are unlikely to be higher at any other location than at the location of the MIR. If there is no significant impact associated with concentrations in air at the MIR location, it is unlikely that there will be significant impacts in any location near the facility.

Health risks potentially associated with concentrations of carcinogenic pollutants in air were calculated as estimated excess lifetime cancer risks. The excess lifetime cancer risk for a pollutant is estimated as the product of the concentration in air and a unit risk value. The unit risk value is defined as the estimated probability of a person contracting cancer as a result of constant exposure to an ambient concentration of 1 $\mu g/m^3$ over a 70-year lifetime. In other words, it represents the increased cancer risk associated with continuous exposure to a concentration in air over a 70-year lifetime. Evaluation of potential noncancer health effects from exposure to short-term and long-term concentrations in air was performed by comparing modeled concentrations in air with the RELs. An REL is a concentration in air at or below which no adverse health effects are anticipated. RELs are based on the most sensitive adverse effects reported in the medical and toxicological literature. Potential noncancer effects were evaluated by calculating a ratio of the modeled concentration in air and the REL. This ratio is referred to as a hazard quotient. The unit risk values and RELs used to characterize health risks associated with modeled concentrations in air were obtained from the *Consolidated Table of OEHHA/ARB Approved Risk Assessment Health Values* (CARB 2000), and are presented in Table 8.9-3.

8.9.2.5 Characterization of Risks from Toxic Air Pollutants

The excess lifetime cancer risk associated with concentrations in air estimated for the MIR location is estimated to be 0.0743×10^{-6}. Excess lifetime cancer risks less than 10×10^{-6} are unlikely to represent significant public health impacts that require additional controls of facility emissions. Risks higher than 10×10^{-6} may or may not be of concern, depending upon several factors. These include the conservatism of assumptions used in risk estimation, size of the potentially exposed population and toxicity of the risk-driving chemicals. Risks associated with pollutants potentially emitted from the facility are presented by exposure pathway in Table 8.9-4. Further description of the methodology used to calculate health risks associated with emissions to the air is presented in Appendix 8.1-G. As described previously, human health risks associated with emissions from the proposed facility are unlikely to be higher at any other location than at the location of the MIR. If there is no significant impact associated with concentrations in air at the MIR location, it is unlikely that there will be significant impacts in any other location near the facility. The REP MIR is located at the project fenceline.

Table 8.9-3. Toxicity values used to characterize health risks.

Compound	Unit Risk Factor $(\mu g/m^3)^{-1}$	Chronic Reference Exposure Level ($\mu g/m^3$)	Acute Reference Exposure Level ($\mu g/m^3$)
Acetaldehyde	2.7E-06	9.00E+00	--
Acrolein	--	2.00E-02	1.90E-01
Ammonia	--	2.00E+02	3.2E+03
Arsenic	3.3E-03	5.10E-01	1.9E-01
Benzene	2.9E-05	6.0E+01	1.3E+03
1,3-Butadiene	1.7E-04	--	--
Cadmium	4.2E-03	3.50E+00	--
Chromium	1.5E-01	2.00E-03	--
Copper	--	2.40E+00	1.0E+02
Ethylbenzene	--	2.0E+03	--
Formaldehyde	6.0E-06	3.0E+00	9.4E+01
Hexane	--	--	--
Lead	1.2E-05	--	--
Mercury(inorganic)	--	9.0E-02	1.8E+00
Naphthalene	--	9.0E+00	--
Nickel	2.6E-04	5.0E-02	6.0E+00
Polycyclic aromatic hydrocarbons	5.6E-03	--	--
Propylene	--	3.0E+03	--
Propylene oxide	3.7E-06	3.00E+01	3.1E+03
Silver	--	--	--
Toluene	--	3.00E+02	3.7E+04
Xylene	--	7.00E+02	2.2E+04
Zinc	--	3.50E+01	--

Source: CARB/OEHHA, 9-26-2000

Table 8.9-4. Summary of excess lifetime cancer risks for the Maximum Impact Receptor.

	Increased Lifetime Cancer Risk by Exposure Pathway				
Emission Source	Inhalation of Ambient Air	Soil Ingestion	Dermal Contact with Soil	Ingestion of Garden Fruits and Vegetables	Infant Ingestion of Mother's Milk[2]
Total Pathway Risk (Combustion Sources[1] and Cooling Tower)	2.80E-08	8.12E-09	5.16E-09	1.97E-08	1.34E-08
Total Risk	0.0743 in one million (70 year exposure)				

Note: [1]Combustion sources include turbines and duct burners.
[2]Mother's milk risk derived from 44 year exposure scenario.

The chronic noncancer hazard quotients associated with concentrations in air estimated for the MIR location were well below one for all target organs. A noncancer hazard quotient less than one is unlikely to represent a significant impact to public health. Chronic noncancer hazard quotients associated with inhalation of pollutants potentially emitted from the facility are presented in Table 8.9-5. The chemicals providing the largest contribution to noncancer risks associated with facility emissions are acrolein and ammonia, from combustion sources. The chronic noncancer hazard indices associated with non-

inhalation exposure pathways are well below the significance level of 1.0 for all target organs. Chronic noncancer hazard indices for non-inhalation exposure pathways are presented in Table 8.9-6. A noncancer reference exposure level (REL) is not available for lead. However, lead exposures are well below typical estimates of average daily exposures estimated for lead (ATSDR 1996).

Table 8.9-5. Summary of chronic noncancer hazard quotients (inhalation exposure pathway) for the Maximum Impact Receptor.

	Target Organ[1]							
Emission Source	**Resp**	**CV/BL**	**CNS**	**Skin**	**Repro**	**Kidn**	**GI/LV**	**Immun**
Combustion Sources[2] and Cooling Tower	0.006	<0.0001	<0.0001	0.0043	<0.0001	<0.0001	<0.0001	-
Total, All Pathways	<0.0108	-	-	-	-	-	-	-

[1]Resp = respiratory
[2]Combustion sources include turbines and duct burners
CV/BL = cardiovascular/blood, CNS = central nervous system, Repro = reproductive system, Kidn = renal system, GI/LV = gastrointestinal/liver, Immun = immunological system

The acute noncancer hazard quotients associated with concentrations in air are shown in Table 8.9-7. The noncancer hazard quotients for all target organs fall below 1.0. The chemicals providing the largest contribution to acute noncancer health risks are ammonia and acrolein. As described previously, a hazard quotient less than 1.0 is unlikely to represent significant impact to public health. As described previously, human health risks associated with emissions from the proposed facility are unlikely to be higher at any other location than at the location of the MIR. If there is no significant impact associated with concentrations in air at the MIR location, it is unlikely that there will be significant impacts in any other location near the facility.

Table 8.9-6. Summary of chronic non-cancer hazard quotients (non-inhalation exposure pathway) for the Maximum Impact Receptor (mg/kg-d).

Chemical	**Total dose (mg/kg-d) combustion sources and cooling tower**	**REL[1] (mg/kg-d)**	**Hazard Quotient (Total Dose/REL)**
Naphthalene	2.36E-08	-	-
PAH (as BaP)	2.75E-09	-	-
Arsenic	2.15E-12	3.00E-04	7.17E-09
Cadmium	1.04E-13	5.00E-04	2.08E-10
Lead	4.32E-13	-	-
Chromium 6	5.99E-13	2.00E-02	2.99E-11

[1]REL - non-cancer Reference Exposure Level

The estimates of excess lifetime cancer risks and noncancer risks associated with chronic or acute exposures fall below thresholds used for regulating emissions of toxic pollutants to the air. Historically, exposure to any level of a carcinogen has been considered to have a finite risk of inducing cancer. In other words, there is no threshold for carcinogenicity. Since risks at low levels of exposure cannot be quantified directly by either animal or epidemiological studies, mathematical models have used to extrapolate from high to low doses. This modeling procedure is designed to provide a highly conservative estimate of cancer risks based on the most sensitive species of laboratory animal for extrapolation to humans (i.e., the assumption being that man is as sensitive as the most sensitive animal species). Therefore, the true risk is

Table 8.9-7. Summary of acute noncancer hazard quotients for the Maximum Impact Receptor.

Emission Source	Target Organ[1]							
	Resp	CV/BL	CNS	Eye	Repro	Kidn	GI/LV	Immun
Combustion Sources[2] and Cooling Tower	0.2334	<0.0001	<0.0001	0.2334	0.00001	-	-	0.0013
Total Acute Hazard Quotient	<0.4684	-	-	-	-	-	-	-

[1]Resp = respiratory
[2]Combustion sources include turbines and HRSG duct burner
CV/BL = cardiovascular/blood, CNS = central nervous system, Repro = reproductive system, Kidn = renal system
GI/LV = gastrointestinal/liver, Immun = immunological system

not likely to be higher than risks estimated using unit risk factors and is most likely lower, and could even be zero (USEPA 1986; USEPA 1996).

An excess lifetime cancer risk of 10×10^{-6} is typically used as a threshold of significance for potential exposure to carcinogenic substances in air. An excess cancer risk level of 1×10^{-6}, which has historically been judged to be an acceptable risk, originates from efforts by the Food and Drug Administration (FDA) to use quantitative risk assessment for regulating carcinogens in food additives in light of the zero tolerance provision of the Delany Amendment (Hutt 1985). The associated dose, known as a "virtually safe dose" (VSD) has become a standard used by many policy makers and the lay public for evaluating cancer risks. However, a recent study of regulatory actions pertaining to carcinogens found that an acceptable risk level can often be determined on a case-by-case basis. This analysis of 132 regulatory decisions, found that regulatory action was not taken to control estimated risks below 1×10^{-6} (one-in-one million), which are called *de minimis* risks. *De minimis* risks are historically considered risks of no regulatory concern. Chemical exposures with risks above 4×10^{-3} (four-in-ten thousand), called *de manifestis* risks, were consistently regulated. *De manifestis* risks are typically risks of regulatory concern. The risks falling between these two extremes were regulated in some cases, but not in others (Travis et al. 1987).

The estimated lifetime cancer risks to the maximally exposed individual located at the MIR are less than 10×10^{-6}, and the aggregated cancer burden associated this risk level is less than one excess cancer case. These risk estimates were calculated using assumptions that are highly health conservative. Evaluation of the risks associated with the facility emissions should consider that the conservatism in the assumptions and methods used in risk estimation considerably overstate the risks from facility emissions. Based on the results of this risk assessment, there are no significant public health impacts anticipated from emissions of toxic pollutant to the air from the proposed facility.

8.9.2.6 Hazardous Materials

Hazardous materials will be used and stored at the REP. The hazardous materials stored in significant quantities on-site and descriptions of their uses are presented in Section 8.5. Use of chemicals at the REP will be in accordance with standard practices for storage and management of hazardous materials. Normal use of hazardous materials, therefore, will not pose significant impacts to public health. While mitigation measures will be in place to prevent releases, accidental releases that migrate offsite could result in potential impacts to the public.

The California Health and Safety Code Sections 25531 to 25541 and Code of Federal Regulations (CFR) Title 40 Part 68 under the Clean Air Act establish emergency response planning requirements for listed hazardous materials. These regulations require preparation of a Risk Management Plan (RMP), which is a

comprehensive program to identify hazards and predict the areas that may be affected by a release of a wide range of hazardous materials. One of the hazardous materials to be used at the facility is aqueous ammonia, which is discussed in Section 8.5.

An offsite consequence analysis was performed to assess potential risks to humans offsite if a spill or rupture of the aqueous ammonia storage tank were to occur; results of this analysis are presented in Section 8.5.

8.9.2.7 Operation Odors

Small amounts of ammonia used to control oxides of nitrogen (NO_X) emissions may escape up the exhaust stack but will not produce objectionable odors. The expected exhaust gas ammonia concentration, known as ammonia "slip," will be less than 10 parts per million (ppm). After mixing with the atmosphere, the concentration at ground level will be far below the detectable odor threshold of 5 ppm that the Compressed Gas Association has determined to be acceptable. Therefore, potential ammonia emissions are not expected to create objectionable odors. Other combustion contaminants are not present at concentrations that could produce objectionable odors.

8.9.2.8 Electromagnetic Field Exposure

Because the electric transmission line does not travel through residential areas, and based on recent findings of the National Institute of Environmental Health Sciences (NIEHS 1999), electromagnetic field exposures are not expected to result in a significant impact on public health. The NIEH report to the U.S. Congress found that "the probability that EMF exposure is truly a health hazard is currently small. The weak epidemiological associations and lack of any laboratory support for these associations provide only marginal scientific support that exposure to this agent is causing any degree of harm (NIEH 1999)."

8.9.2.9 Summary of Impacts

Results from an air toxics risk assessment based on emissions modeling indicate that there will be no significant incremental public health risks from construction or operation of the proposed project. Results from criteria pollutant modeling for routine operations indicate that potential ambient concentrations of NO_2, CO, SO_2, and PM_{10} will not significantly impact air quality (Section 8.1). Potential concentrations are below the federal and California standards established to protect public health, including the more sensitive members of the population.

8.9.2.10 West Roseville Not Annexed

The REP's emissions would be the same, whether or not the annexation of West Roseville and the build-out of the WRSP take place. Similarly, the potential exposure of local residents to hazardous materials would be approximately the same. Without the build-out of the WRSP, however, there would be fewer sensitive receptors within 1 mile of the project site and there would be no schools, day care centers, or senior centers within 1.25 miles.

8.9.3 Cumulative Impacts

The health risk assessment for the proposed project indicates that the maximum cancer risk will be approximately 0.0743 in one million (verses a significance threshold of 10.0 in one million) at the point of maximum exposure to air toxics from power plant emissions. This risk level is considered to be insignificant. Non-cancer chronic and acute effects will also be less than significant. There are no known sources of air toxics located near the REP site that, cumulatively with the REP, would cause a

significant impact on public health. Though the WRSP includes industrial zoning to the east and southeast of the WRSP, there are currently no specific proposals for the industrial use of this land.

8.9.4 Mitigation Measures

8.9.4.1 Criteria Pollutants

Emissions of criteria pollutants will be minimized by applying Best Available Control Technology (BACT) to the facility. BACT for the combustion turbine includes the combustion of natural gas.

The proposed project location is in an area that is designated by the state as non-attainment for ozone and particulate matter (PM). Therefore, all increases in emissions of NO_X, volatile organic compound (VOC), particulate matter with an aerodynamic diameter less than a nominal 10 micrometers (PM_{10}), and sulfur oxides (SO_X) must be fully offset if emissions exceed trigger limits. The combination of using BACT and providing emission offsets as needed may result in no net increase in criteria pollutants. Therefore, further mitigation of emissions is not required to protect public health.

8.9.4.2 Toxic Pollutants

Emissions of toxic pollutants to the air will be minimized through the use of natural gas as the only fuel at the proposed facility. Emissions from tanks storing liquid organic chemicals will be minimized through the use of one or a combination of the following:

- Use of small capacity fixed roof tanks
- Use of low vapor pressure organic substances
- Use of exempt compounds
- Use of vapor balance and/or vapor recovery systems on a case-by-case basis as deemed appropriate

8.9.4.3 Hazardous Materials

Mitigation measures for hazardous materials are presented below and discussed in more detail in Section 8.5. Potential public health impacts from the use of hazardous materials are only expected to occur as a result of an accidental release. The plant has many safety features designed to prevent and minimize impacts from the use and accidental release of hazardous materials. The REP will include the following design features:

- Curbs, berms, and/or secondary containment structures will be provided where accidental release of chemicals may occur.
- A fire protection system will be included to detect, alarm, and suppress a fire, in accordance with the applicable laws, ordinances, regulations, and standards (LORS).
- Construction of the aqueous ammonia storage system will be in accordance with applicable LORS.

A Risk Management Plan (RMP) for the REP facility will be prepared prior to commencement of facility operations. The RMP will estimate the risk presented by handling ammonia at the facility. The RMP will include a hazard analysis, off-site consequence analysis, seismic assessment, emergency response plan, and training procedures. The RMP process will accurately identify and propose adequate mitigation measures to reduce the risk to the lowest possible level.

A safety program will be implemented and will include safety training programs for contractors and operations personnel, including instructions on: 1) the proper use of personal protective equipment, 2) safety operating procedures, 3) fire safety, and 4) emergency response actions. The safety program will also include programs on safely operating and maintaining systems that use hazardous materials. Emergency procedures for REP personnel include power plant evacuation, hazardous material spill cleanup, fire prevention, and emergency response.

Areas subject to potential leaks of hazardous materials will be paved and bermed. Incompatible materials will be stored in separate containment areas. Containment areas will be drained to either an oily waste collection sump or to the waste water neutralization tank. Also, piping and tanks exposed to potential traffic hazards will be additionally protected by traffic barriers.

8.9.5 Laws, Ordinances, Regulations, and Standards

An overview of the regulatory process for public health issues is presented in this section. The relevant LORS that affect public health and are applicable to this project are identified in Table 8.9-8.

Table 8.9-8. Summary of primary regulatory jurisdiction for public health.

LORS	Public Health Concern	Primary Regulatory Agency	Project Conformance
Clean Air Act	Public exposure to air pollutants	USEPA Region IX CARB PCAPCD	Based on results of risk assessment as per CAPCOA guidelines, toxic contaminants do not exceed acceptable levels. (see Section 8.9.2.5) Emissions of criteria pollutants will be minimized by applying BACT to the facility. Increases in emissions of criteria pollutants will be offset as required by PCAPCD rules. (Section 8.1.)
Health and Safety Code 25249.5 *et seq.* (Safe Drinking Water and Toxic Enforcement Act of 1986—Proposition 65)	Public exposure to chemicals known to cause cancer or reproductive toxicity	Office of Environmental Health and Hazard Assessment (OEHHA)	Based on results of risk assessment as per CAPCOA guidelines, toxic contaminants do not exceed thresholds that require exposure warnings. (see Section 8.9.2.5)
40 CFR Part 68 (Risk Management Plan)	Public exposure to listed hazardous materials	USEPA Region IX Placer Operational Area Office of Emergency Services (OES) City Roseville Fire Department	A vulnerability analysis will be performed to assess potential risks from a spill or rupture of the aqueous ammonia storage tank. (See Section 8.5) An RMP will be prepared prior to commencement of facility operations. (See Section 8.9.4.3)
Health and Safety Code Sections 25531 to 25541	Public exposure to listed hazardous materials	Placer Operational Area Office of Emergency Services (OES), CARB PCAPCD	A vulnerability analysis will be performed to assess potential risks from a spill or rupture of the aqueous ammonia storage tank. (See Section 8.5)

Table 8.9-8. Summary of primary regulatory jurisdiction for public health.

LORS	Public Health Concern	Primary Regulatory Agency	Project Conformance
Health and Safety Code Sections 44360 to 44366 (Air Toxics "Hot Spots" Information and Assessment Act-AB 2588)	Public exposure to toxic air contaminants	CARB PCAPCD	Based on results of risk assessment as per CAPCOA guidelines, toxic contaminants do not exceed acceptable levels. (see Section 8.9.2.5)

Table 8.9-9 also summarizes the primary agencies responsible for public health, as well as the general category of the public health concern regulated by each of these agencies. The conformity of the project to each of the LORS applicable to public health is also presented in this table, as well as references to the selection locations within this report where each of these issues is addressed. Points of contact with the primary agencies responsible for public health are identified in Table 8.9-9.

8.9.6 Permits Required and Schedule

Agency-required permits related to public health include a Risk Management Plan and Placer County Air Pollution Control District Authority to Construct/Permit to Operate. These requirements are discussed in detail in Sections 8.5 (Hazardous Materials Handling) and 8.1 (Air Quality), respectively.

Table 8.9-9. Summary of agency contacts for public health.

LORS	Public Health Concern	Primary Regulatory Agency	Regulatory Contact
Clean Air Act	Public exposure to air pollutants	USEPA Region IX CARB PCAPCD	Gerardo Rios, (415) 744-1500 Richard Bode, (916) 323-8413 John Finnel, (530) 889-7133
Health and Safety Code 25249.5 *et seq.* (Safe Drinking Water and Toxic Enforcement Act of 1986—Proposition 65)	Public exposure to chemicals known to cause cancer or reproductive toxicity	Office of Environmental Health and Hazard Assessment (OEHHA)	Cynthia Oshita or Susan Long, (916) 445-6900
40 CFR Part 68 (Risk Management Plan)	Public exposure to listed hazardous materials	USEPA Region IX" Placer Operational Area Office of Emergency Services (OES)	Gerardo Rios, (415) 744-1500 Rui Cunha (530) 886-5310
Roseville Municipal Code	Public exposure to listed hazardous materials	City of Roseville Fire Department (HazMat)	Ken Wagner (916) 774-5800
Health and Safety Code Sections 25531 to 25541	Public exposure to listed hazardous materials	Placer Operational Area Office of Emergency Services (OES) PCAPCD	Rui Cunha (530) 886-5310 John Finnel (530) 889-7133
Health and Safety Code Sections 44360 to 44366 (Air Toxics "Hot Spots" Information and Assessment Act—AB 2588)	Public exposure to toxic air contaminants	CARB PCAPCD	Richard Bode, (916) 323-8413 John Finnel (530) 889-7133

8.9.7 References

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8.10 SOCIOECONOMICS

This section presents a discussion of the environmental setting, environmental consequences, impacts, and mitigation measures associated with the socioeconomic conditions of the proposed Roseville Energy Park (REP). Section 8.10.1 discusses the regional and local socioeconomic setting. Section 8.10.2 discusses potential environmental effects as they relate to socioeconomics. Section 8.10.3 discusses cumulative impacts and Section 8.10.4 presents proposed mitigation measures for any impacts determined to be significant. Section 8.10.5 presents applicable laws, ordinances, regulations, and standards (LORS) related to socioeconomics, and references agency contacts. Section 8.10.6 presents permit requirements and schedules, and Section 8.10.7 contains a list of references cited.

8.10.1 Affected Environment

The project is located in the City of Roseville in Placer County, which is situated of the Greater Sacramento Area in California. The Greater Sacramento Area includes El Dorado, Placer, Sacramento, Sutter, Yolo and Yuba Counties. Placer County encompasses approximately 946,140 acres (Placer County 2003). County communities include Roseville, Lincoln, Rocklin, Loomis, Auburn, Foresthill, Colfax, Tahoe City, and Kings Beach.

Placer County has experienced substantial growth and development over the past 20 years. One catalyst for this economic growth was the relocation of Hewlett-Packard facilities from the San Francisco Bay area to the City of Roseville in the early 1980s. Business interest in Placer County has continued over the years with expanding or relocating companies attracted to the County's desirable location in the Greater Sacramento Area.

The REP site is owned by the City of Roseville and is located approximately 5 miles northwest of the City Center. The REP site is next to the City of Roseville Pleasant Grove Waste Water Treatment Plant (PGWWTP). The PGWWTP borders the REP site on the south. Portions of West Roseville (West Roseville Specific Plan area) are located to the east and west of the REP site. The area to the north is rural Placer County.

8.10.1.1 Population

The population of City of Roseville is 85,553 (as of January 1, 2002), and it is expected to grow 29.5 percent to 110,793 by 2010 (City of Roseville 2002). By 2010, the Greater Sacramento Area is expected to reach a population of 2,413,800, and Placer County is expected to reach 336,805 (Table 8.10-1), attaining growth rates of 24.7 percent and 35.6 percent, respectively (Placer County 2003).

Table 8.10-1. Estimated population growth in the project area and statewide.

Location	1990	2000	2005	2010
City of Roseville	44,685	79,921	95,200	110,793
Greater Sacramento Area	1,603,745	1,936,006	2,119,793	2,413,800
Placer County	172,796	248,399	292,640	336,805
California	29,760,021	33,871,648	37,473,500	40,262,400

Source: U.S. Census Bureau 2003; City of Roseville 2002; Placer County 2003; State of California 2001.

8.10.1.2 Housing

There is available housing in the City of Roseville, Placer County and the Sacramento-Yolo Metropolitan Statistical Area (MSA), as defined by the U.S. Census Bureau. The City of Roseville had an estimated 31,925 housing units in 2000, with a vacancy rate of 3.6 percent. The Sacramento-Yolo MSA had an estimated 714,981 housing units in 2000, with a vacancy rate of 6.9 percent. These vacancy rates were lower than the Placer County vacancy rate of 13.0 percent in 2000 (Table 8.10-2).

Table 8.10-2. Housing units and vacancy rate.

	1990			2000		
Housing Status	City of Roseville	Placer County	Sacramento MSA[1]	City of Roseville	Placer County	Sacramento-Yolo MSA[1]
Housing units	17,789	77,879	609,904	31,925	107,302	714,981
Occupied	16,606	64,101	556,448	30,783	93,382	665,298
Vacant	1,183	13,778	53,456	1,142	13,920	49,683
Vacancy rate	6.7%	17.7%	8.8%	3.6%	13.0%	6.9%

Source: U.S. Census Bureau 2003

[1]In 1990, the Sacramento MSA included Placer, El Dorado and Sacramento counties

[2]In 2000, the Sacramento-Yolo MSA included Placer, El Dorado, Sacramento and Yolo counties

Housing Availability, Prices and Rentals

During March 2003, housing rentals in the City of Roseville averaged $880 per month for one bedroom, $1,060 per month for two bedrooms, and $1,336 per month for three bedrooms. During 2002, sale prices of homes within the City averaged $275,609, and prices for townhomes and condominiums averaged $129,374 (City of Roseville 2003a). In addition to rental housing, temporary accommodation in the City is available at nine motels and hotels with approximately 1,112 rooms (Peters 2003, personal communication).

8.10.1.3 Employment and the Economy

Placer County is one of the fastest growing areas in California with an economy almost as diverse as its geography. Tourism is the primary economic activity in the eastern North Lake Tahoe area, while high technology sectors dominate in south Placer and the Greater Sacramento Area (Placer County 2003).

In 2001, services, retail trade, and government accounted for 65 percent of the nonfarm employment in Placer County (Table 8.10-5). The services sector is the largest industry employer in the County, accounting for 27.3 percent of total employment. Retail trade is the County's second largest economic sector, accounting for approximately 22.4 percent of employment. This is an ever-growing sector of the County's economy. In 2000, one of the largest regional shopping malls in the Greater Sacramento Area, the Galleria at Roseville, was opened in the City of Roseville, increasing the retail trade employment opportunities in Placer County. This industry is projected to increase steadily over the next few years, as is the economy of the entire County (California Employment Development Department [CEDD] 2002).

Table 8.10-3. Employment by industry in Placer County.

Title	1991	2001	Percent Change 1991-2001
Labor Force:	91,100	127,900	40
Employment	86,900	123,300	42
Unemployment	5,800	4,600	-20
Total, all industries	569,500	736,800	29
Total Farm	4,900	4,400	-10
Total Nonfarm:	564,600	732,400	30
Construction & Mining	31,000	53,400	72
Manufacturing	35,200	51,300	46
Transportation & Public Utilities	24,400	28,100	15
Retail Trade	108,100	129,800	20
Wholesale Trade	26,100	26,700	2
Finance, Insurance & Real Estate	40,000	49,100	23
Services	137,900	205,700	49
Government	162,000	188,400	16

Source: Placer County 2003

Employment data for the City of Roseville, Placer County, the Greater Sacramento Area and the State of California are summarized in Table 8.10-4. These data illustrate that the average annual unemployment rate in 2002 in the City of Roseville was about 2 percent lower than the state average and slightly higher than that of the Placer County and the Greater Sacramento Area. These figures are based on workforce information by place of residence.

Table 8.10-4. 2002 employment statistics in the project area.

Area	Labor Force	Employment	Unemployment	Unemployment Rate
City of Roseville	36,550	34,800	1,750	4.8%
Placer County	138,900	132,600	6,300	4.5%
Greater Sacramento Area[1]	981.4	917.8	44.7	4.6%
California	17,404,600	16,241,800	1,162,800	6.7%

Source: California Employment Development Department (CEDD) 2003; Placer County 2003.

[1]Based on 2001 data

The REP project will create a short-term demand (18- to 20-month construction period starting in early 2005) for various construction trade and operations workers. As a result of the variable nature and duration of construction-related projects, construction workers often commute considerable distances to reach potential job locations. Workers frequently move from one project site to another. Therefore, permanent relocation for any given project is usually not a practical option. Some workers may, however, temporarily relocate on a work-week basis. Since the region's construction labor force is fairly large it is expected that most of the construction workers will commute daily for 1 hour or less each way to the job site.

The project labor supply could be drawn from a radius of approximately 50 miles from the proposed project site, assuming that the one-way commuting time of workers residing within this distance would be approximately 1 hour.

Employment data for power plant construction- and operation-related occupations are presented in Table 8.10-5. Data are presented for Sacramento County, the Golden Sierra Consortium, and the North Central Consortium. These consortia are statistical areas defined by the CEDD. Placer County is included in the Golden Sierra Consortium. The table presents existing and projected employment data for 1999 and 2006, respectively. These data are intended to indicate of the size of the existing construction- and operation-related labor force in Placer County and surrounding counties. These data are estimates of recent employment and growth rates for each occupation. They do not identify the number of unemployed workers by occupation.

Table 8.10-5. Potential labor force in the principal labor pool area[1].

Occupational Title	1999	2006	Percentage Change
Construction:			
Brickmasons	560	740	32.1%
Carpenters	7,600	10,840	42.6%
Electricians	3,400	4,560	34.1%
Insulation workers[2]	310	380	22.6%
Ironworkers (structural metal workers)	330	510	54.6%
Laborers	29,060	38,010	30.8%
Millwrights	280	250	10.7%
Operating engineers	830	1,110	33.7%
Painters	2,010	2,620	30.3%
Pipefitters/plumbers/steamfitters	2,320	2,960	27.6%
Sheetmetal workers	1,980	2,900	46.5%
Supervisors (construction)	2,400	3,260	35.8%
Architects and surveyors (including surveyor technicians)[2]	1,340	1,640	22.4%
Truck drivers	12,930	17,020	31.6%
Welders and cutters	870	1,130	29.9%
Total construction:	66,220	87,930	32.8%
Operations:			
Mechanical engineers (including technicians)[2]	1,150	1,190	3.5%
Electrical and electronic engineers (including technicians)	5,020	7,010	39.6%
Plant and system operators	500	620	24%
Total Operations:	6,670	8,820	32.2%

Source: CEDD 2003b

[1] The labor pool here includes the following:
Sacramento County
The Golden Sierra Consortium: Alpine, El Dorado, Nevada, Placer, and Sierra counties
North Central Consortium: Colusa, Glenn, Lake, Sutter and Yuba counties

[2]No data are available for the North Central Consortium

8.10.1.4 Education

There are three public elementary school districts and one high school district within the boundaries of the City of Roseville: the Dry Creek Joint Elementary School District, the Eureka Union School District, the Roseville City School District and the Roseville Joint Union High School District. The REP is located in the Roseville City School District (Elementary) and the Roseville Joint Union High School District. The four school districts that operate within the City of Roseville have 22 elementary schools (K-8) and 8 high schools (not all within the City of Roseville) (Placer County 2003).

Table 8.10-6. K-12 school enrollment.

School	1998/99	1999/00	2000/01	2001/02	2002/03
City of Roseville[1]	13,861	15,225	15,866	16,680	17,725
Placer County Total	49,102	52,306	54,079	55,531	58,228

Source: California Department of Education 2003

[1]Enrollment figures include only schools within City of Roseville limits.

The average pupil-teacher ratio for all public schools within the City of Roseville limits was 20.8:1 during the 2002-03 school year. This ratio was similar to the Placer County and California pupil-teacher ratios, which were 20.5:1 and 20.7:1, respectively (California Department of Education 2003). There are six private elementary schools located in the City of Roseville. Higher education is available from a wide variety of institutions in the Greater Sacramento area (Placer County 2003).

As noted in the preceding section, it is expected that most of the construction workforce will commute to the site. Therefore, it is not expected that additional services will be required from existing educational facilities.

8.10.1.5 Public Services

Law Enforcement

The principal agency responsible for providing law enforcement in the City of Roseville is the Roseville Police Department. The police department has 95 sworn officers and 68.5 support personnel. The Placer County Sheriff's office also supports law enforcement in the City (City of Roseville 2003b).

Fire Protection

Fire protection service for the City of Roseville is provided by the Roseville Fire Department, which has an ISO Fire Rating of ISO 3. The City of Roseville Fire Department has six fire stations and is staffed by 79.5 paid fire service personnel who are supported by clerical staff.

The closest station to the proposed project site is Fire Station No. 5, at 1567 Pleasant Grove Boulevard, approximately 3.8 miles southeast of the REP site, with an estimated response time of 8 to 10 minutes. The Department's 2003-2004 operating budget is $12,750,000. Fire stations are located at the following sites:

- FS1 401 Oak Street
- FS2 1398 Junction Blvd.
- FS3 1300 Cirby Way
- FS4 1900 Eureka Road
- FS5 1567 Pleasant Grove Blvd.
- FS6 1430 East Roseville Parkway (Kenneth Wagner 2003, personal communication)

Medical Facilities

The Sutter Roseville Medical Center is the closest medical facility to the proposed site. Located at One Medical Plaza in the City of Roseville, it is approximately 9 miles from the REP, with a response time of approximately 20 minutes. The Sutter Roseville Medical Center has 172 licensed beds and more than 400 staff physicians. It is the only trauma center between Sacramento and Reno and operates a 24-hour emergency department. The city also has numerous dentists, optometrists, and other medical specialists (Placer County 2003).

8.10.1.6 Utilities

Electricity and Gas

Electricity is provided by Roseville Electric, which is the City of Roseville's municipal electric utility. Natural gas is supplied by Pacific Gas & Electric Company (City of Roseville 2003b).

Sewer

Sanitary sewer service will be provided by the City of Roseville. Waste water will be discharged to the PGWWTP located immediately south of the REP. The REP will use a zero liquid discharge (ZLD) system that will eliminate waste water discharges from power plant cooling (cooling tower blowdown). See Chapter 6 for a description of the ZLD system.

Water

Potable water service to the REP will be provided by a new onsite well until the City of Roseville supply is available as part of the build-out of the West Roseville Specific Plan. At that time, use of the on-site well will be discontinued, and the project will use water from the City main.

Telephone

Roseville Telephone provides standard telephone service to the City of Roseville (City of Roseville 2003a).

8.10.1.7 Fiscal Resources

Under current law, property taxes are levied and collected in accordance with Proposition 13. Property tax is a significant source of revenue for the City. Property taxes are applied to the value of most secured and unsecured property in the county. Property tax collection is the responsibility of Placer County. Once the County collects property tax, it redistributes a percentage back to the cities.

Tax rate areas in the City of Roseville vary by neighborhood. Tax collections are allocated by the Placer County Assessor's Office. The base tax rate of 1 percent of the property value at time of most recent sale is allocated to the County government. Any additional voter-approved, bonded indebtedness or special district charges or infrastructure bonding is funneled back into the levying districts by the County.

Since Roseville Electric is a department of the City of Roseville, the project will not be assessed for property taxes. A breakdown of City revenue for fiscal years is presented in Table 8.10-7.

The new budget year for the City of Roseville started July 1, 2003. The City's 2003-2004 General Fund operating budget is $91,763,784 million, a 3.6 percent decrease over the prior year's budget.

Use and sales tax in the City of Roseville is the combined statewide rate of 7.25 percent (California State Board or Equalization 2002).

Table 8.10-7. City of Roseville General Fund tax revenue ($000).

Revenue Source	2001-2002	2002-2003	2003-2004
Sales and use tax	31,884	33,481	35,155
Property tax (secured)	10,438	11,942	12,791
Utility user's tax	8,036	4,467	0
Current services	9,071	9,208	9,607
Other	33,515	36,115	34,211
Totals	92,944	95,213	91,764

Source: City of Roseville 2003c

School impact fees for commercial/industrial facilities in the Roseville Joint Union High School District are $0.13 per square foot (Johnson 2003, personal communication).

School impact fees for commercial/industrial facilities in the Roseville City School District are $0.21per square foot (Rundle 2003, personal communication). Since Roseville Electric is a department of the city of Roseville, the project will not be assessed for school impact fees.

8.10.2 Environmental Consequences

8.10.2.1 Potential Environmental Impacts

This section assesses the potential impacts of the proposed REP project on local socioeconomic resources, including population, housing, employment, education (schools), public services and utilities, and fiscal resources. Impacts have the potential to occur locally and/or regionally, although most impacts would be relatively localized. Impacts are assessed by comparing project demands with potentially affected local and regional resources, as appropriate. Overall, the proposed project is not anticipated to have any significant adverse impacts on the local or regional socioeconomic environment.

8.10.2.2 Significance Criteria

The criteria used in determining whether project-related socioeconomic impacts are significant are consistent with standard industry practice and California Code of Regulations Title 14, §15065. Project-related impacts are determined to be significant if they do the following:

- Induce substantial growth or concentration of population, either directly or indirectly
- Displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere
- Displace substantial numbers of people, necessitating the construction of housing elsewhere
- Disrupt or divide the physical arrangement of an established community
- Result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the following: fire protection, police protection, schools, parks, or other public facilities

Other impacts may be significant if they cause substantial change in community interaction patterns, social organizations, social structures, or social institutions; if they cause substantial conflict with community attitudes, values, or perceptions; or if they cause substantial inequities in the distribution of project costs and benefits.

8.10.2.3 Construction Impacts

Construction Workforce

Actual construction will take place over approximately 18 to 20 months, beginning early in 2005. Primary trades in demand will include boilermakers, carpenters, electricians, ironworkers, laborers, millwrights, operators, pipefitters, and others, as presented in Table 8.10-8, which shows the total construction workforce for the REP plant, by craft. Total construction personnel requirements during the 18 to 20 months of construction will be approximately 2,158 person-months, or 180 person-years. Construction personnel requirements will peak at approximately 206 workers during months 11 and 12 of the construction period.

Construction Impacts on Population

Due to the small scale of the project, it is not likely that project construction will generate a significant increase in area population. Almost all of the construction workforce (114 workers on average, peaking to 206 in months 11 and 12), will be drawn from the principal labor pool (Sacramento County, the Golden Sierra Consortium, and the North Central Consortium). The proximity of the project to the labor pool and the fact that individual work assignments typically last from several days to weeks suggest that there will be no permanent relocation of construction workers. Overall, there will be no significant construction-related impacts to local population conditions.

Construction Impacts on Housing

There will be no impact to local housing. As discussed above, there will be no permanent relocation of construction workers. However, there may be some temporary relocation that will impact local hotel/motel conditions. If necessary, there is adequate hotel/motel space available in the City of Roseville (1,112 rooms) to accommodate workers who might choose to commute to the project site on a workweek basis.

Construction Impacts on Employment and the Economy

The project will provide short-term job opportunities for up to 114 construction workers on average. Construction personnel requirements will peak at 206 workers during the two most active months of construction. The average construction workforce of 114 workers represents a negligible percent of the 1999 regional construction labor pool of over 66,000 (Table 8.10-5).

In 2002, the unemployment rates in Placer County and in the City of Roseville were 4.5 percent and 4.8 percent, respectively. These are approximately 2 percentage points below California's civilian unemployment rate of 6.7 percent for the same time period.

Construction Impacts on Education

Construction of the proposed project is not expected to cause significant impacts to population or housing in the City of Roseville and surrounding areas. Most of the construction workforce is expected to commute daily for 1 hour or less each way to the job site. While some workers may relocate on a work-week basis, it is unlikely that construction workers will permanently relocate to the area. As a result, it is also unlikely that there will be any new students entering the local school districts as a result of the

Table 8.10-8. Construction personnel craft by month (months after Notice to Proceed).

Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	Total
Boilermaker	2	2	2	15	15	15	15	15	15	20	20	20	10	10	10	2	2	2	2	194
Carpenter	10	10	10	12	12	12	12	12	12	5	5	5	5	5	5	2	2	2	2	140
Cement mason	2	2	2	5	5	5	5	5	5	2	2	2	0	0	0	0	0	0	0	42
Electricians	5	5	5	15	15	15	15	15	15	30	30	30	12	12	12	3	3	3	3	243
Iron worker	5	5	5	20	20	20	20	20	20	10	10	10	5	5	5	2	2	2	2	188
Labor	10	10	10	15	15	15	15	15	15	10	10	10	5	5	5	2	2	2	2	173
Millwright	0	0	0	15	15	15	15	15	15	10	10	10	5	5	5	2	2	2	2	143
Operator	5	5	5	8	8	8	8	8	8	6	6	6	3	3	3	2	2	2	2	98
Pipe fitter	4	4	4	25	25	25	25	25	25	52	56	56	22	22	22	8	8	8	8	424
Teamster	2	2	2	2	2	2	2	2	2	2	2	2	1	1	1	1	1	1	1	31
Insulation worker	0	0	0	0	0	0	0	0	0	10	10	10	4	4	4	4	4	4	4	58
Painter	0	0	0	0	0	0	0	0	0	0	0	0	4	4	4	4	4	4	4	28
Sheet metal	0	0	0	0	0	0	0	0	0	10	10	10	4	4	4	3	3	3	3	54
Total Craft	45	45	45	132	132	132	132	132	132	167	171	171	80	80	80	35	35	35	35	1816
Field start-up	0	0	0	0	0	0	0	0	0	10	10	10	10	10	10	10	10	10	10	66
Field non-manual	5	5	5	18	18	18	18	18	18	25	25	25	10	10	10	5	5	5	5	276
On-site total	50	50	50	150	150	150	150	150	150	202	206	206	100	100	100	50	50	50	50	2158

proposed construction activities. Therefore, construction of the REP is not expected to have any significant adverse impacts on the local school system and existing education facilities.

Construction Impacts on Public Services and Facilities

The construction of the proposed project is not expected to cause significant demands on public services or facilities. During construction, public services such as police, fire, and medical facilities will only be needed in cases of emergency (i.e., construction accidents). Due to standard safety plans in effect at the project site (see Section 8.16, Worker Health and Safety), it is expected that these occurrences will be rare. Emergency services are available in the City of Roseville close to the proposed project site.

Construction Impacts on Utilities

Construction of the proposed project will not cause significant demands for electricity and gas, sewer, water, or telephone service. All utilities are readily available from local utility providers.

Construction Impacts on Fiscal Resources

The total construction cost of the proposed facility is estimated to be between $100 and $130 million, with approximately $30.0 million of this total paid out as wages and salaries, including benefits (estimated using $54.50/hr for wages plus all benefits). A portion of the wages and salaries paid to construction workers will be spent locally generating expenditures in local industries and additional income in the local economy. This is known as the multiplier effect. Wages and salaries paid to construction workers will generate an estimated $47.7 million in total income in the local and regional economy based on an income multiplier of 1.59.

Local products subject to County taxes will be purchased during the construction process. An estimated $1.5 million to $3 million of products will be purchased from local suppliers during project construction. The current sales and use tax rate in the City of Roseville is 7.25 percent (California State Board of Equalization 2002). Local expenditures of $1.5 million to $3 million will, therefore, generate total tax revenues between $109,000 and $218,000.

As a municipal government, the City of Roseville will not be required to pay property taxes or school impact fees for the project.

8.10.2.4 Operation Impacts

Plant Operation Workforce

The REP is expected to begin commercial operation during the summer of 2006. During commercial operation, the REP is expected to employ approximately 25 full-time employees with job classifications as shown in Table 8.10-9.

Operation Impacts on Population

The proposed facility is expected to employ approximately 25 people in full-time, on-site positions (see Table 8.10-9). Employees will be drawn from the local and regional labor force. Some employees could relocate to be closer to the site, but these possible relocations are not likely to significantly affect the local or regional population, given the small numbers involved.

Table 8.10-9. Plant operation workforce.

Department	Personnel	Shift	Work days
Operations	12 Operating technicians (4 control room operators, 4 outside [auxiliary] operators, 3 water treatment operators, and 1 lead water treatment specialist.	Rotating 12-hour shift, 3 operators per shift	7 days a week
Maintenance	6 Maintenance Technicians (2 mechanical, 2 electrical, and 2 instrumentation)	Standard 8-hour days	5 days a week (Maintenance technicians will also work unscheduled times as required)
Administration	7 Administrators (1 Plant Manager, 1 Plant Engineer, 1 Operations Manager, 1 Maintenance Manager, 1 Compliance Manager, 1 Administrative Assistant, and 1 File Clerk)	Standard 8-hour days	5 days a week with additional coverage as required

Operation Impacts on Housing

Operation of the proposed project will not significantly affect the local housing resources because there will be little or no associated increase in local population.

Operation Impacts on Employment and the Economy

As stated above, during operation, the REP is expected to employ approximately 25 full-time workers. Although there will be a minor increase in employment due to the project, it will not have a significant impact on local employment rates. For the most part, non-technical positions will be filled from the local workforce, while the regional labor force will supply the more technical positions. There are a enough of skilled employees in the region to meet the project's operations labor needs (see Table 8.10-8). Although there will be a minor local increase in employment, the project will not significantly affect local employment rates. The average salary per operations employee is expected to be $58,000 per year, which will result in an average operations payroll of $1.45 million annually. The operations payroll will have a small, but direct, beneficial impact on the local economy through local spending patterns by these employees.

Operation Impacts on Education

Operation of the proposed project is not expected to significantly affect the local school system because there will be little or no associated increase in local school district enrollment. The REP will not be required to pay a school impact fees because Roseville Electric is a municipally owned facility.

Operation Impacts on Public Services

Operation of the proposed project will not cause significant demands on public services or facilities, although there is a potential for increased calls to the City of Roseville Fire Department in the event of an emergency. However, the City of Roseville Fire Department's ISO rating of 3 suggests that it will be able to sufficiently handle any increased activity resulting from the proposed project. If emergency medical services are needed, Sutter Roseville Medical Center is located approximately 9 miles from the site.

Operation Impacts on Utilities

Operation of the proposed project will not cause significant demands for electricity, water, sewer, or telephone service. These utilities are readily available from local utility providers. Natural gas will be used to fuel the electrical generation process, and PG&E has agreed to supply natural gas to the facility (see Chapter 5). Recycled water from the City of Roseville PGWWTP will be used and is in sufficient supply (see Chapter 7).

Operation Impacts on Fiscal Resources

The proposed project will not have a significant effect on fiscal resources, because, as a municipally owned facility, it will not be assessed property taxes.

Environmental Justice

The purpose of Executive Order 12898, *Federal Actions to Address Environmental Justice in Minority and Low Income Populations* (1994), is to avoid adverse environmental, economic, social, or health impacts from federal actions and policies disproportionately affecting minority and low-income communities. The Order requires that impacts on minority or low-income populations be taken into account when preparing environmental and socioeconomic analyses of projects or programs that are proposed, funded, or licensed by federal agencies. The proposed project will not cause disproportionate impacts to minority or low-income populations.

In April 1998, the EPA published its *Final Guidance for Incorporating Environmental Justice Concerns in EPA's NEPA Compliance Analysis*. This document provides specific guidelines for determining whether there are any environmental justice issues associated with a proposed federal project that undertakes analysis of environmental regulatory issues under the National Environmental Policy Act (NEPA).

General Issues

The CEC has incorporated an environmental justice analysis as part of its power plant licensing process under the California Environmental Quality Act (CEQA). The federal government views environmental justice as a civil rights standard and a way of preventing racial and economic discrimination, rather than as a remedy for disproportionate impacts that may already exist. To prove violation of civil rights, the government must show that a project would cause impacts that are "disproportionately high and adverse," either directly, indirectly, or cumulatively. In other words, the following must apply: 1) a significant (high) adverse impact, and 2) this impact must disproportionately affect minority or low-income populations. For power plant permitting, air quality impacts are generally considered most likely to raise issues of racial and economic discrimination.

In general, construction of a new power plant results in a net reduction of regional air emissions because CEC and regional air management district permits require that emission reduction credits be obtained. Identifying the environmental justice effects of power plant-related air emissions is further complicated because air quality impacts may not be highest in a local community near the power plant, but may be highest downwind of a power plant. The fact that the regulatory agencies have set very clear standards for power plant emissions in terms of human health risk assessment may mean that discriminatory project siting can only be viewed cumulatively. If a specific project does not have a significant impact on human health, it can only have a significant and discriminatory impact on a minority or low income population in conjunction with and in addition to, other impacts that population is experiencing, some of which may not be due to air emissions.

Methodology

According to EPA guidelines, the first step in conducting an environmental justice analysis is to define minority and low-income populations. Based on the EPA guidelines, a minority population is present in a project area if the following conditions apply: a) the minority population of the affected area exceeds 50 percent, or b) the minority population percentage in the affected area is meaningfully greater than the minority population percentage in the general population. These guidelines do not provide a numeric measure for low-income populations; rather, they advise that the analyst use the techniques that best suit the project at hand.

The area of potential effect for the purpose of an environmental justice screening is an approximately 6-mile radius surrounding the project site. The CEC has used this distance in past projects to assess potential air emissions effects. The following discussion uses data from the 2000 Census to assess the race and ethnic origin of the population located within six miles of the proposed REP. All census tracts touching on or within the 6-mile radius were included in this analysis. The 6-mile radius from the proposed project site includes portions of the City of Roseville as well as portions of Placer, Sacramento and Sutter counties. The total population in the census tracts located wholly or partially within 6 miles of the proposed project site was 115,641 in 2000. For comparison purposes, ethnicity data for the county and state are presented in Table 8.10-10.

Results

Minority Population—Approximately 91,420 residents or 79.1 percent of the population within six miles of the proposed project site was identified as white in the 2000 Census (Table 8.10-10). Approximately 13,412 residents or 11.6 percent of the population identified Hispanic or Latino origins in the 2000 Census. The U.S. Census Bureau considers Hispanic or Latino origin to be an ethnic category, rather than a racial category. Persons of Hispanic or Latino origin can be of any race.

Table 8.10-10. Race and Hispanic origin within 6-miles of the REP site in 2000 with Placer County and California statistics for comparison.

Race/Ethnicity	6-mile radius	Pct	Placer County	Pct	California	Pct
Total Population:	115,641		248,399		33,871,648	
White	91,420	79.1%	220,053	88.6%	20,170,059	59.5%
Minority	24,221	20.9%	28,346	11.4%	13,701,589	40.5%
Hispanic (of any race)	13,412	11.6%	24,019	9.7%	10,966,556	32.4%

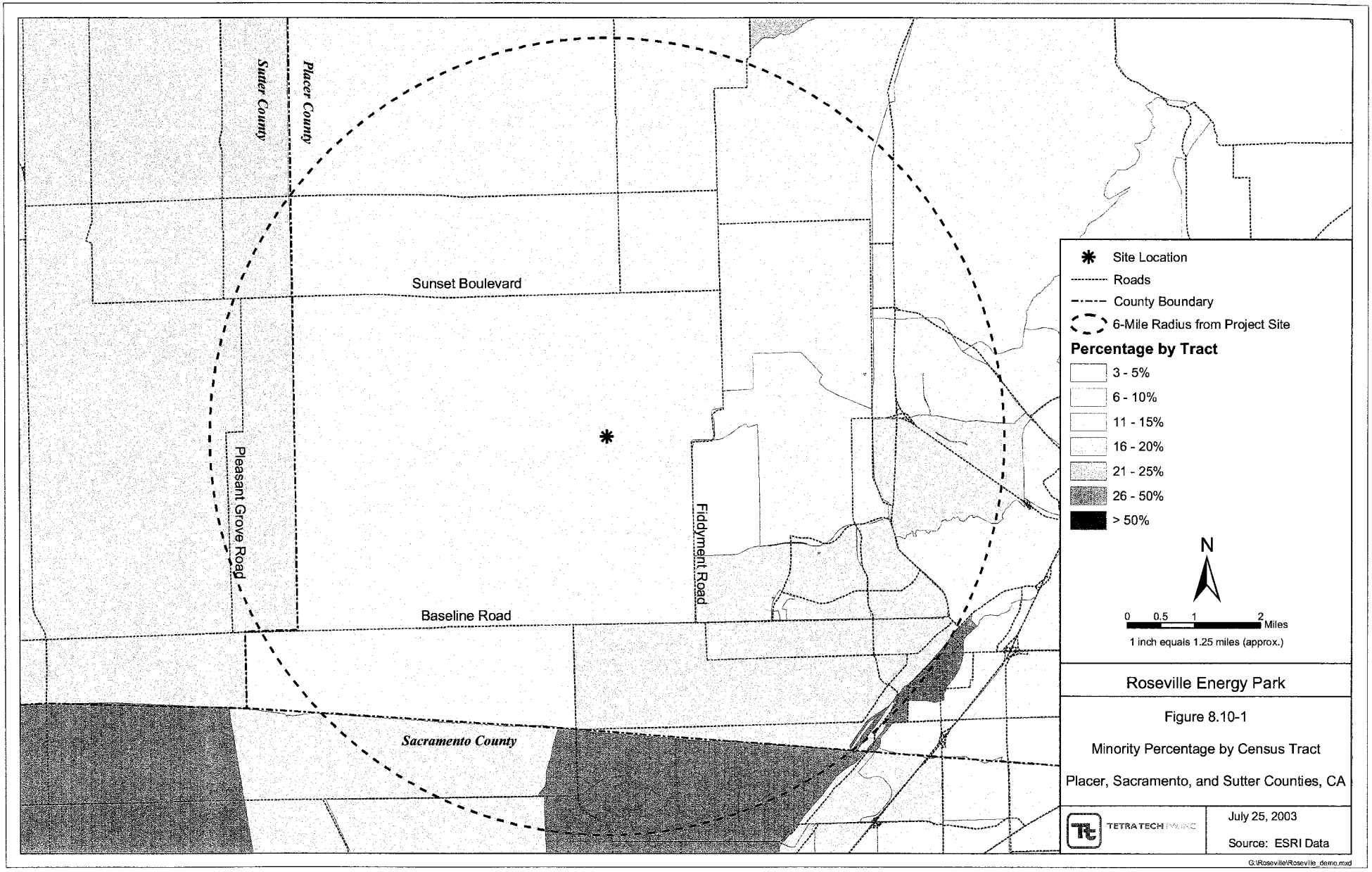
Source: U.S. Census Bureau 2003

There are 20 census tracts within a 6-mile range of the REP project site. The range of the percent of population classified as minority (non-white) in these tracts varies from 3.40 percent to 41.78 percent. The average minority percent rate for the six-mile range is 19.97 percent (U.S. Census Bureau 2003). Figure 8.10-1 illustrates the census tracts, and their percentages of minority population, within a 6-mile radius of the project site. Table 8.10-11 presents the data by census tract. Based on these data, it is clear that the population in the project area does not qualify as a minority population as the minority population, does not exceed 50 percent, and is not meaningfully greater than the minority percentage in the general population.

Table 8.10-11. Ethnic characteristics of population by census tract, six-mile radius of project site, year 2000 Census.

	Total									Percent	
Census Tract	Population	White alone	Black or African American alone	American Indian and Alaska Native alone	Asian alone	Native Hawaiian and Other Pacific Islander alone	Some other race alone	Two or more races	Hispanic	Non-White	Hispanic
020901	3034	2181	27	55	22	5	579	165	1161	28.11	38.27
020902	7334	6016	86	81	223	19	578	331	1645	17.97	22.43
021003	4968	4361	39	36	149	14	196	173	676	12.22	13.61
021004	3692	3075	87	22	288	11	70	139	329	16.71	8.91
021005	5518	4835	85	17	292	6	84	199	381	12.38	6.90
021006	5326	5145	12	7	104	5	10	43	105	3.40	1.97
021007	11135	9391	204	52	724	25	319	420	1061	15.66	9.53
021008	7229	5965	96	63	405	18	397	285	1058	17.49	14.64
021105	5504	4833	70	40	243	11	109	198	486	12.19	8.83
021107	6390	5603	43	85	295	9	125	230	515	12.32	8.06
021301	2747	2432	22	35	34	4	119	101	298	11.47	10.85
021303	5479	4797	81	24	268	13	73	223	392	12.45	7.15
007206	4196	3363	125	64	121	36	231	256	525	19.85	12.51
007207	3965	3291	53	83	125	7	186	220	440	17.00	11.10
007417	3143	1830	308	55	488	25	162	275	343	41.78	10.91
007418	10826	7013	1072	74	1458	68	421	720	1073	35.22	9.91
007419	10122	6980	881	99	1064	45	432	621	1100	31.04	10.87
007420	8166	5051	1158	92	820	63	324	658	1036	38.15	12.69
007421	4164	2975	252	22	494	14	132	275	356	28.55	8.55
051100	2703	2283	14	46	58	3	219	80	432	15.54	15.98
Total	115,641	91,420	4715	1052	7675	401	4766	5612	13,412	20.94%	11.60%

Source: U.S. Census 2000, Data Set: Summary File 2 (SF 2) 100-Percent Data, U.S. Census Bureau 2003.



Roseville Energy Park

Figure 8.10-1

Minority Percentage by Census Tract

Placer, Sacramento, and Sutter Counties, CA

TETRA TECH EM INC

July 25, 2003

Source: ESRI Data

G:\Roseville\Roseville_demo.mxd

Poverty Population—U.S. Census 2000 economic data for poverty levels are not yet available. Data from 1999 estimate that 4.9 percent of the population in the City of Roseville and 5.8 percent of the population of Placer County were living at or below poverty level. Poverty levels were higher in Sutter County and Sacramento where the rates were 15.5 percent and 14.1 percent, respectively. The statewide percent of people living at or below poverty was 14.2 percent in 1999. Based on these data, the project area does not qualify as a low-income or poverty population.

Discussion

The results of the preliminary screening for environmental justice concerns presented above suggest that the population of the census tracts located within a 6-mile radius of the proposed project site will not be considered a minority population. While this screening suggests that the surrounding population may include minority and low-income populations, the key issue from an environmental justice perspective is whether these groups would be disproportionately affected by high and adverse impacts. The proposed project is not expected to have significant environmental impacts; therefore, it is unlikely that surrounding minority and low-income communities will be disproportionately impacted. Air emissions from the project will tend to be dispersed at fairly high altitudes over a very wide area and are not expected to fall disproportionately on minority or low-income communities. Other potential environmental impacts associated with the proposed project are discussed elsewhere in this document.

8.10.2.5 West Roseville Not Annexed

The project's potential effects in terms of socioeconomics would not be significantly different without the West Roseville annexation. Though the transmission and natural gas pipeline routes would differ somewhat from the expected scenario under which the annexation of West Roseville takes place, these changes would have a negligible effect on the economics of the project.

8.10.3 Cumulative Impacts

Due to the small size and temporary nature of construction activities for the REP, no adverse cumulative socioeconomic impacts are anticipated from either construction or operation of the project. That is, there are no impacts of the REP that would be below the level of significance, but that would reach significance cumulatively with other recent or foreseeable developments in the project area. The REP will contribute in a positive way to the area's infrastructure and economy.

8.10.4 Proposed Mitigation Measures

No significant adverse impacts to socioeconomic resources were identified; therefore, no mitigation measures are proposed. Overall, the proposed project is expected to have a positive socioeconomic effect.

8.10.5 Applicable Laws, Ordinances, Regulations, and Standards (LORS)

All applicable LORS and their conformance measures are detailed in the text below. Table 8.10-12 summarizes this information.

8.10.5.1 Federal

Executive Order 12898, "Federal Actions to address Environmental Justice in Minority Populations and Low-Income Populations," focuses federal attention on the environment and human health conditions of minority communities and calls on federal agencies to achieve environmental justice as part of this mission. The order requires the U.S. Environmental Protection Agency (EPA) and all other federal agencies (as well as state agencies receiving federal funds) to develop strategies to address this issue. The agencies are required to identify and address any disproportionately high and adverse human health or

Table 8.10-12. Laws, ordinances, regulations and standards.

LORS	Document and Section	Applicability	AFC Section Where Conformance is Discussed	Agency/Contact
Federal:				
	Environmental Justice	Nondiscrimination in siting or operating facilities	8.10.2.4	EPA Region 9 Willard Chin (415) 972-3797
State:				
General Plan	California Government Code, Section 65302	Requires each city/county to implement a General Plan	8.10.5.2	City of Roseville Planning Department Paul Richardson 916-774-5276
Local:				
School Impact Fees	Roseville City School District	School impact fees on new development in the City	8.10.2.3	Roseville City School District Patricia Rundle Administrative Assistant 916-782-5289, ext. 100
School Impact Fees	Roseville Joint Union High School District	School impact fees on new development in the City	8.10.2.3	Roseville Joint Union High School District Helen Johnson Administrative Assistant 916-782-6565

environmental effects of their programs, policies, and activities on minority and/or low-income populations.

The Civil Rights Act of 1964, Public Law 88-352, 78 Stat.241 (Codified as amended in scattered sections of 42 U.S.C.), Title VI of the Civil Rights Act, prohibits discrimination on the basis of race, color, or national programs in all programs or activities receiving federal financial assistance.

8.10.5.2 State

California State Planning Law, Government Code Sections 65302 et seq.

This code requires that each city and county adopt a General Plan consisting of seven mandatory elements to guide its physical development. Section 65302(c) requires a housing element and Section 65302(e) requires that an open space element be included in the General Plan. Section 65303(a) provides that optional elements also may be included in the General Plan. The City of Roseville manages local development through the City of Roseville General Plan, which was created in 1992.

California Government Code, Sections 65996-65997

As amended by SB 50 (Stats. 1998, ch. 407, sec.23), these sections state that public agencies may not impose fees, charges, or other financial requirements to offset the cost for school facilities.

Title 14, California Code of Regulations, Section 15131

- Economic or social effects of a project shall not be treated as significant effects on the environment.
- Economic or social factors of a project may be used to determine the significance of physical changes caused by the project.
- Economic, social and particularly housing factors shall be considered by public agencies together with technological and environmental factors in deciding whether changes in a project are feasible to reduce and or avoid the significant effects on the environment.

8.10.5.3 Local

City of Roseville

The Public Facilities Element of the City of Roseville General Plan (1992, amended 2003) states that the City of Roseville prides itself on being a full-service city providing its residents with water, wastewater, recycled water, solid waste, electric, and library services. The purpose of the Public Facilities Element is to identify facility and service needs of the community as growth and development occur. The following are goals the City of Roseville has identified for the Electric Utility (Roseville Electric):

- Maintain a municipal electric utility that provides an efficient, economical, and reliable electric system.
- Provide electric services to all existing and future Roseville development through the City's Electric Utility. The provision of services by another provider may be considered where it is determined that such service is beneficial to the City and its utility customers or the provision of City services is not feasible.
- Maintain adequate resource reserves consistent with industry standards, sound utility planning, and applicable contracts.
- Aggressively pursue cost-effective and environmentally safe alternative sources of energy and energy conservation measures

The REP project will comply with this regulation by providing a new source of clean and reliable electricity for the City of Roseville.

Roseville City School District and the Roseville Joint Union High School District

School Impact Fees are assessed pursuant to the California Education Code Section 17620 and Government Code Section 65995(b)(2).

8.10.5.4 Involved Agencies and Agency Contacts

Table 8.10-13 summarizes this information a list of agencies and contact persons.

Table 8.10-13. Agency contacts.

LORS	Applicability	Agency/Contact
City of Roseville Police Department	Construction, safety & emergency response	City of Roseville Police Department Joel Neves (916) 774-5319
City of Roseville Fire Department	Construction, safety & emergency response	City of Roseville Fire Department Chief Ken Wagner (916) 774-5800
Placer County Sheriff's Department	Construction, safety & emergency response	Placer County Sheriffs Department Sheriff Edward N. Bonner (530) 889-4000
Sutter Roseville Medical Center	Emergency response	Sutter Roseville Medical Center (916) 781-1000
Placer County Assessors Office Tax revenues	Tax revenues	Placer County Assessors Office Bruce Dear Assessor (530) 889-4300

8.10.6 Permits Required and Schedule

No permits related to the socioeconomic aspects of the project are required.

8.10.7 References

California State Board of Equalization. 2002. *California city and county sales and use tax rates.* Publication Labor No. 71.

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U.S. Census Bureau. 2003. American Fact Finder for census tract information, 2003. Internet site: http://factfinder.census.gov/.

U.S. Environmental Protection Agency. 1998. Final Guidance for incorporating environmental justice concerns in EPA's NEPA Compliance Analysis. April 1988.

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8.11 SOILS AND AGRICULTURE

This section presents an evaluation of the potential environmental effects from construction and operation of the proposed Roseville Energy Park (REP) and associated linear facilities on soils and agriculture. The REP will be located in the City of Roseville, Placer County, California. This assessment includes the REP site as well as the natural gas pipeline route alternatives, recycled water supply pipeline, sanitary sewer pipeline, storm water outfall, and construction laydown and worker parking areas.

Section 8.11.1 describes the existing environment that the project may affect. Section 8.11.2 identifies potential environmental impacts resulting from construction and operation of the REP plant. Section 8.11.3 discusses potential cumulative impacts, and Section 8.11.4 describes proposed mitigation measures. Section 8.11.5 addresses laws, ordinances, regulations, and standards (LORS) applicable to soils and agriculture. Section 8.11.6 describes the agencies involved and provides agency contacts, and Section 8.11.7 describes the permits required and a schedule for obtaining such permits. Section 8.11.8 contains a list of references cited.

8.11.1 Affected Environment

The REP will be located on a 12-acre site within a larger 40-acre parcel on Phillip Road in the City of Roseville. The project site and surrounding areas consist of a wide variety of soil types, ranging in texture from silty clays to silty sands, that are derived from older fan deposits of the Quaternary Riverbank and Turlock Lake formations (see Section 8.4, Geological Hazards and Resources). This project site is not designated as prime farmland or unique farmland by the California Department of Conservation (California Department of Conservation 1995). The project site could be classified as farmland of statewide importance if it were in agricultural production. The site has, however, been out of agricultural production for several years, is publicly owned by the City of Roseville, and is zoned Public/Quasi-Public.

8.11.1.1 Soil Resources

Identification of soil types and their distribution was accomplished primarily through a review of maps provided by the U.S. Soil Conservation Service (now called the Natural Resources Conservation Service [NRCS]). Figure 8.11-1 is a detailed map of the surficial soils in the project area. The soil map units associated with the REP facility, construction laydown areas, and natural gas pipeline, recycled water pipeline, sanitary sewer pipeline, and stormwater outfall routes are listed in Table 8.11-1. Table 8.11-2 provides a detailed summary of the physical and chemical characteristics of each soil type identified from the project site. This information was obtained from the Soil Survey of Placer County, California (US Department of Agriculture Soil Conservation Service 1980).

REP Parcel

The power plant site is entirely situated within the Cometa-Ramona sandy loam soil type (see Figure 8.11-1). The Cometa-Ramona sandy loam is moderately slowly to very slowly permeable and well drained, with a slight erosion hazard.

Natural Gas Pipeline Alternative Routes

The proposed natural gas pipeline alternatives routes cross several soil series, including, most prominently, the Fiddyment-Cometa-Kaseberg series and the Cometa-Ramona series (Figure 8.11-1) and

Table 8.11-1. Soil mapping unit identified by project component.

Project Component	Soil Mapping Unit
REP Parcel	142 - Cometa-Ramona sandy loams, 1 to 5 percent slopes 195 – Xerofluvents, hardpan substratum
Natural Gas Pipeline Alternative A	195 - Xerofluvents, hardpan substratum 193 - Xerofluvents, occasionally flooded 104 - Alamo-Fiddyment complex, 0 to 5 percent slopes 140 - Cometa sandy loam, 1 to 5 percent slopes 175 - Ramona sandy loam, 2 to 9 percent slopes 141 - Cometa-Fiddyment complex, 1 to 5 percent slopes 191 - Sobrante silt loam, 2 to 15 percent slopes 147 - Fiddyment-Kaseberg loams, 2 to 9 percent slopes 182 - San Joaquin-Cometa sandy loams, 1 to 5 percent slopes 142 - Cometa-Ramona sandy loams, 1 to 5 percent slopes 146 - Fiddyment loam, 1 to 8 percent slopes
Natural Gas Pipeline Alternative B	142 - Cometa-Ramona sandy loams, 1 to 5 percent slopes 141 - Cometa-Fiddyment complex, 1 to 5 percent slopes 182 - San Joaquin-Cometa sandy loams, 1 to 5 percent slopes 147 - Fiddyment-Kaseberg loams, 2 to 9 percent slopes 195 - Xerofluvents, hardpan substratum 175 - Ramona sandy loam, 2 to 9 percent slopes
Natural Gas Pipeline Alternative B1	Same as Alternative B
Natural Gas Pipeline Alternative C	195 - Xerofluvents, hardpan substratum 142 - Cometa-Ramona sandy loams, 1 to 5 percent slopes 141 - Cometa-Fiddyment complex, 1 to 5 percent slopes 195 - Xerofluvents, hardpan substratum 147 - Fiddyment-Kaseberg loams, 2 to 9 percent slopes 182 - San Joaquin-Cometa sandy loams, 1 to 5 percent slopes 140 - Cometa sandy loam, 1 to 5 percent slopes 193 - Xerofluvents, occasionally flooded 146 - Fiddyment loam, 1 to 8 percent slopes
Recycled Water Pipeline	142 - Cometa-Ramona sandy loams, 1 to 5 percent slopes
Sanitary Sewer Pipeline	142 - Cometa-Ramona sandy loams, 1 to 5 percent slopes 195 - Xerofluvents, hardpan substratum
Storm Water Outfall Pipeline	142 - Cometa-Ramona sandy loams, 1 to 5 percent slopes 195 - Xerofluvents, hardpan substratum

Source: USDA Soil Conservation Service 1980.

a variety of soil types including xerofluvents, Alamo-Fiddyment complex, Cometa sandy loam, Ramona sandy loam, Cometa-Fiddyment complex, Sobrante silt loam, Fiddyment-Kaseberg loams, San Joaquin-Cometa sandy loams, Cometa-Ramona sandy loams, and Fiddyment loam. These are mostly deep and well-drained soils that have formed on terraces (USDA SCS 1980). Construction of the gas pipeline along any of these alternative routes will only temporarily affect these soils.

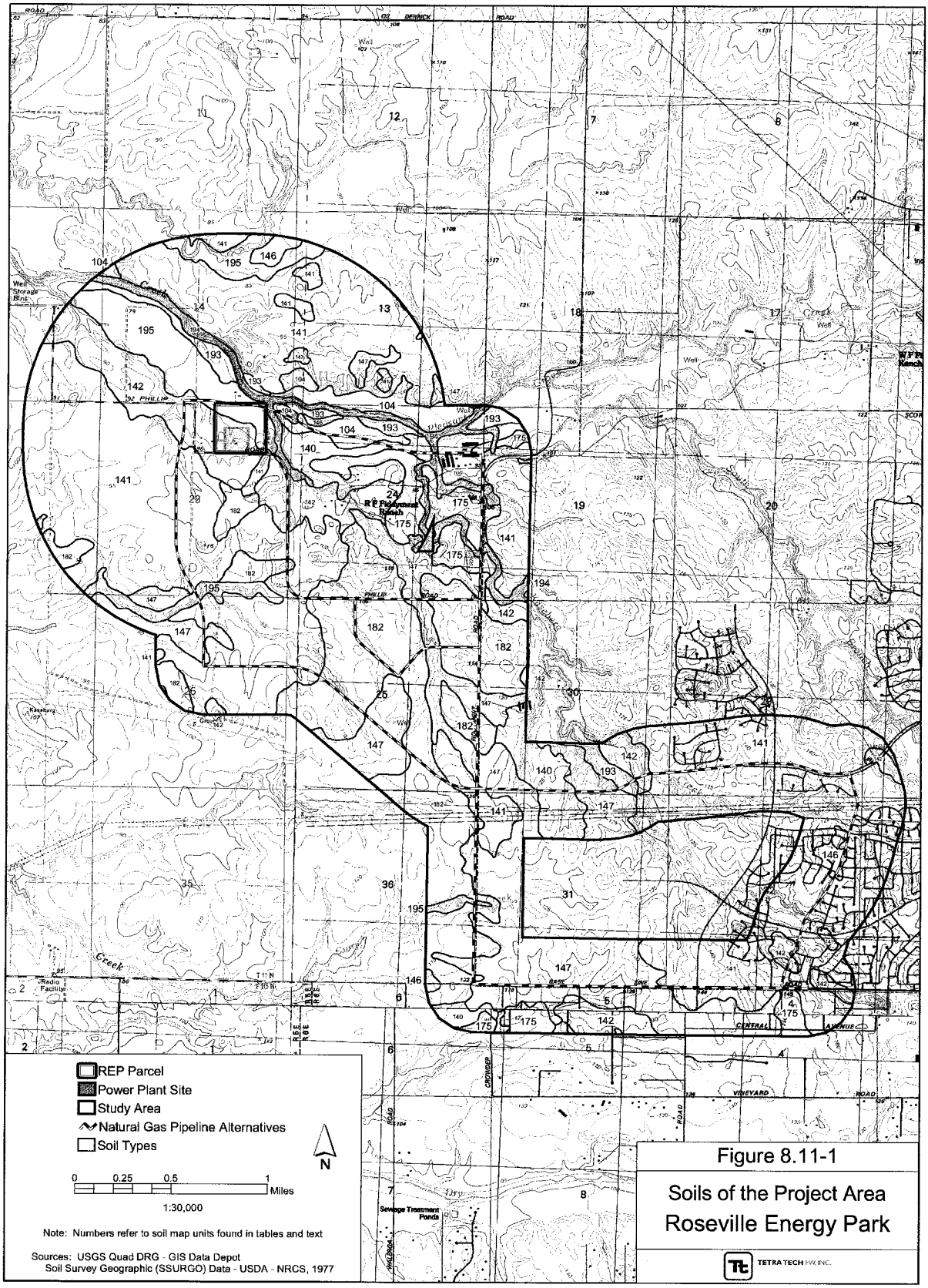

Figure 8.11-1

Soils of the Project Area
Roseville Energy Park

TETRA TECH EM, INC.

Recycled Water Pipeline

The recycled water pipeline crosses Phillip Road between the REP and the Pleasant Grove Waste Water Treatment Plant (PGWWTP) in soils characterized as Cometa-Ramona sandy loam. Because the pipeline will lie entirely beneath Phillip Road (where it is not within the REP or PGWWTP boundaries), there will be little disturbance to soils.

Sanitary Sewer Pipeline

The sanitary sewer pipeline will follow the shoulder of Phillip Road for 800 feet east to the PGWWTP lift station within the Cometa-Ramona sandy loam type. The pipeline will also encounter xerofluvents with hardpan substratum in the unnamed tributary to Pleasant Grove Creek that it crosses. Disturbance to soils will be temporary.

Storm Water Outfall

The storm water outfall will extend for 720 feet east of the power plant fenceline to an unnamed tributary of Pleasant Grove Creek within the Cometa-Ramona sandy loam type. It will also encounter xerofluvents with hardpan substratum at the unnamed tributary to Pleasant Grove Creek. Disturbance to soils will be temporary.

8.11.1.2 Agricultural Resources

Local agricultural uses in western Placer County include livestock grazing, irrigated pasture, nursery products, chickens and other poultry, and irrigated rice. The predominant agricultural use near the project site is livestock grazing, but large areas of rice cultivation are located to the west, there is some hay and grain cultivation to the north and south of the project site, and nut-crop orchards are located to the east. Livestock grazing currently occurs adjacent to the project site to the north, east, and west. Existing land use, including agricultural use in the area is discussed in Section 8.6, Land Use. The following section is limited to agricultural use for each project component.

There is no prime or unique farmland, as defined by the California Department of Conservation on the project parcel. Agricultural land along the natural gas pipeline alternative routes is mostly classed as farmland of local importance (Department of Conservation 1995), though the pipeline routes cross small areas containing land classed (by soil type) as prime farmland or farmland of statewide importance. The project parcel has not been in agricultural production for several years and is no longer zoned agricultural.

REP Parcel

As mentioned in Section 8.11.1 (Affected Environment) the project site is zoned Public/Quasi-Public. There are no agricultural crops on or near the REP power plant parcel. Soil types on the project site itself consist of Cometa-Ramona sandy loams (map unit 142) and xerofluvents with hardpan substratum (map unit 195). These are both Class III soils (USDA SCS 1980) and would not qualify as prime farmland if zoned agricultural. Both of these soil types, however, could be classed by the California Department of Conservation as farmland as statewide importance. The REP site is not used for agriculture, however, so the project will not displace any currently used agricultural land.

Table 8.11-2. Soil mapping unit descriptions.

Map Symbol[1]	Map Unit Name	Depth (inches)	USDA texture	Permeability	Drainage	Erosion Hazard	Land Capability[2]	pH
104	Alamo-Fiddyment complex (0 to 5 percent slopes)					Slight	IVw-5(17)	
			Clay	Very slow	Poorly drained			
	—Alamo	0-37	Loam, clay loam,	Very slow	Well drained			6.1-8.4
	—Fiddyment	0-35	weathered bedrock					5.1-7.3
140	Cometa sandy loam (1 to 5 percent slopes)	0-60	Sandy loam, clay, clay loam, sandy loam	Very slow	Well drained	Slight	IIIe-3(17)	5.6-7.3
141	Cometa-Fiddyment complex (1 to 5 percent slopes)				Well drained	Slight	IVe-3(17)	
	—Cometa	0-60	Sandy loam, clay, clay loam	Very slow				5.6-7.3
	—Fiddyment	0-35	Loam, clay loam, weathered bedrock	Very slow				5.1-7.3
142	Cometa-Ramona sandy loams (1 to 5 percent slopes)				Well drained	Slight	IIIe-3(17)	
	—Cometa	0-60	Sandy loam, clay, clay loam	Very slow				5.6-7.3
	—Ramona	0-73	Sandy loam, loam, gravelly sandy loam, gravelly coarse sandy loam	Moderately slow				5.6-7.3
146	Fiddyment loam (1 to 8 percent slopes)	0-35	Loam, clay loam, weathered bedrock	Very slow	Well drained	Slight to Moderate	IVe-3(17)	5.1-7.3
147	Fiddyment-Kaseberg loams (2 to 9 percent slopes)				Well drained	Slight to Moderate	IVe-3(18)	
	—Fiddyment	0-35	Loam, clay loam, weathered bedrock	Very slow				5.1-7.3
	—Kaseberg	0-17	Loam, weathered bedrock	Moderate				5.6-6.5

Table 8.11-2. Soil mapping unit descriptions.

Map Symbol[1]	Map Unit Name	Depth (inches)	USDA texture	Permeability	Drainage	Erosion Hazard	Land Capability[2]	pH
175	Ramona sandy loam (2 to 9 percent slopes)	0-73	Sandy loam, loam, sandy clay loam, gravelly sandy loam, gravelly coarse sandy loam	Moderately slow	Well drained	Slight or moderate	IVe-3(17)	5.6-7.3
182	San Joaquin-Cometa sandy loams (1 to 5 percent slopes)			Very slow	Well drained	Slight	IVe-3(17)	
	—San Joaquin	0-60	Sandy loam, clay loam, clay, stratified sandy loam to loam					5.6-7.8
	—Cometa	0-60	Sandy loam, clay, clay loam					5.6-7.3
185	Sierra sandy loam (15 to 30 percent slopes)	0-41	Sandy loam, loam, clay loam, sandy clay loam, weathered bedrock	Moderately slow	Well drained	High	VIe(18)	5.6-7.3
193	Xerofluvents, occasionally flooded	0-60	Variable	Moderate to moderately slow	Well drained	Slight	IIw-2(17,18)	—
194	Xerofluvents, frequently flooded	0-60	Variable	Variable	Poorly drained	High	IVw-2(17,18,22)	—
195	Xerofluvents, hardpan substratum	0-40	Variable, indurated	Moderately slow	Poorly drained	Slight	IIIw-2(17)	—

1 Soil numbers refer to numbers shown on Figure 8.11-1 (Soil Map of Project Area).

2 An indication of the suitability of soils for most kinds of field crops. Land capability classes are I through VIII. Subclasses are designated by letters e, w, s, or c. The land capability units are 0 through 9. See Soil Survey of Placer County, California, p. 11-72.

Source: U.S. Department of Agriculture Soil Conservation Service July 1980.

Natural Gas Pipeline Alternatives

Construction of the natural gas pipeline will take place along city streets and arterials and in open fields currently used for livestock grazing. For example, Alternative gas route A crosses agricultural land in the planned, and as yet unconstructed, new (under the West Roseville Specific Plan [WRSP]) alignment of Blue Oaks Boulevard between Fiddyment Road and the plant site. Alternative B crosses agricultural land between Fiddyment Road at Del Webb Boulevard and Phillip Road. Alternative C extends across what is currently agricultural land, between Fiddyment Road at Pleasant Grove Boulevard west along the planned new (WRSP) alignment if Pleasant Grove Boulevard and then north along the planned new (WRSP) alignment of West Side Drive. Only Alternative B1 follows Phillip Road and would cross agricultural land if constructed adjacent to the roadway, rather than in the pavement.

Project effects on agricultural land, however, would be temporary and would be limited to the construction phase. The pipeline will be constructed in the future right-of-way of the WRSP street grid and also along Pacific Gas & Electric (PG&E) and Roseville Electric (RE) transmission line rights-of-way. After construction in the open field areas, the land will be restored and reseeded to its preconstruction state. Eventually, the agricultural land along these pipeline routes will be displaced by urban development as part of the build-out of West Roseville.

Recycled Water Pipeline

The 40-foot-long recycled water pipeline will cross Phillip Road to the PGWWTP and will not cross any agricultural land.

Sanitary Sewer Pipeline

The 720-foot-long sanitary sewer pipeline will be installed in the shoulder of Phillip Road between the power plant site and the PGWWTP influent junction structure east of the REP and will not cross any agricultural land.

Storm Water Outfall

The storm water outfall will extend for 340 feet east of the REP parcel to the unnamed drainage. It will cross vacant land not currently used for agriculture. There will, therefore, be no construction impacts to agriculture.

8.11.2 Environmental Consequences

The following subsections describe the probable environmental effects on agricultural production and soils during the construction and operational phases of the project.

8.11.2.1 Soil Resources

The Universal Soil Loss Equation is typically used to quantify water-induced soil loss in agricultural areas. Because there will be no conversion of agricultural land during construction, estimates of soil loss have not been determined. Erosion characteristics of individual soil series have been included in Table 8.11-2. The soil series affected by this project have erosion hazards of slight to high (USDA SCS 1980). Anticipated soil erosion during and after construction will be minimized through implementation of the erosion control measures. Routine vehicle traffic during operation of the project will be limited to existing roads, most of which are paved, and normal operational activities will not disrupt soils.

The proposed natural gas pipeline alternative routes all follow existing roadways or as yet unconstructed new roadways with routes designated in the WRSP, which will facilitate access and reduce project-related disturbances. Disturbed areas along the pipeline route will be allowed to revegetate following construction activities.

Significance Criteria

The project could cause a significant environmental impact relative to soil resources by causing the following:

- Accelerated wind or water-induced soil erosion resulting from project construction or operation
- Increased sedimentation in stream channels and stream crossings

Impacts to soil resources would be significant if construction activities were to occur in areas of high erosion susceptibility and if the disturbed areas were left exposed and not properly stabilized.

Construction Impacts

The magnitude, extent, and duration of any construction-related effects on soil resources would depend on several factors, including the proximity of the construction to water; the soils affected; and the method, duration, and time of year of construction.

Power Plant Site and Construction Laydown Areas

Construction of the power plant site will require grading and earthwork. Graded areas will be smooth, compact, free from irregular surface changes, and sloped to drain toward the natural drainage system. Any cut-and-fill slopes for permanent embankments will be designed to withstand horizontal ground accelerations for Seismic Zone 3. Geogrid reinforcement for fill slopes and soil nailing for cut slopes will be provided, if necessary, for slopes requiring soil reinforcement to resist seismic loading. Slopes for embankments will be no steeper than 2:1 (horizontal:vertical).

Any areas to be backfilled (if needed) will be prepared by removing unsuitable material and rocks. The bottom of an excavation will be examined for loose or soft areas. Such areas will be fully excavated and backfilled with compacted fill in layers of uniform, specified thickness. Structural fill supporting foundations, roads, parking areas, etc., will be compacted in accordance with American Society for Testing and Materials (ASTM) standards. Final grading will include aggregate surfacing of portions of the site to control erosion, except for paved roadways or landscaped areas. Erosion control measures might also included swales and ditches hydro-seeded for revegetation.

The surficial soils at the REP site are predominantly sandy loam, clay, and clay loam (Cometa-Ramona sandy loam). The cut-and-fill operations at the site will result in alteration of the existing soil profiles. Alteration of the existing soil profiles, including mixing of soils and rock, will alter the physical, chemical, and biological characteristics of the native soils. Clearing of the protective vegetative cover and the subsequent soil disturbance will likely result in short-term (construction related) increases in water and wind erosion rates. The proposed project design will include measures to stabilize fill areas and cut slopes and to control drainage and erosion. These design measures are expected to minimize erosion and sedimentation to acceptable levels.

Following construction, wind and water erosion on the plant site will be reduced, because the site will be leveled, compacted, covered with concrete and/or aggregate, and drainage will be controlled through a storm drain system. Implementation of the mitigation measures discussed in Section 8.11.4 will limit

impacts to the soil resources at the power plant site to acceptable levels. There will likewise be no significant impacts from air emissions to the surrounding soil-vegetation system.

Following construction, wind and water erosion on the plant site will be negligible, because the plant site will be leveled; compacted; covered with concrete, aggregate, mulch, protective covering (e.g., jute netting), or vegetation; and drainage will be controlled through a storm water conveyance system.

Significant soil loss during and following construction activities is not anticipated due to the implementation of various best management practices (BMPs). If soil loss does occur, however, it will be arrested at the storm water ponds. Before construction and, in accordance with NPDES permit requirements, an SWPPP will be prepared where the most appropriate BMPs are identified to minimize soil loss from the site.

Natural Gas Pipeline

The construction right-of-way disturbances along the natural gas pipeline alternative routes are expected to be approximately 50 feet wide in open areas, to accommodate excavators, trucks and other equipment, and spoil piles. In urban areas where the trench is shored, the actual disturbance area will only be about 3 feet wide. Effects on soils and prospects for soil erosion are slight in the improved areas along the pipeline routes (Baseline Road, Country Club Lane, Pleasant Grove Boulevard, Fiddyment Road) because the pipeline will be constructed in or next to paved city streets in these areas. In other areas, including the existing alignment of Phillip Road and the planned new alignments (under the WRSP) of Blue Oak Boulevard, Phillip Road, Pleasant Grove Boulevard, and West Side Drive, the pipeline could be constructed in open fields, and the potential for soil erosion without controls would be much greater. Clearing of the protective vegetative cover and the subsequent soil disturbance will likely result in short-term increases in water and wind erosion rates. Following construction, wind and water erosion on the plant site will be reduced, because pipeline rights-of-way will be leveled, compacted, recontoured, and allowed to naturally revegetate.

Recycled Water Pipeline

The recycled water pipeline will extend across Phillip Road between the REP and the PGWWTP. For this reason, such the opportunities for soil erosion will be very slight, since Phillip Road will be resurfaced after construction or the pipe will be bored under the existing roadway.

Sanitary Sewer Pipeline

The construction right-of-way disturbances for the sanitary sewer pipeline will be somewhat similar to those for the natural gas pipeline. Because the pipeline will be placed next to Phillip Road, however, the effects on soils and prospects for soil erosion will be minimal, as long as drainage and ground contours are restored after construction.

Storm Water Outfall

The construction right-of-way disturbances for the storm water outfall will be similar to those for the natural gas pipeline. Clearing of the protective vegetative cover and the subsequent soil disturbance will likely result in short-term increases in water and wind erosion rates. Following construction, wind and water erosion on the plant site will be reduced, because pipeline construction rights-of-way will be leveled, compacted, recontoured, and allowed to naturally revegetate.

Operational Impacts

Operation of the REP and natural gas pipeline are not expected to result in significant impacts to soil from either erosion or compaction. Routine vehicular access to the individual project components during operation of the project will be limited to existing roads, most of which are paved. Normal operational activities will not involve disruption of soil.

Power Plant Site

Operation of the project will have little or no effect on soils because the site will be leveled; compacted; covered with concrete, aggregate, mulch, protective covering (e.g., jute netting), or vegetation; and drainage will be controlled through a storm drain system.

Natural Gas Pipeline

Operation of the natural gas line will have little or no effect on soils; the natural gas line will be underground.

Recycled Water Pipeline

Operation of the recycled water supply pipeline will have little or no effect on soils; the pipeline will be underground.

Sanitary Sewer Pipeline

Operation of the sanitary sewer pipeline will have little or no effect on soils; the pipeline will be underground.

Storm Water Outfall

Operation of the storm water outfall will have little or no effect on soils; the pipeline will be underground.

8.11.2.2 Agricultural Resources

Significance Criteria

The following significance criteria were used in evaluating potential impacts to agricultural resources:

- Substantial displacement or curtailment of agricultural land uses
- Degradation of agricultural land productivity
- Impacts to Prime Farmland, agricultural areas of statewide importance, or unique farmland

Impacts could be significant if the project were to alter land with special designations (e.g., prime farmland) to the point that the disturbed area would no longer exhibit the inherent characteristics of the special designation.

Construction Impacts

Because the project will not permanently displace or curtail any agricultural land use or degrade agricultural productivity, construction of the project will not cause a significant impact to agricultural resources. The project site does not contain prime or unique farmland. Three of the natural gas pipeline Alternatives (A, B, and B1) cross lands of soil map units 142 (Ramona sandy loam) and 193 (xerofluvents, occasionally flooded), which are classed as prime farmland. These lands are located in areas that are slated for conversion to urban uses through the build-out of the West Roseville under the WRSP.

The project site consists of two soil types (map unit 142—Cometa-Ramona sandy loam and map unit 195—xerofluvents with hardpan substratum) that the California Department of Conservation has classed as characteristic of farmland of statewide importance. This land is not currently in agricultural production, however, and the project site has been rezoned Public/Quasi-Public and taken out of agricultural use (current use is as a construction laydown area for the PGWWTP). The project would not, therefore, have a significant impact on agricultural resources.

Operational Impacts

Operation of the power plant its appurtenant facilities will not cause a significant impact to agricultural resources.

8.11.2.3 West Roseville Not Annexed

If the West Roseville annexation is denied or delayed indefinitely, the only significant differences in the project design would be the following: 1) natural gas pipeline alternative B1 would be the preferred route and 2) RE would construct a double-circuit 60 kV transmission line to connect the project with the Fiddyment Receiving Station. The route for this transmission line would be the same as for gas pipeline route B1. Beginning at the REP site, the route would run south, then east on Phillip Road. It would then turn south on Fiddyment Road and run to the Fiddyment Receiving Station. Any effects the construction of this route would have on agricultural resources would be temporary and would occur only if the pipeline were constructed next to Phillip Road, rather than in Phillip Road.

8.11.3 Cumulative Impacts

Because the construction and operation of the project and appurtenances at the project site will only have minor and temporary effects on soil resources and will have no effects on agricultural lands, the project will not contribute to cumulative impacts. The REP's effects will not be cumulative with those of the build-out of West Roseville under the WRSP because the project effects within the WRSP (natural gas pipeline alternative routes) would be either entirely on city streets or in the footprint of the WRSP street grid, and would be subsumed in the effects of the WRSP.

8.11.4 Proposed Mitigation Measures

This section discusses mitigation measures that will be implemented to reduce project-related effects on soil resources. The project will not have a lasting effect on agricultural lands or resources.

Applying appropriate erosion control measures and conducting grading operations in compliance with the Roseville City Grading Ordinance will help maintain soil resources and water quality, protect property from erosion damage, and prevent accelerated soil loss (which destroys soil productivity and its capacity to support and maintain vegetation). Temporary erosion control measures will be installed before construction begins and will be removed from the construction site after construction activities are completed.

The following mitigation measures can be implemented to reduce potentially significant soil impacts. An acceptable level of soil erosion, as used herein, is defined as that amount of soil loss that would not affect (i.e., limit) the potential long-term beneficial uses of the soil as a growth medium or adversely affect water resources due to accelerated erosion and subsequent sedimentation. The Applicant will implement the following measures:

- Prepare an Erosion Control Plan before construction and implement the plan during and following construction. Erosion and sediment control measures may include, but are not limited to, use of sand bags, mulches, protective coverings (e.g., jute netting and rip-rap), installation of culverts under roadways at drainage crossings, installation of sediment detention basins, construction of water diversions along roads, and placement of water bars along pipeline rights-of-way.
- Perform construction activities in accordance with the Storm Water Pollution Prevention Plan (SWPPP) and associated Monitoring Program. These items will be required for the project in accordance with California's General Permit for Storm Water Discharges Associated with Construction Sites under the United States Environmental Protection Agency (USEPA) National Pollutant Discharge Elimination System (NPDES) Program. The SWPPP will include erosion control measures, including Best Management Practices (BMPs) to reduce erosion and sedimentation.
- Stabilize disturbed areas that will not be covered with surface structures (e.g., buildings) or pavement following grading and/or cut-and-fill operations. In areas to be disturbed or excavated along pipeline routes and where vegetation is present before construction, topsoil will be selectively salvaged and replaced. No seeding or irrigation is proposed.
- Limit soil erosion/dust generation by wetting active construction areas with water (including roads).
- Conduct visual monitoring during and after construction of areas that were disturbed during the construction phase, particularly noting steep slope areas or other erosion prone areas.
- Implement corrective measures in areas that do not respond adequately to initial stabilization techniques or in areas where accelerated erosion is occurring.

8.11.5 Applicable Laws, Ordinances, Regulations, and Standards

Design, construction and operation of the REP, including the associated linear facilities will be conducted in accordance with all laws, ordinances, regulations, and standards (LORS) pertinent to Soils and Agriculture (Table 8.11-3).

8.11.5.1 Federal

The federal requirements under the Clean Water Act of 1977 (CWA) are administered under California's Regional Water Quality Control Board (RWQCB) National Pollution Discharge Elimination System (NPDES). The project will comply with the NPDES permit requirements by generating a (SWPPP), which identifies the most appropriate BMPs to be implemented during and following site construction. Adherence to the SWPPP will mitigate the potential for adverse impacts to the environment and will also meet the local drainage and erosion control requirements. Table 8.11-4 lists the types of BMPs that may be included in the SWPPPs when they are prepared to meet the NPDES permit requirements before construction and operation, and indicates their estimated effectiveness. The NDPES specifications also require a plan for monitoring storm water during major storms to determine the effectiveness of the management practices and erosion control measures. The REP project SWPPPs would, thus, include a storm water monitoring plan and measures to observe and verify the effectiveness of the storm water and erosion control BMPs and other methods and techniques. Preparing and following these plans ensure that the REP project would not

Table 8.11-3. Laws, ordinances, regulations and standards, administering agencies, agency contacts, and requirements for compliance.

Conformance (Section)	Jurisdiction	Authority	Applicability	Administering Agency	Contact, Title and Telephone	Requirements/Compliance
Section 8.11.4	Federal	Clean Water Act of 1977 (including 1987 amendments) 33 USC § 1342	These authorities establish requirements for any facility or activity which has or which will discharge wastes (including sediment due to accelerated erosion) that may interfere with the beneficial uses of affected waters.	RWQCB	Jacque Kelley Water Quality Engineer (916) 255-3064	Project will implement erosion control measures such that it will meet discharge requirements relative to sediment due to accelerated erosion.
Section 8.11: Agriculture and Soils (all).	State	Cal. Pub. Res. Code § 25523(a); CCR §§ 1752, 1752.5, 2300 - 2309, and Chapter 2, Subchapter 5, Article 1, Appendix B, Part (I)	Provides for the protection of environmental quality and requires submission of information to the CEC concerning potential environmental impacts to agriculture and soils.	CEC		Project will submit information to the CEC concerning potential environmental impacts, including impacts to agriculture and soils.
Section 8.11.5.2		California Environmental Quality Act, California Public Resources Code § 21000 *et seq.;* Guidelines for Implementation of the California Environmental (Quality Act of 1970, 14 CCR § 15000 - 15387, Appendix G	Environmental protection	CEC		REP will not cause substantial flooding, erosion or siltation and, therefore, will not have a significant impact.
Section 8.11.4		California Porter-Cologne Water Quality Control Act of 1972; Cal. Water Code, § 13260 – 13269, 23 CCR Chapter 9	Controls erosion of soil and disruption or displacement of surface soil. The RWQCB implements the NPDES permit requirements.	CEC, the RWQCB and the State Water Resources Control Board	Jacque Kelley Water Quality Engineer (916) 255-3064	Project will provide adequate protection of water quality by appropriate design, sizing and construction of erosion and sediment controls; it will also fulfill waste discharge requirements concerning potential surface water pollution from project area runoff (Storm Water Pollution Prevention Plan). An NPDES General Permit for Storm Water Discharges Associated with construction activities will include the following: • Submit Notice of Intent (NOI), including facility information, receiving water information, implementation requirements, site map, and certification • Prepare a Storm Water Pollution Prevention Plan (SWPPP) • Prepare a Storm Water Monitoring Plan (SMP)

Table 8.11-3. Laws, ordinances, regulations and standards, administering agencies, agency contacts, and requirements for compliance.

Conformance (Section)	Jurisdiction	Authority	Applicability	Administering Agency	Contact, Title and Telephone	Requirements/Compliance
Section 8.11.5.3	Local	City of Roseville	Soil loss controls	City of Roseville Planning and Engineering Departments	Paul Richardson City of Roseville Planning Department City Planner (916) 774-5276	Project will comply with the following Grading/Drainage/Erosion Control Permit Requirements: • Engineered Grading Plan • Topographic Plan • Drainage controls • Surface Hydrology Report • Geotechnical/Geological Hazard Evaluation • Identify material source or disposal location and haul route • Erosion and Dust Control Plan • Traffic Control Plan
Section 8.11.5.4 and 8.11.5.5	Industry Standard	Soil Conservation Service (SCS), *National Engineering Handbook* (1983), Sections 2 and 3	Soil loss controls	U.S. Department of Agriculture (Natural Resources Conservation Service) and California Department of Conservation	NA	Project will implement standards for the planning, design, soil conservation practices and protection of prime agricultural land.

have a significant adverse effect on soils or on water quality (see also Section 8.15, Water Resources). The standard measures required by the EPA, State Water Resources Control Board, and Regional Water Quality Control Board have proven effective in reducing potential impacts below the level of significance in many projects.

8.11.5.2 State

The State of California Porter-Cologne Act (California Clean Water Act) is applicable to agriculture and soils. This law regulates discharges to waters of the state. The Porter-Cologne Act is not directly applicable to the REP, however, because the project will not discharge directly to waters of the state. In addition, the SWRCB, which controls surface water discharge, may become involved indirectly through a NPDES discharge permit if a surface discharge during construction were to cause soil erosion (see Section 8.15, Water Resources).

Table 8.11-4. Best Management Practices and their effectiveness.

Practice	Percent effectiveness
Construct silt fence	70%
Construct sedimentation trap	70%
Install sod	99%
Lay sand bags	40%
Provide a vegetation buffer	90%

Source: United States Environmental Protection Agency. 1993, Guidance specifying management measures for sources of non-point pollution in coastal waters. EPA 840-B-92-002. USEPA, Office of Water, Washington, DC (http:/cfpub.epa.gov/npdes/stormwater/menuofbmps/

8.11.5.3 Local

Ordinances for land grading and storm water pollution control have been established by the City of Roseville (Roseville Ordinance No. 3000, Title 16.20, Grading). These ordinances establish permitting requirements and exemptions for grading land, as well as other activities that can cause the discharge of pollutants into storm water systems or watercourses.

8.11.6 Involved Agencies and Agency Contacts

A number of agencies are involved with agriculture, land use, and soil erosion. These include the State Water Resources Control Board, City of Roseville, and Natural Resources Conservation Service. The agencies and persons to contact for each of these agencies are shown in Table 8.11-3.

8.11.7 Permits Required and Schedule

The State Water Resources Control Board administers the federal Clean Water Act discharges permitting program and will require an NPDES General Permit for Storm Water Discharges before starting construction. The City of Roseville will require a grading and erosion control permit prior to the start of construction. The schedule for acquiring these permits is summarized in Table 8.11-5. Information required to obtain each permit is also included.

Federal Requirements

The Clean Water Act (CWA) authorizes EPA to regulate discharges of waste water and storm water into surface waters by using NPDES permits and pretreatment standards. These permits are implemented at the state level by the State Water Resources Control Board (SWRCB), but the USEPA may retain

Table 8.11-5. Permits required and schedule.

Permit/Approval Required	Schedule
• Grading/Drainage/Erosion Control Permit: • Engineered Grading Plan • Topographic Plan • Drainage controls • Surface Hydrology Report • Geotechnical/Geological Hazard Evaluation • Identify material source or disposal location and haul route • Erosion and Dust Control Plan • Traffic Control Plan	30 days prior to start of construction activities
NPDES General Permit for Storm Water Discharges Associated with Construction Activities: • Submit Notice of Intent (NOI), including facility information, receiving water information, implementation requirements, site map, and certification • Prepare a Storm Water Pollution Prevention Plan (SWPPP) • Prepare a Storm Water Monitoring Plan (SMP)	Submit NOI 30 days prior to start of construction
National Pollutant Discharge Elimination System (NPDES) General Permit for Storm Water Discharges Associated with Operation Activities: • Submit Notice of Intent (NOI), including facility information, receiving water information, implementation requirements, site map, and certification • Prepare a Storm Water Pollution Prevention Plan (SWPPP) • Prepare a Storm Water Monitoring Plan (SMP)	Submit NOI 14 days prior to start of Operation

jurisdiction at its discretion. The primary interest of the CWA in the current project concerns soil erosion control during construction, and the need to prepare and execute site-specific erosion control measures for construction of each element of the project that will entail physical disruption or displacement of surface soil.

State Requirements

The California Public Resources Code [§ 25523(a); CCR §§ 1752, 1752.5, 2300-2309, and Chapter 2, - Subchapter 5. Article 1. Appendix B. Part (i)] provides authority for the protection of environmental quality. With respect to the REP and agriculture and soils, it requires submitting information to the CEC concerning potential environmental impacts to agriculture and soils. The administering agency for the above authority is the CEC.

The State of California Porter-Cologne Act (California Clean Water Act) is applicable to agriculture and soils. This law regulates discharges to waters of the state. In addition, the SWRCB, which controls surface water discharge, may become involved indirectly through an NPDES discharge permit if a surface discharge during construction were to cause soil erosion (see Section 8.15, Water Resources).

Concerning potential surface water pollution from project area runoff, the waste discharge requirements may incorporate requirements based on the following sources of recommended methods and procedures:

- State Water Resources Control Board. 1996. Erosion and Sediment Control Field Manual.
- US EPA. 1973. Processes, Procedures and Methods to Control Pollution resulting From All Construction Activity. Presents information on processes, procedures, and methods for controlling sediment, storm water, and pollutants form construction activities.
- California Department of Resources Conservation. 1978. *Erosion and Sediment Control Handbook.* Provides procedures by which physical and climatic data and erosion control practices can be considered when assessing a site to determine the need for an erosion control plan and methods for preparing such a plan.

Local Requirements

The City of Roseville has local authority for the project-related grading and excavation activities and defers to the NPDES permit requirements regarding storm water pollution control. Specifically, the City requires that a Storm Water Pollution Prevention Plan (a requirement under the NPDES permit) be prepared and submitted before site development activities.

Industry Codes and Standards

The U.S. Department of Agriculture defines standards of technical excellence for the soil conservation service, now called the Natural Resources Conservation Service (NRCS) for planning, design, and construction of soil conservation practices. This is described in the U.S. Department of Agriculture, Soil Conservation Service (SCS), National Engineering handbook (1983).

Project Compliance with Agricultural and Soils LORS—The project will obtain a General NPDES Construction Activity Stormwater Permit from the Regional Water Quality Control Board and will grade and excavate in accordance with approved grading plans to reduce soil erosion from development activities during the project. For operation, the project will obtain a General Industrial NPDES Stormwater Permit from the Regional Water Quality Control Board (see also Water Resources, Section 8.15).

To obtain the Construction Activity NPDES permit, Roseville Electric will file a Notice of Intent at before the start of construction, along with the SWPPP for construction. For the General Industrial NPDES permit, Roseville Electric must file a Notice of Intent at least 14 days before commencing power plant operation.

The following lists the information requirements for the various permits:

Grading/Drainage/Erosion Control Permit (City of Roseville)

- Engineered grading plan
- Topographic plan
- Drainage controls
- Surface hydrology report
- Geotechnical/geological hazard evaluation
- Material source identification, disposal location and haul route
- Erosion and dust control plan
- Traffic control plan

NPDES General Permit for Construction (Regional Water Quality Control Board)

- Notice of Intent application
- Stormwater Pollution Prevention Plan (construction)
- Storm Water Monitoring Program (construction)

NPDES General Permit for Industrial Activity (Regional Water Quality Control Board)

- Notice of Intent Application (Form NOI-1)
- Site map
- Stormwater Pollution Prevention Plan (operation)
- Storm water monitoring program (operation)
- Annual report (part of monitoring plan)

8.11.8 References

California Department of Conservation. 1995. Soil candidate listing for prime farmland and farmland of statewide importance, Placer County. California Department of Conservation, Farmland Mapping and Monitoring Program.

Environmental Protection Agency. 1993. Guidance specifying management measures for sources of non-point pollution in coastal waters. EPA 840-B-92-002. USEPA, Office of Water, Washington, DC (http:/cfpub.epa.gov/npdes/stormwater/menuofbmps/.

U.S. Department of Agriculture, Soil Conservation Service. 1980. Soil survey of Placer County, California, Western Part. United States Department of Agriculture, Soil Conservation Service, in cooperation with the University of California Agricultural Experiment Station.

8.12 TRAFFIC AND TRANSPORTATION

This section presents information on traffic and transportation as required by the siting regulations of the California Energy Commission (CEC). The potential effects on traffic and transportation resulting from construction and operation of the proposed Roseville Energy Park (REP) are analyzed and documented within this section. Section 8.12.1 discusses the existing environmental setting; Section 8.12.2 discusses the environmental effects of project construction and operation; Section 8.12.3 evaluates potential cumulative impacts to traffic and transportation due to other simultaneous projects; Section 8.12.4 includes proposed mitigation measures during construction and operation; Section 8.12.5 presents applicable laws, ordinances, regulations, and standards (LORS); Section 8.12.6 provides agency contacts; Section 8.12.7 discusses permits and permit schedules, and Section 8.12.8 contains references.

8.12.1 Affected Environment

The roads in the project vicinity have recently been included in a traffic analysis performed for the West Roseville Specific Plan (City of Roseville 2003a) and the subsequent West Roseville Specific Plan Environmental Impact Report (City of Roseville 2003b). In addition, in 2001, Roseville Energy Facility LLC submitted an Application for Certification (01-AFC-14) for a 900 MW generating facility that was proposed to be located on the same parcel of land that the REP is now proposed (URS Corporation 2001). Although that application was subsequently withdrawn in October 2001, the traffic and transportation section of the AFC provides background information and analysis relevant to REP. These documents, in addition to city, county and federal agencies, provided the background and baseline data necessary to both establish existing traffic conditions and analyze impacts of the proposed REP.

8.12.1.1 Regional Setting

The REP project site is located in the City of Roseville in Placer County, which is situated in the Greater Sacramento Area (GSA) in California. The GSA includes El Dorado, Placer, Sacramento, Sutter, Yolo, and Yuba Counties and is served by an extensive transportation system, including interstate freeway, highway, airport, deep-water shipping channel, and rail facilities. Figure 8.12-1 illustrates the regional transportation setting. The primary transportation corridors in or near Roseville include Interstate Highway (I-80) and State Route 65 (SR 65).

The REP site can be accessed from Interstate 80, SR 65, and State Route 70/99 and then along a variety of local access routes. I-80, SR 65, and SR 70/99 are all under the jurisdiction of the California Department of Transportation (CalTrans).

SR 70/99 are north-south state routes that connect Marysville and Yuba City in the north with the Sacramento area to the south. SR 65 is a north-south state route connecting Roseville with Lincoln (via SR 65) and then Marysville (via SR 70). In Roseville, this highway is a four-lane freeway. I-80 is a transcontinental highway that links Roseville to the San Francisco Bay area to the west and Nevada to the east. In Roseville, I-80 has eight lanes west of Riverside Avenue and six lanes through the remainder of the City.

Figure 8.12-1 (Regional Transportation Setting) illustrates the major roads, highways, and railways in the project vicinity. The following plans and programs describe the framework for managing the transportation resources in the project area.

Metropolitan Transportation Plan

The Sacramento Area Council of Governments (SACOG) has implemented the Metropolitan Transportation Plan (MTP), which includes the GSA. The current MTP was completed in 2002 and contains over $21.8 billion in planned transportation improvements. The MTP is updated every 3 years (SACOG, 2002).

Metropolitan Transportation Improvement Program

The Metropolitan Transportation Improvement Program (MTIP) lists all transportation-related projects requiring federal funding or other approval by the Federal Highway Administration (FHWA) or Federal Transit Administration (FTA). The MTIP, developed by SACOG, also lists non-federal, regionally significant projects for information and air quality emissions modeling purposes. The MTIP indicates the area's short-term plan for use of federal dollars and other resources for the maintenance, operation, and improvement of the transportation system and the achievement of federal air quality standards (SACOG, 2003).

Placer County General Plan

The Placer County General Plan is the master blueprint for Placer County growth and development. The plan is usually evaluated and revised every 10 years. The most recent update of the Plan was adopted by the Board of Supervisors in 1994. The Plan is currently under revision, and changes will be adopted during 2004. Section 3 of the General Plan, Transportation and Circulation, outlines the goals and policies for the County's transportation and circulation system (Placer County 1994).

City of Roseville General Plan Circulation Element

The Circulation Element of the City of Roseville General Plan (City of Roseville 1992) defines transportation facilities and includes the goals, policies, and implementation measures for the City's circulation system. The Circulation Element's provisions are mandated by State law to be correlated with, and thus support, the goals and policies of the Land Use Element. The following goals and policies laid out in the Circulation Element are particularly relevant to the REP:

- **Level of Service, Policy 1:** Maintain a Level of Service (LOS) "C" standard at 70 percent of all signalized intersections and roadway segments in the City during the afternoon peak hours. Exceptions to the LOS "C" standard may be considered for intersections where the city finds that the required improvements are unacceptable based on established criteria identified in the implementation measures.
- **Transportation Systems Management, Policy 2:** Work with appropriate agencies to develop measures to reduce vehicular travel and demand and meet air quality goals (City of Roseville 1992).
- **Functional Classification, Policy 4:** Maintain a system of truck routes to provide for the safe and efficient movement of goods and avoid impacting residential neighbors.

8.12.1.2 Site Location and Local Street System

Local Street System

The existing street network in the City of Roseville is a mix of roads that have provided access to the older portion of the City for decades and roads that were designed to serve newer specific plan areas.

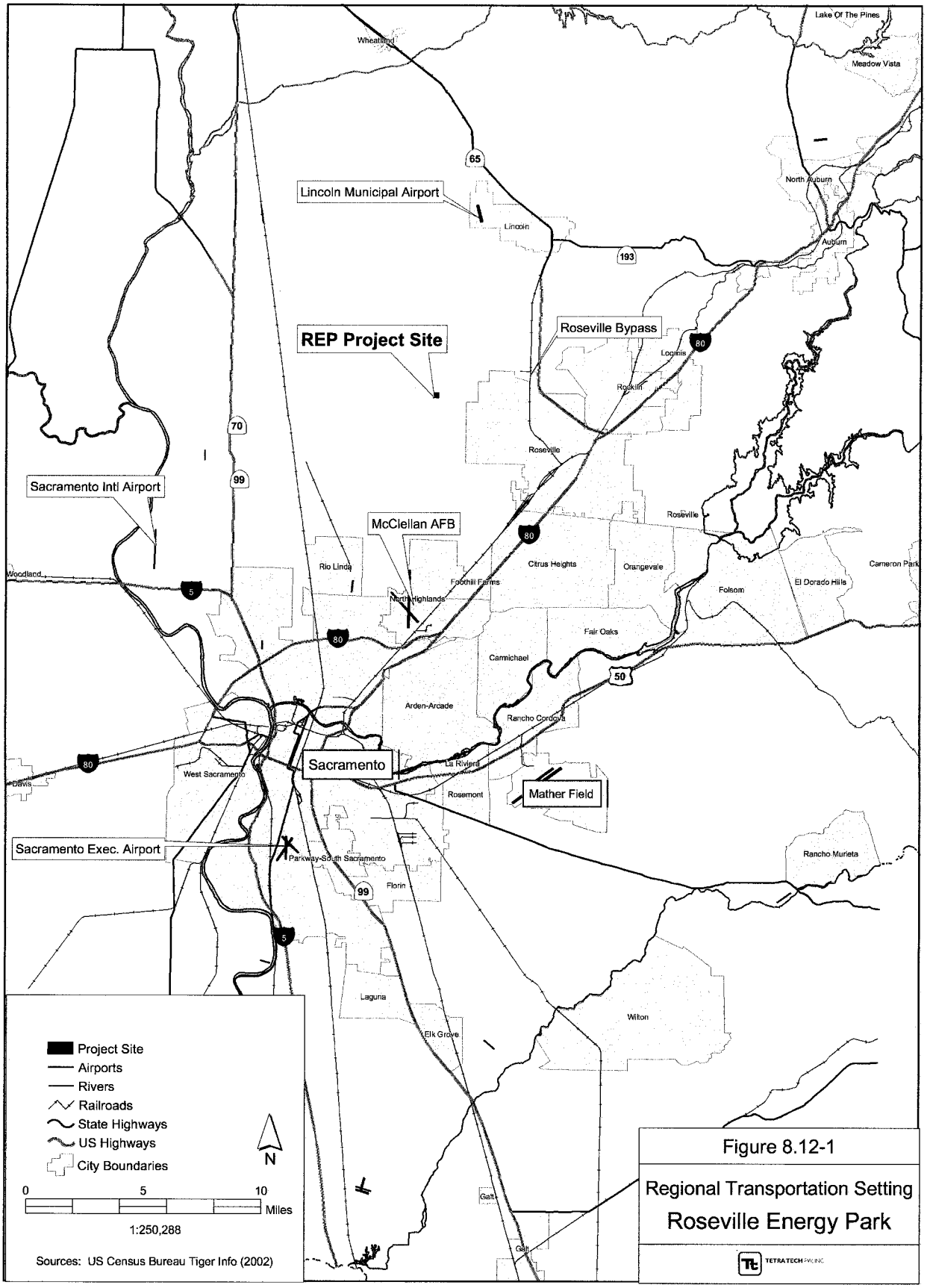

Figure 8.12-1

Regional Transportation Setting

Roseville Energy Park

TETRA TECH EM INC

Roadways within the City are defined as either arterial or collector systems. The primary function of arterial roadways is to move large volumes of traffic through the City to other sections and beyond.

Collector streets generally link local residential streets and the commercial and office parking areas to the arterials.

The local transportation network in the site vicinity is illustrated in Figure 8.12-2. The key local roadways near the site are as follows:

- Baseline Road: an east-west arterial that is two lanes west of Fiddyment and three lanes (two westbound and one eastbound) east of Fiddyment
- Fiddyment Road: a north-south arterial that is two lanes
- Pleasant Grove Boulevard: an east-west arterial that is four lanes between Fiddyment Road and Sun City Boulevard, two lanes between Sun City Boulevard and Woodcreek Oaks Boulevard, four lanes between Woodcreek Oaks Boulevard and Foothills Boulevard, and six lanes between Foothills Boulevard and SR 65
- Blue Oaks Boulevard: an east-west arterial that is two lanes between Fiddyment Road and Crocker Ranch Road, four lanes between Crocker Ranch Road and Technology Drive, two lanes between Technology Drive and Foothills Boulevard, and four lanes between Foothills Boulevard and SR 65
- Phillip Road: an east-west local Placer County road that is two lanes
- Brewer Road: a north-south local Placer County road that is two lanes

The most likely (shortest) access routes to the REP site are as follows:

- From Interstate 80 eastbound, follow Riverside Avenue north to Cirby Way, then follow Cirby Way west to Foothills Boulevard and Foothills north to Baseline Road. Turn right (north) onto Fiddyment Road. Turn right (west) onto Phillip Road and follow west and north.
- From State Route 65, follow Blue Oaks Boulevard west to end. Turn left (south) onto Fiddyment Road. Turn right (west) onto Phillip Road and follow west and north.
- From State Route 99, follow Baseline Road east. Turn left (north) onto Fiddyment Road. Turn left (west) onto Phillip Road and follow west and north.

The primary east-west access to the project site will be via Blue Oaks Boulevard or Baseline Road. Phillip Road provides direct east-west access to the site. Pleasant Grove Boulevard is another east-west parallel route but is not considered a primary project access route. The primary north-south access roads are Fiddyment Road (from Blue Oaks Boulevard) and Brewer Road (from Baseline Road). These roadways provide the most direct north-south connections to the project site.

Access to the power plant site will be provided by one driveway located on the north side of Phillip Road. The ingress/egress has been designed to enable large trucks to pull off of Phillip Road onto a driveway to await opening of the security gate and gain access to the power plant. The driveway location will provide the necessary sight distance to allow safe entrance/egress of vehicular traffic. The geometry of the driveway is specified to accommodate tractor-trailer traffic. For security purposes and control of access to the proposed power plant, ingress/egress will be normally limited to one location. A second driveway from Phillip Road will be located at the east end of the site. This driveway will be used by PG&E to access its gas metering station, which will be fenced separately from the rest of the REP. This driveway

will also provide access to a second entrance to the REP, which may be used by emergency vehicles to access the site. This second entrance will normally remain locked, and its use will be restricted

8.12.1.3 Current Traffic Conditions

To establish a threshold for evaluation of the addition of project traffic to the street system, the existing traffic conditions must be determined by calculation of the LOSs of key roadways (Transportation Research Board 1985). The City of Roseville LOS policy focuses on the operations of its signalized intersections during the PM peak hour. Placer County, however, uses a combination of peak hour intersection analysis, plus roadway segment analysis based on daily traffic volumes, to assess its roadway network. The LOS calculations are generally based on the relationship of the traffic volume to the capacity of the street system to accommodate the traffic flow. The LOS measures range from LOS A (free flow) to LOS F (excessive delays with volumes at capacity) traffic conditions. For purposes of this analysis, LOS measurements have been calculated for street segments. Table 8.12-1 defines the LOS categories in terms of their volume to capacity (V/C) ratio and general traffic condition descriptions.

Table 8.12-1. Level of Service definitions.

LOS	V/C Ratio[1]	Description
A	0.00 - 0.59	Free flow/insignificant delays
B	0.60 - 0.69	Stable operation/minimal delays
C	0.70 - 0.81	Stable operation/acceptable delays
D	0.82 - 0.89	Approaching unstable/tolerable delays
E	0.90 - .99	Unstable operation/significant delays
F	1.00	Forced flow/excessive delays

[1]Ratio of traffic volume to roadway capacity.
Source: Transportation Research Board 1985.

The City's Capital Improvement Program (CIP) update included a modification to the City's level of service policy requiring that the City maintain at least 70 percent of its signalized intersections at LOS C or better during the pm peak period. The impacts associated with this modification were identified in an EIR prepared in conjunction with the CIP update. That EIR identified all intersections projected to function at less than LOS C at 2020 assuming build-out of the then current City limits (City of Roseville 1992). The revised LOS policy allows additional intersections beyond those identified in the CIP EIR to function at less than LOS C, provided the City maintains the 70 percent criterion. In addition, the EIR identified the potential for intersections currently functioning at less than LOS C to degrade to a lower standard. Should either of these occur, the City's General Plan requires a formal action by the City Council at a public hearing to modify the projected LOS at these intersections. CalTrans accepts LOS D for the roads it maintains, and considers LOS E and F unacceptable.

The City of Roseville's LOS policy focuses on the operations of its signalized intersections during the pm peak hour because the pm peak hour typically represents the highest traffic period of the day. Placer and Sutter counties and the City of Rocklin use a combination of peak hour intersection analysis, and roadway segment analysis, based on daily traffic volumes, to assess their roadway networks. Table 8.12-2 shows the daily volume thresholds that were used in the roadway segment analysis for those jurisdictions.

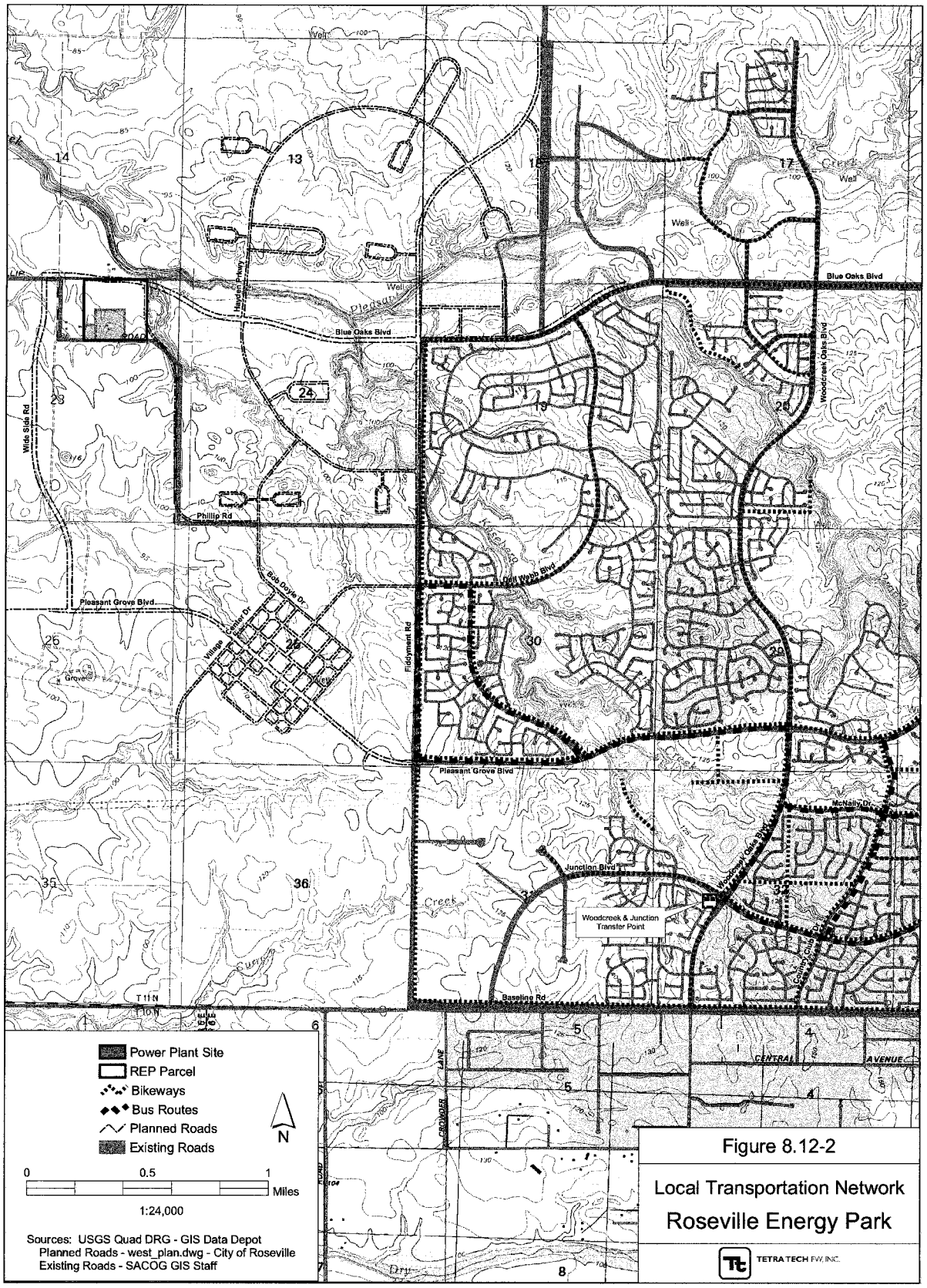

Figure 8.12-2

Local Transportation Network

Roseville Energy Park

TETRA TECH FW, INC.

Average daily traffic (ADT) counts were obtained from the City of Roseville Traffic Count Program database (City of Roseville 2001) and the Placer County Department of Public Works (Rosfe 2003). These counts were used for the roadway segment analysis. Existing traffic volumes, capacity, and characteristics are summarized in Table 8.12-3. The results of the LOS analysis indicate that most routes operate at Level A and that one operates at Level D and one at Level F. The segment that operates at Level D is Baseline Road between Fiddyment and Brewer. The segment that operates at Level F is Interstate 80 Taylor Road to SR 65 Junction.

Table 8.12-2. Roadway segment level of service thresholds

	Average Daily Traffic Volume Threshold				
Facility Type	**LOS A**	**LOS B**	**LOS C**	**LOS D**	**LOS E**
Two-Lane Collector	9,000	10,700	12,000	13,500	15,000
Two-Lane Arterial	10,800	12,600	14,400	16,200	18,000
Four-Lane Arterial	21,600	25,200	28,800	32,400	36,000
Six-Lane Arterial	32,400	37,800	43,200	48,600	54,000
Four-Lane Freeway	37,600	52,800	68,000	76,000	80,000
Six-Lane Freeway	56,400	79,200	102,000	114,000	120,000
Eight-Lane Freeway	75,200	105,600	136,000	152,000	160,000

Source: City of Roseville (2003b, Table 4.3-9).

8.12.1.4 Other Transportation Issues and Plans

This section describes other traffic and transportation-related issues and plans important for the subsequent analysis of potential project impacts.

Weight/Load Restrictions

The Circulation Element of the City of Roseville General Plan does not specifically detail size and weight/load limits for any roadways in the city (City of Roseville 1992). Therefore, all applicable regulations are found in California Vehicle Code, which states the following:

- The gross weight imposed upon the highway by the wheels on any axle of a vehicle shall not exceed 20,000 pounds and the gross weight upon any one wheel, or wheels, supporting one end of an axle, and resting upon the roadway, shall not exceed 10,500 pounds.
- The maximum wheel load is the lesser of the following: (a) the load limit established by the tire manufacturer, or (b) a load of 620 pounds per lateral inch of tire width, as determined by the manufacturer's rated tire width.
- The gross weight imposed upon the highway by the wheels on any one axle of a vehicle shall not exceed 18,000 pounds and the gross weight upon any one wheel, or wheels, supporting one end of an axle and resting upon the roadway, shall not exceed 9,500 pounds, except that the gross weight imposed upon the highway by the wheels on any front steering axle of a motor vehicle shall not exceed 12,500 pounds; maximum allowable gross combination weight is 80,000 pounds (State of California Vehicle Code, Section 35550-35559).
- The maximum allowable vehicle height is 14 feet (State of California Vehicle Code, Section 35250-35252).

Table 8.12-3. Existing traffic characteristics of local highways and roads in the project area.

Road or Highway	Existing Traffic		Capacities[5]		V/C (LOS)	
	AADT	Peak Hour Traffic	AADT	Peak Hour Traffic	AADT	Peak Hour Traffic
I-80 (6-lane freeway)						
Taylor Road to SR 65 Junction	137,000[1]	11,500[1]	120,000	12,000	1.14 (F)	0.96 (E)
SR 65 (4-lane expressway)						
Harding Blvd. to Washington Blvd.	36,000[2]	4,450[2]	80,000	7,200	0.45 (A)	0.62 (B)
SR 99 (4-lane expressway)						
Baseline Road to Highway 70 Junction	23,700[2]	2,300[2]	80,000	7,200	0.30 (A)	0.32 (A)
Baseline Road (2-lane arterial)						
Between Fiddyment Road and Brewer Road	15,614[3]	2,444[3]	18,000	3,400	0.867 (D)	0.72 (C)
Baseline Road (4-lane arterial)						
East of Fiddyment Road	12,788[3]	1,667[3]	36,000	3,400	0.36 (A)	0.49 (A)
Brewer Road (2-lane County collector)						
West of REP site	551[4]	55[4]	15,000	3,000	0.04 (A)	0.02 (A)
Fiddyment Road (2-lane arterial)						
North of Baseline Road	8,766[3]	897[3]	18,000	3,400	0.49 (A)	0.26 (A)
Phillip Road (2-lane County collector)						
West of Fiddyment Road	157[4]	6[4]	15,000	3,000	0.01 (A)	0.00 (A)
West of REP site	45[4]	3[4]	15,000	3,000	0.00 (A)	0.00 (A)

Sources: [1] Caltrans 2002.
[2] URS 2001.
[3] City of Roseville Traffic Count Database 2001.
[4] Placer County 2003.
[5] From Table 8.12-2.

- The maximum allowable vehicle width is 102 inches (State of California Vehicle Code, Section 35100-35111).
- Maximum allowable length for single vehicle is 40 feet. Maximum allowable length for combination of vehicles is 65 feet
- Maximum allowable length for combination of vehicles consisting of a truck tractor and two trailers is 75 feet, provided each individual trailer length does not exceed 28 feet 6 inches (State of California Vehicle Code, Section 35400-35414).

As noted in the Vehicle Code, these provisions would not apply if the City permitted the operation and transport of vehicles and loads on city roadways in excess of the maximum gross limits specified in the Vehicle Code (State of California Vehicle Code, Section 35780-35796).

Public Safety

There are no road features or characteristics in the project vicinity that will affect public safety, nor are there any substandard bridges along the potential access routes. In addition, there are no city roadways that are subject to normal weather-related closures such as localized flooding or fog.

Truck Routes

Policy 4 of the Circulation Element of the Roseville General Plan (City of Roseville 1992) is to "maintain a system of truck routes to provide for the safe and efficient movement of goods and to avoid impacting residential neighborhoods." To implement this goal, the City strives to "enforce, evaluate and, as circumstances warrant, update the truck route system to ensure safe and efficient routes through the City." Most truck traffic to the REP will be routed via SR 65, west to Blue Oaks Boulevard, south on Fiddyment Road and west onto Phillip Road. Both Blue Oaks Boulevard and Fiddyment Road are designated truck routes by the City of Roseville.

Hazardous Materials

Hazardous materials would be transported to the project site from SR 65 west along Blue Oaks Boulevard, then south along Fiddyment to Phillip Road, then west and north on Fiddyment to the project site.

Public Transportation

One of the underlying goals of the Circulation Element of the City of Roseville General Plan is that the City should promote a shift from the automobile to other modes of transportation. Currently, the City of Roseville has an existing public transportation system, consisting of a bus, rail, and bike network. Both the existing transit network and the planned street additions are shown on Figure 8.12-2.

Roseville Transit, operated by the City of Roseville, provides fixed route, dial-a-ride and commuter service. Fixed route and dial-a ride provide inter-City service, while the commuter service operates an express commuter bus between Roseville and Sacramento.

Placer County Transit, operated by Placer County, provides bus service throughout South Placer County. Amtrak provides intercity rail service to Roseville. Amtrak shares its station with Greyhound Bus Lines, which provides intercity bus service to Roseville.

The West Roseville Specific Plan includes the expansion of public transit to West Roseville. There are provisions in the WRSP development plan for bus stop turnouts and park-and-ride lots, though bus routes are yet to be determined. Bus service is currently unavailable in the project area west of Fiddyment Road.

Cumulative Roadway Improvements

Planned roadway improvements in the REP project vicinity include, most prominently, the development of the street grid for West Roseville (see Figure 8.2-2) for which the City is currently processing an application for annexation into Roseville. A specific traffic analysis regarding this land use is included in the West Roseville Specific Plan Environmental Impact Report (City of Roseville 2003b). Key features of this grid and other planned improvements include the following:

- Extension of Blue Oaks Boulevard to the west as four-lane arterials, with right-of-way reserved for six lanes
- Extension of Pleasant Grove Boulevard to the west as a four-lane arterial to connect with a new arterial named West Side Drive
- Construction of West Side Drive as a north-south, four-lane arterial from Pleasant Grove Boulevard to Blue Oaks Boulevard
- Expansion of Fiddyment Road to four lanes between Pleasant Grove and Blue Oaks Boulevard
- Abandonment of a portion of Phillip Road west of Fiddyment Road and east of Bob Doyle Drive (a new collector)
- Extension of Phillip Road northward to Blue Oaks Boulevard to the east of the REP site (from the northeast corner of the Pleasant Grove Waste Water Treatment Facility
- Addition of new collector streets Bob Doyle Drive, Village Green Drive, Village Center Drive, and Hayden Parkway
- Future connection of the north end of Watt Avenue farther north to the future Placer Parkway (this may include a connection to West Side Drive)
- Future expansion of Baseline to six lanes between Fiddyment Road and Watt Avenue. To assist with the widening of Baseline Road and the Walerga/Fiddyment Corridor, the City and County are currently exploring the potential for a regional traffic fee to fund improvements to these roadways through the existing South Placer Regional Traffic Authority (SPRTA) traffic fee program.

Traffic impacts associated with the Roseville Energy Park under this scenario would be very minor, based on the projected 28 daily trips during operation of the facility and 290 daily trips during construction, compared to the projected 110,341 daily trips expected to be generated by the West Roseville Specific Plan upon completion.

8.12.2 Environmental Consequences

Criteria used in determining whether project-related traffic impacts are significant are consistent with standard industry practice and California Code of Regulations Title 14, §15065. A project would have a significant effect on traffic and transportation if it would do the following:

- Cause an increase in traffic which is substantial relative to the existing traffic load and capacity of the street system
- Exceed, either individually or cumulatively, a level of standard service established by the County Congestion Management Agency for designated roads or highways
- Result in a change in traffic patterns, including an increase in traffic levels or a change in location that results in substantial safety risks

- Substantially increase hazards due to a design feature or incompatible uses
- Result in inadequate emergency access
- Result in inadequate parking capacity
- Conflict with adopted policies, plans, or programs supporting alternative transportation.

8.12.2.1 Construction Phase Impacts

Power Plant Site

Table 8.10-8 provides an estimate of the average and peak construction workforce anticipated for construction of the REP. During the peak months (months 11 and 12 after Notice to Proceed), 206 workers will be required for construction. An average of 114 workers/month will be required during construction. Table 8.12-4 displays the numbers of vehicle trips and truck deliveries expected during project construction, and a summary of the round-trip generation for the project construction phase. For traffic impact analysis purposes, the truck trips have been converted to Passenger Car Equivalent (PCE) trips by applying a factor of 2.0 to reflect the additional impact that large trucks have on street system operations beyond that of a normal passenger car. This factor is recommended from the appropriate tables in the Highway Capacity Manual based on terrain and roadway geometrics. For the scheduled peak months of construction activity, the proposed project will generate 290 actual one-way vehicle trips per day and approximately 302 PCE one-way trips per day as a measure of combined truck and passenger vehicle impact on the street system (Table 8.12-4).

Table 8.12-4. Trip generation summary, construction phase.

	Vehicle Daily Round Trips		Vehicle Daily One-Way Trips		PCE[1] Daily One-Way Trips		PCE Peak Hour[4]	
Traffic Source	Average	Peak[2]	Average	Peak[2]	Average	Peak[2]	Average	Peak[2]
Workers[3]	93	139	186	278	186	278	74	132
Delivery Trucks	13	6	26	12	52	24	3	2
Total	106	145	212	290	238	302	77	134

(1) A passenger car equivalent (PCE) factor of 2.0 was applied to delivery trucks and heavy trucks.
(2) "Peak" refers to scheduled peak months of construction activity (months 11 and 12 after Notice to Proceed).
(3) Assumes 1/3 of workers carpool (1.5 persons per vehicle).
(4) Assumes 80 percent of workers and 10 percent of deliveries arrive or depart during peak traffic hour.

Construction traffic impacts to local and regional roads will be determined by the routes used by construction workers when arriving and departing from the project site. Because most workers will come from the Sacramento Metropolitan Area (including western Placer County), the primary route to the site will be north on SR 65, west on Blue Oaks Boulevard, south on Fiddyment Road, and west on Phillip Road to the site. However, because the potential labor pool also includes El Dorado, Sacramento, Sutter, Yolo and Yuba Counties, it is anticipated that a smaller number of workers will be drawn from these areas in comparison to the Sacramento Area.

Workers originating from Sutter County and portions of Yuba County will use SR 70/99, and other workers originating from Yuba County will use SR 65. Workers originating from Sacramento County will use I-80, SR 65, and SR 99. Workers originating from Yolo County will use SR 99, and workers coming from El Dorado County will use I-80 and SR 65. These highway connections eventually tie in to the local roadway circulation system and to the project site via Blue Oaks Boulevard, Baseline Road, Pleasant Grove Boulevard, Fiddyment Road, and Phillip Road.

Table 8.12-5. Existing plus project-generated traffic during the peak construction month[1].

Road or Highway	Project Plus Existing Traffic[2]		Capacities[5]		Project Plus Existing V/C (LOS)	
	AADT[3]	Peak Hour Traffic[4]	AADT	Peak Hour Traffic	AADT	Peak Hour Traffic
I-80 (6-lane freeway)						
Taylor Road to SR 65 Junction	137,226[1]	11,788[1]	120,000	12,000	1.14 (F)	0.98 (E)
SR 65 (4-lane expressway)						
Harding Blvd. to Washington Blvd.	36,281[1]	4,807[1]	80,000	7,200	0.45 (A)	0.67 (B)
SR 99 (4-lane expressway)						
Baseline Road to Highway 70 Junction	23,786[2]	2,408[2]	80,000	7,200	0.30 (A)	0.33 (A)
Baseline Road (2-lane arterial)						
Between Fiddyment Road and Brewer Road	15,645[3]	2,483[3]	18,000	3,400	0.87 (D)	0.73 (C)
Baseline Road (4-lane arterial)						
East of Fiddyment Road	12,835[3]	1,726[3]	36,000	3,400	0.36 (A)	0.51 (A)
Brewer Road (2-lane County collector)						
West of REP site	575[4]	85[4]	15,000	3,000	0.04 (A)	0.03 (A)
Fiddyment Road (2-lane arterial)						
North of Baseline Road	8,844[3]	995[3]	18,000	3,400	0.49 (A)	0.29 (A)
Philip Road (2-lane County collector)						
West of Fiddyment Road	371[4]	278[4]	15,000	3,000	0.02 (A)	0.09 (A)
West of REP site	69[4]	33[4]	15,000	3,000	0.00 (A)	0.01 (A)

(1) Scheduled peak construction months are the 11th and 12th months after Notice to Proceed.
(2) Existing traffic from Table 8.12-3.
(3) Based on PCE daily one-way trips shown in Table 8.12-4.
(4) Based on PCE for peak hour shown in Table 8.12-4.
(5) From Table 8.12-2.

Table 8.12-5 lists the existing plus construction-related traffic from the REP project at each highway or street segment analyzed. Traffic associated with project construction was added to existing traffic and distributed to the local and regional street and highway system by estimate (see assumptions below). The resulting traffic volumes were added to the existing critical volumes for each intersection to determine whether the project could cause a change in the existing LOS and, hence, a significant adverse impact. For purposes of this analysis, the following assumptions were made:

- When leaving the site, 90 percent of the traffic will travel east on Phillip Road and 10 percent will travel west. All of the traffic traveling west on Phillip Road will then travel south on Brewer Road to Baseline Road, where it will travel west toward SR 99. Approximately 50 percent of the traffic will travel north and 50 percent will travel south on SR 99.
- Of the 90 percent of the traffic that travels east on Phillip Road, approximately 60 percent will travel north on Fiddyment Road to Blue Oaks Boulevard to SR 65, and 40 percent will travel south on Fiddyment Road. Of the workers traveling south on Fiddyment Road, 10 percent will travel east on Pleasant Grove Boulevard to SR 65, and 90 percent will continue to travel south to Baseline Road. Of those traveling south on Fiddyment Road, 60 percent will travel east on Baseline Road and disperse into the City of Roseville and 40 percent will travel west on Baseline Road (and meet up with other project-related traffic west of Brewer Road).
- Most of the traffic using Blue Oaks Boulevard east of the site will originate from the Sacramento and west Placer County areas; it is assumed that 70 percent of the traffic will travel south on SR 65, and 30 percent will travel north.
- Most of the traffic using Baseline Road east will originate from either the City of Roseville or the Sacramento and west Placer County areas; it is assumed that 30 percent will travel east on I-80, and 70 percent will travel west on I-80.
- Approximately 80 percent of the construction workers will arrive or depart during peak traffic hours; 10 percent of delivery trucks will arrive or depart during peak traffic hours.

For determination of impacts to LOS, the traffic generated by the project was added to the existing traffic levels on roads in the project area as shown in Table 8.12-5. Project construction traffic will not cause a change to the LOS of any project area roads for average or peak hour conditions, compared with the existing conditions, as described in Table 8.12-3.

In reality, construction personnel tend to arrive at a project site before the morning peak hour begins (7 am to 8 am). In addition, when working normal days, construction workers typically leave before 5 pm, whereas the evening peak hour is between 5 pm and 6 pm. Therefore, the effects of construction traffic will be less than shown in Table 8.12-5 because this traffic will be distributed over a longer period assumed in the calculations.

Increased transportation due to power plant construction will include deliveries of plant equipment and construction materials by truck, such as concrete, steel, and lumber. Truck deliveries will generally occur between 7 am and 4:30 pm on weekdays. In total, approximately 2,160 truck deliveries of materials and supplies are expected between summer 2005 and winter 2006, an average of 8 to 10 deliveries per weekday. At various times during peak construction, the number of daily deliveries will increase to as many as 25 per day. This will not significantly affect the traffic/truck mix along state highways, but it may increase the ratio of trucks to passenger vehicles on city streets for short times. Truck deliveries by load type are presented in Table 8.12-6.

Table 8.12-6. Truck deliveries by type and percentage.

Delivery type	Percent
Major equipment (components of the heat recovery steam generator, combustion turbine generator and steam turbine generator)	18
Mechanical equipment	4
Electrical equipment and material	7
Piping, supports, and valves	10
Concrete and reinforcing steel	29
Miscellaneous steel, roofing, and siding	6
Administration and warehouse buildings	1
Construction consumables	15
Office supplies	2
Contractor mobilization and demobilization	3
Construction equipment delivery and pickup	5

Deliveries to the REP project site will generally occur from Phillip Road, using Fiddyment Road. Based on the city truck routes, truck deliveries will typically access the site via SR 65, west on Blue Oaks Boulevard, south on Fiddyment Road, and west on Phillip Road.

In conclusion, significant effects on the local transportation system are not expected from power plant construction activities for the following reasons:

- There is no change to the LOS of any project area roads for average or peak hour conditions.
- The only noticeable effects on traffic will be localized near the construction site.
- The REP construction shift will generally begin at 7 am and finish at or before 4 pm. This will limit the number of vehicles during peak hour traffic periods and thus reducing potential traffic effects. During periods when the construction workday is extended, the workday generally will finish before 7 pm, Monday through Friday. Extended construction on weekends will take place between 8 am and 8 pm.
- The projected number of truck deliveries over the construction period is not expected to significantly impact truck/passenger car traffic ratios of the surrounding network as it currently exists. Any noticeable impact in traffic composition will likely be limited to a relatively small number of days when concrete deliveries will be made. Other deliveries will be spread over the construction period and will not significantly affect local traffic.

Delivery of Hazardous Materials

In general, only small quantities of hazardous materials will be used during the construction period as described in Section 8.5, Hazardous Materials Handling. These materials will be shipped by truck. They may consist of welding flux, paint, and various solvents. The pipes and boilers will be cleaned before startup using various alkaline solutions. These cleaning chemicals will be used in such small quantities that there will probably not be separate truck deliveries of hazardous materials during construction. If such deliveries should become necessary, however, all applicable requirements will be met, including the use of transporters with a Hazardous Material Transportation License. Additionally, all deliveries will follow a route that offers the shortest overall transit time possible and avoids congested thoroughfares,

places where crowds are assembled, and residential districts. This route runs along SR 65, Blue Oaks Boulevard, Fiddyment Road, and Phillip Road. Roseville Electric will obtain the appropriate permits required by the State of California.

Oversize or Overweight Shipments

Certain components of the facility are of such dimension and weight that special delivery will be required during construction. Oversize/overweight shipments are anticipated to be transported by heavy-load truck delivery. According to the City of Roseville, there are no substandard bridges along any city roadways. Any necessary ground shipment exceeding the size and/or weight/load limits described would require a Single Trip Transportation Permit (State of California Vehicle Code, Sections 35780-35796). Appropriate permits will be obtained for all deliveries to comply with local laws and ordinances.

Natural Gas Pipeline

There are currently four alternative routes being considered for the natural gas pipeline (see Chapter 5). Pipeline construction may involve trenchless construction techniques such as boring and jacking and open trenching. It will involve stringing, welding, radiographic inspection, coating, lowering-in, backfilling, street repair, hydrostatic testing, and clean-up activities. These will each be completed as a single, sequenced, construction effort. Access during pipeline construction will be along existing roads and rights-of-way. An encroachment permit will be obtained from the City of Roseville Public Works Department before construction. Construction damage to existing roads will be repaired to original or as close to original condition as possible. Traffic management plans will be filed with the City of Roseville as part of the encroachment permit approval.

Pipeline construction will occur in segments. As a result, impacts from construction will be of short-term duration, lasting only for the day or so required to open the street and lay the line. Temporary, indirect impacts may include traffic slowdowns and/or re-routing; however, plans will be in place to ensure that access is provided for emergency vehicles (police, fire, and ambulances).

There is a potential for minor, short-term increases in motor vehicle hazards due to the nature of pipeline construction and operation of construction equipment. For example, detours may be necessary to complete construction. Using standard linear construction practices (i.e., warning signs and lights, cones, and "reduce speed" notices), however, will reduce these impacts to a less than significant level. Traffic control, including signage and flag persons, will be required on all road segments during construction. Overall, construction of the proposed gas pipeline route is not anticipated to create long-term effects on the transportation system in the area.

Baseline Road functions as a major arterial roadway within the City of Roseville and carries large volumes of traffic during peak hours. To reduce construction impacts, lane closings on Baseline Road will be limited in terms of their timing and distance. That is, only small segments of the right-hand westbound lane on Baseline will be closed at a given time. Once the pipeline is completed, there will be no impacts to local transportation patterns.

Fiddyment Road also functions as a major arterial roadway within the City of Roseville and carries large volumes of traffic during peak hours. To reduce construction impacts, lane closings on Fiddyment Road will be limited in terms of their timing and distance. That is, only small segments of the right-hand northbound lane will be closed on Fiddyment at a given time. Once the pipeline is completed, there will be no impacts to local transportation patterns.

Recycled Water Pipeline

A new, recycled water pipeline will be installed across Phillip Road, from the REP site to the Pleasant Grove Waste Water Treatment Plant (PGWWTP). Access during pipeline construction will be along existing roads and right-of-ways. An encroachment permit will be obtained from the City of Roseville Public Works Department before construction. Construction damage to Phillip Road will be repaired to original or as near original condition as possible. Traffic management plans will be filed with the City of Roseville as part of the encroachment permit approval.

Sanitary Sewer Pipeline

A new, sanitary sewer pipeline will be installed next to Phillip Road, from the REP site to the existing influent junction structure northeast of the PGWWTP. Access during pipeline construction will be along existing roads and rights-of-way. An encroachment permit will be obtained from the City of Roseville Public Works Department before construction. Traffic management plans will be filed with the City of Roseville as part of the encroachment permit approval.

8.12.2.2 Operation Phase Impacts

Power Plant Site

The proposed project will generate up to 29 round-trips per day to the facility. These include 19 round-trips by employees and 10 round trips by tradespeople, vendors, consultants, and management personnel. There will be a maximum of 25 full-time employees working at the plant. The REP plant will be operated by a staff consisting of 3 operators per 12-hour rotating shift (8 am to 8 pm), with 3 relief operators; there will also be 7 supervisors/administrators, 6 maintenance technicians, and a water treatment specialist during the standard 8-hour workday. The facility will be operated 7 days per week, 24 hours per day.

It is assumed that most of the permanent workforce will reside in Roseville and nearby communities, and that their preferred routes to work will follow Blue Oaks Boulevard, Baseline Road, Pleasant Grove Boulevard, Fiddyment Road, and Phillip Road. These avenues of travel will accommodate the operations-related traffic without a change in LOS. Round trips generated by power plant operations personnel will be spread over two shifts and represent a negligible increase in peak hour or daily traffic volumes. The additional 19 trips generated by power plant operations will not result in any change in the LOS classification of the affected roadways.

During project operation, materials will be delivered to the plant site by truck on a regular, but infrequent basis. Overall, the number of truck deliveries to the site is estimated to be approximately three per day on average. The anticipated travel routes for materials delivery will be via SR 65 and Blue Oaks Boulevard.

Operation of the proposed project will generate a small amount of traffic that can easily be accommodated by the existing roadway system. The City of Roseville requires an analysis of traffic impacts for projects that generate 50 or more pm peak hour trips. Additionally, if a project generates 50 pm peak hour trips beyond what is assumed in the "Buildout/2020" traffic model for the site, a long-term analysis is required which involves adding the project into the City's model and running it to determine the project's impacts to the City's roadways. The City does not require an operational analysis of projects that are expected to generate less than 50 pm peak hour trips, such as the REP project.

Operation of the proposed project will not do the following: 1) generate substantial vehicular movement; 2) alter present patterns of circulation; 3) alter waterborne, rail, or air traffic; 4) substantially increase traffic hazards to motor vehicles, bicyclists, or pedestrians; 5) violate adopted LOS standards; 6) generate traffic for which impacted routes are not suitable; or 7) create demand for new parking that cannot be

accommodated by the project design. Therefore, operation of the proposed project will not result in significant impacts on the local transportation system.

Hazardous Material Transport

According to Section 31303 of the California State Vehicle Code, the transportation of hazardous materials shall occur on state or interstate highways offering the shortest possible overall transit time. In addition, the transporter shall avoid, whenever practicable, congested thoroughfares, places where crowds are assembled, and residential districts. According to Vehicle Code 3200.5, transporters of hazardous materials must contact the CHP and apply for a Hazardous Material Transport Permit.

All transporters of hazardous materials to the project site will be required to have a Hazardous Materials Transportation License. The licensed shipper will obtain a handbook specifying the routes approved to ship such materials. In addition, all shipments will follow the City-designated hazardous materials truck routes. This route will typically be I-80 to SR 65 to Blue Oaks Boulevard to Fiddyment Road, to Phillip Road. The route could potentially also include using Hayden Parkway or the western extension of Del Webb Boulevard to Phillip Road for an interim period before completion of Blue Oaks Boulevard west to Phillip Road. Overall, the number of hazardous materials truck deliveries to the site will be insignificant.

During plant operations, trucks will periodically transport replacement parts, lubricants, liquid fuels, aqueous ammonia, sulfuric acid, trash and other consumables. On average, there will be one or fewer truck deliveries or pickups to the project site per day. Table 8.12-7 provides a summary of hazardous materials transportation frequencies.

Table 8.12-7. Truck transportation of hazardous materials and hazardous waste to and from the site.

Delivery Type	Number and Occurrence of Trucks
Aqueous ammonia	1 to 2 per weeks
Sulfuric acid	1 per month
Cleaning chemicals	1 per month
Trash pickup	1 per week
Water treatment chemicals	4 per week
Lubricating oil	4 per year
Spent lubricating oil filters	4 per year
Laboratory analysis waste	4 per year
Oily rags	4 per year
Oil absorbents	4 per year
Sanitary waste	1 per week

Natural Gas Pipeline

The only traffic associated with the operation of the natural gas pipeline will be occasional preventative maintenance or repair vehicles in case of damage to any of the lines. This traffic will not cause any significant change to local traffic conditions.

Recycled Water Supply Pipeline

The only traffic associated with the operation of the recycled water supply pipeline will be occasional preventative maintenance or repair vehicles in the event of damage to any of the lines. This traffic will not cause any significant change to local traffic conditions.

Sanitary Sewer Pipeline

The only traffic associated with the operation of the sanitary sewer discharge pipeline will be occasional preventative maintenance or repair vehicles in the event of damage to any of the lines. This traffic will not cause any significant change to local traffic conditions.

8.12.2.3 West Roseville Not Annexed

If West Roseville were not annexed or were delayed indefinitely, there would be no difference in the project's effects on traffic and transportation during operation. The natural gas pipeline would follow alternative B1, and it would be necessary to construct an electrical transmission line between the REP and Fiddyment Substation. This electrical transmission route would follow Phillip Road from the project site to Fiddyment Road. From Fiddyment Road, the natural gas transmission line would follow Baseline Road to PG&E Line 123. The electrical transmission line would connect with the Fiddyment Receiving Station on Fiddyment Road near Pleasant Grove Boulevard. The potential effects of these alternatives on traffic and transportation would be the same as those of natural gas alternative B1.

8.12.3 Cumulative Impacts

There should not be any significant cumulative impacts resulting from the project in combination with any other proposed projects within the City, since impacts resulting from the power project are insignificant and negligible. There are no other large planned industrial developments in the general project area being considered by the City of Roseville. Traffic volumes generated by the REP during the operations phase will be low enough so that there should be no significant environmental impact. The proposed REP does not generate the threshold level of trips necessary to require a full traffic analysis, as recommended by the Institute of Transportation Engineers (ITE 2001). The existing roadway infrastructure is adequate to accommodate the predicted traffic movements generated by the proposed REP and the roadways are scheduled to improve during build out of the West Plan. In addition, the proposed REP will not exceed the standards of significance for traffic impacts.

8.12.4 Mitigation Measures

There are no significant impacts to traffic and transportation caused by construction or operation of the project, even with the use of a PCE factor to evaluate the impact of heavy trucks on the street system. Standard mitigation measures described above, and that are required under street-opening permits (warning signs and lights, traffic control cones, flag persons, etc.), will ensure that the project's effects on traffic and transportation remain insignificant during project construction and operation.

8.12.5 Laws, Ordinances, Regulations, and Standards

All applicable laws, ordinances, regulations, and standards and their conformance measures are detailed in the text below. Table 8.12-8 summarizes this information and provides agency contacts.

Table 8.12-8. Laws, ordinances, regulations, and standards.

LORS	Document and Page	Applicability	AFC Section Where Conformance is Discussed	Agency/Contact
Federal:				
Transport of hazardous materials	Hazardous Materials Transportation Act	Requires transporters to adhere to established regulations	8.12.5.1	N/A
State:				
Transport oversized or excessive loads over state highways	California Vehicle Code Section 35780	Requires permit to transport oversized or excessive loads over state highways. Enforced by the California Highway Patrol.	8.12.5.2	Caltrans, Darshan Sahota (916) 322-1297
Transport hazardous materials on state or interstate highways	California Vehicle Code Section 31303(b)	Requires that the transportation of hazardous materials be on state or interstate highways that offer the shortest overall transit time possible.	8.12.5.2	California Highway Patrol. Sgt. Debbie Pierce, (916) 445-1865
Transport hazardous materials on state or interstate highways	California Vehicle Code Section 31303(c)	Requires that the transportation of hazardous materials avoid, whenever practicable, places where crowds are assembled, and residence districts.	8.12.5.2	California Highway Patrol. Sgt. Debbie Pierce, (916) 445-1865
Licensing of hazardous materials transporters	California Vehicle Code Section 32000.5	Requires that transporters of hazardous materials contact the California Highway Patrol and apply for and receive a Hazardous Material Transportation License.	8.12.5.2	California Highway Patrol. Sgt. Debbie Pierce, (916) 445-1865
Local:				
Provide for the long-range planning and development of the Roseville transportation system	City of Roseville, General Plan, Transportation Element	Encourage new development to incorporate TDM measures through site design guidelines, including preferential carpool and vanpool parking, flex time, transit ticket sales, enhanced pedestrian access, bicycle storage, and on-site eating and recreation facilities	8.12.2.4	City of Roseville Rob Jensen Public Works (9165) 774-5331

8.12.5.1 Federal

The Hazardous Materials Transportation Act of 1974, 49 Code of Federal Regulations (CFR) 397.9, is a federal law applicable to this project. It directs the U.S. Department of Transportation to establish criteria and regulations for the safe transportation of hazardous materials. There are no specific conformance measures necessary for this law.

8.12.5.2 State

State laws that will apply to this project include the following:

- California Vehicle Code Section 35780 requires approval for a permit to transport oversized or excessive loads over state highways. The project will conform to Section 35780 by requiring that shippers obtain a Single Trip Transportation Permit for oversized loads, as required by Caltrans, for each vehicle. The administering agency is CalTrans. California Vehicle Code Section 31303(b) requires that the transportation of hazardous materials occur on state or interstate highways offering the shortest overall transit time possible. The project will conform to Section 31303(b) by requiring that shippers of hazardous materials use the shortest route possible to and from the project site. The administering agency is CalTrans.
- California Vehicle Code Section 31303(c) requires that the transporters of hazardous materials avoid, whenever practicable, congested thoroughfares, places where crowds are assembled, and residential districts. The project will conform to Section 31303(c) by requiring transporters to use routes that avoid these areas, if possible.
- California Vehicle Code Section 32000.5 requires that shippers of hazardous materials must contact the California Highway Patrol and apply for and receive a Hazardous Material Transportation License. The project will conform to Section 32000.5 by requiring hazardous materials transporters to be licensed when transporting to and from the project site.
- California State Planning Law, Government Code Section 65302, requires each city and county to adopt a General Plan, consisting of seven mandatory elements, to guide its physical development. Section 65302 (b) requires that a circulation (transportation) element be one of the mandatory elements. The scope of a circulation element consists of the "general location and extent of existing and proposed major thoroughfares, transportation routes, terminals, and other local public utilities and facilities, all correlated with the land use element of the plan." Compliance with this section is described below under the local LORS.

8.12.5.3 Local

Local laws that will apply to this project include the following:

- The Metropolitan Transportation Plan (MTP) establishes regional transportation goals, policies, objectives, and actions for various modes of transportation, including internodal and multinodal transportation activities. The MTP is implemented through the County Transportation Improvement Program (TIP). The administering agency is the Sacramento Council of Governments. The circulation element of the Placer County General Plan establishes goals and policies, and identifies implementation measures for County traffic and transportation systems.
- The circulation element of the Roseville General Plan sets forth goals, policies, and implementation programs related to traffic issues in the City of Roseville.

- The Roseville Public Works Department requires encroachment permits for pipelines on rights-of-way and for road improvements.

8.12.6 Involved Agencies and Agency Contacts

Table 8.12-8 includes a listing of the agencies involved and their contact names and phone numbers.

8.12.7 Permits Required and Schedule

Table 8.12-9 outlines the permit schedule related to traffic/transportation issues for the project. Permits reflect preferred facility routing. Information required to obtain each permit is also included.

Table 8.12-9. Permit schedule for traffic and transportation.

Permit	Schedule
Encroachment permit for the natural gas pipeline: • Site specific plan • Pipeline routes • Road rights-of-way where pipelines will be constructed	1 to 2 weeks from submittal to approval by the City of Roseville Public Works Department
Transport of oversized or excessive loads over state highways: • Specific route • Transport time • Load contents	Obtain when necessary from Caltrans, 2-hour processing time

8.12.8 References

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Caltrans. 2002. Traffic counts from the traffic and vehicle data systems unit. Internet site: http://www.dot.ca.gov/hq/traffops/saferesr/trafdata/index.htm. Accessed August 2003.

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8.13 VISUAL RESOURCES

Visual resources are the natural and cultural features of the landscape that can be seen and that contribute to the public's enjoyment of the environment. Visual resource or aesthetic impacts are generally defined in terms of a project's physical characteristics and potential visibility and the extent to which the project will change the perceived visual quality of the environment in which it will be located.

This section was prepared following CEC guidelines for preparing visual impact assessments for AFCs. Section 8.13.1 documents the visual conditions that currently exist in the Roseville Power Project (REP) area. Section 8.13.2 discusses the potential environmental effects as they relate to visual resources. Section 8.13.3 discusses the potential cumulative impacts of this and other projects in the area. Section 8.13.4 summarizes the mitigation measures proposed to reduce project impacts on visual resources. Section 8.13.5 describes the Laws, ordinances, regulations, and standards (LORs). Section 8.13.6 lists the references used in preparation of this section.

Figure 8.13-1 shows the location of the site the project's estimated visibility from the surrounding area. Figure 8.13-2 shows the locations of the Key Observation Points (KOPs) referenced in this section and the locations and view directions of visual character photos that are included as Figures 8.13-3 through 8.13-6. The existing views and simulated views of the project from the KOPs follow as Figures 8.13-7 and 8.13-8. All illustrations in this section are bound together at the end of the section for the reader's convenience.

8.13.1 Affected Environment

8.13.1.1 Regional Setting

The project is located within a physical setting that is generally level or slightly rolling with open plains. This area is considered as a transitional zone between the flat, open terrain of the Central Valley and the foothills of the Sierra Nevada Mountains. Major drainage channels, Pleasant Grove and Curry creeks, drain the area from east to west and serve as habitat for oak-woodland vegetation. The groves of oak trees, together with the scattered riparian vegetation along the creeks, accentuate the swales and drainage patterns in the landscape and create a strong visual contrast to the surrounding grasslands especially during the dry summer and fall months when the earth tones dominate the landscape. Seasonal wetlands in swales and vernal pools are scattered throughout the area and are an important aesthetic component of the landscape, providing floral colors during the springtime that contrast with the grassland area. There is extensive mature vegetation (oaks and riparian vegetation) along the creek northeast of the site, creating a dense visual screen. West of the project site the land slopes very gently towards the lowlands of the Sacramento River. Land use in this direction is agricultural, with extensive, seasonally flooded rice fields, irrigated pasture, row crops, and some grazing land. To the east are low hills that begin the Sierra foothills. These are more densely vegetated with oak woodland than the immediate project area. On clear days, the Sierra foothills are visible from the project area, and the Sierra crest is visible on very clear days. Views of these features have the highest scenic resource value of any in the project area.

Beginning 1.25 miles east of the project area lie residential communities within the City of Roseville. Most of these communities are relatively new, having been planned within the past 10 to 15 years. All have been developed consistent with the City's planning guidelines, with pleasantly landscaped arterial boulevards, open riparian corridors, and residential areas, punctuated with community commercial zones, schools, and other uses.

8.13.1.2 Visibility of the Project Site and Linear Corridors

Power Plant Site

The project site is open land surrounded by agricultural uses on the north, east, and west, and by the newly constructed Pleasant Grove Waste Water Treatment Plant (PGWWTP) on the south side. The riparian corridor along Pleasant Grove creek runs east-west approximately 1,800 feet north of the site. The riparian zone forms a visual screen, when seen from the site, though the open plains to the north of the creek can be seen intermittently from the project site. Southeast of the site and east of Phillip Road is an area of open oak woodland along an intermittent stream that runs north into Pleasant Grove Creek. To the west are slightly undulating plains, lacking shrubs or trees, which are currently in pasture or cultivation.

The 40-acre power plant site is generally level, at an elevation of about 94.3 feet and is at about the same elevation as the surrounding parcels but slopes gently downward, away from Phillip Road, from south to north. The site is undeveloped open grassland. There are no 'Public Protected Trees' or 'Protected Trees' observed on-site and the site is not considered a sensitive natural resource.

A study of the power plant visibility was conducted through an analysis of aerial photographs, initial engineering drawings of the power plant, extensive field observations, and an analysis of photographs taken from various viewpoints. Figure 8.13-1 shows estimated visibility of the project site from surrounding areas, both in terms of general visibility and intermittent or partial visibility. Viewers of the project site in the immediate vicinity include the workers at the PGWWTP, travelers on Phillip Road, and the inhabitants of nearby rural residences. There are three rural residences within 0.5-mile of the project site.

A one-story rural residence with a dog kennel is about 1,115 feet northwest of the power plant site and is encircled by some trees and screening vegetation. This residence is accessed from Phillip Road.

A second rural residence is located about 1,125 feet directly north of the power plant location. Residents in this house will have direct views of the project site since the house is not screened by trees. The driveway to this residence runs from Phillip Road along the northern boundary of the 40-acre REP parcel, turning north into the residence.

A third rural residence is located about 1,815 feet northeast of the power plant site. The driveway to this residence runs north from Phillip Road to the east of the REP site. The view of the REP site from this house would mostly be blocked by large trees in the riparian corridor of Pleasant Grove Creek, since the house is north of the creek.

Another rural residence is located about 0.75 mile southeast of the REP site. This is the R.F. Fiddyment Ranch house, a large two-story, colonial-style home. Several barns and shed-like structures are in the back and to the east of the main house. This farmstead is one of the earliest to be built in the general area and has been proposed for designation as an historic property (see Section 8.3, Cultural Resources). Several large, mature trees and shrubs surround the main house and groves of oak trees are located along the unnamed tributary to Pleasant Grove Creek that runs between the house and the project site. Due to the distance between the REP and the house complex and the presence of the large trees, the project would not be visible from the Fiddyment Ranch house or other nearby areas in the barnyard.

The closest residential area to the project is the Del Webb Sun City Roseville retirement community located about 1.25 miles east of the site, extending to the east of Fiddyment Road. This is a planned community with single-family dwellings with riparian corridors, open space, a golf course, and

community center. Residents of Sun City will not generally see the REP from within the residential area, however, because none of the Sun City residences faces Fiddyment Road, and a high masonry wall would block most views from lots with a rear yard to Fiddyment Road.

South of Sun City on Fiddyment Road, near the corner of Pleasant Grove Boulevard and approximately 1.5 miles from the REP, is a two-story residential retirement apartment complex, the Sutter Retirement Community. Second-story residents of this complex may be able to see the project to the northwest. Many of these views, however, will be blocked by the large screening trees along Fiddyment Road. These trees are medium-sized and have not yet reached maturity.

Further north along Fiddyment Road north of Phillip Road, views of the project will be entirely blocked by large oak trees in a wooded area west of Kasebèrg Creek. North of Pleasant Grove Creek, the project will be intermittently or partially visible at a distance from Oil Derrick Road, about two miles north. The project will be visible along Phillip Road to the west of the REP site for approximately 1.5 miles. Further east, low hillocks will block the view. From the south, the project will be generally visible, unless intermittently blocked by structures at the PGWWTP. Approaching Baseline Road, however, visibility will decline due to low hillocks.

The most important visual corridor in the project area in terms of the number of viewers is Fiddyment Road, with an Average Daily Traffic (ADT) of about 6,000 vehicles/day north of the Pleasant Grove Road (Rose 2003, personal communication). Phillip Road, which passes immediately by the site, by contrast, has an ADT of 47 to 157 vehicles/day.

The most-traveled roadway in the project vicinity is Baseline Road, which has an ADT of 15,644 vehicles/day. This road is approximately 3 miles south of the site, however, and low undulating terrain will block views of the project from this distance.

Transmission Lines

The REP project will not require a transmission line. A new double-circuit 60 kV transmission line will be built as part of the WRSP infrastructure development program and will run along Phillip Road immediately south of the project site. This line will be permitted as part of the WRSP development. A part of the REP project, this line will be looped into the REP switchyard.

Natural Gas Pipeline

The natural gas pipeline for the project will run along existing city streets or within the rights-of-way of WRSP planned streets (See Figure 5.1-1 and Chapter 5). The pipeline will be constructed entirely underground and so not be visible after construction.

Recycled Water Pipeline

The recycled water pipeline for the project will cross beneath Phillip Road from the REP to the PGWWTP.. The pipeline will be constructed entirely underground and so not be visible after construction.

Sanitary Sewer Pipeline

The sanitary sewer pipeline will run for about 800 feet along Phillip Road to the waste water treatment plant's influent junction structure. The pipeline will be constructed entirely underground and so not be visible after construction from nearby roadways.

Storm Water Outfall

The storm water outfall will run east to northeast for about 340 feet to an unnamed tributary to Pleasant Grove Creek. The western portion of the storm water outfall will be a pipeline and the eastern portion will be an open ditch. The pipeline will be 30 inches in diameter and will be installed underground. It will not be visible after construction. The ditch will be constructed below the level of the existing grade and, thus, will only be visible from a narrow area looking straight down the length of the ditch.

8.13.1.3 Sensitive Viewing Areas and Key Observation Points

To assess the potential visual impacts of REP facilities on visual resources, the view areas most sensitive to potential visual impacts were identified. In consultation with CEC staff, two KOPs were selected for detailed analysis. These KOPs represent the two distinctive viewer groups that will be able to view the project: 1) three rural residences located north of the REP site and 2) occupants of vehicles traveling north on Fiddyment Road between Pleasant Grove Boulevard and Phillip Road.

Photographic simulations of the completed REP facility were developed for the KOPs as a basis for identifying the project potential visual effects. Since the natural gas and water pipelines will be underground and not visible, these project components are not discussed in the evaluation of the visibility of the project site from the KOPs.

The following factors were considered when evaluating the sensitivity of the viewing areas potentially impacted by the project: 1) distance of the viewer to the site; 2) number of viewers; 3) duration of the view; and 3) viewer sensitivity, including viewer activity (commute, recreational, residential). The potentially sensitive viewing areas selected for visual analysis are shown in Figure 8.13-2 and views from each of the KOPs are discussed below.

Discussion of the views seen from the KOPs includes ratings of the relative visual quality of the landscapes. These ratings were developed based on on-site observations completed during the months of July through August 2003, review of photos of the area; review of local planning documents, review of methods for assessment of visual quality, and review of research on public perception of the environment and scenic quality ratings of landscape scenes. The final assessment of the visual quality of the views from each of the KOPs was made based on professional judgement, considering a variety of landscape assessment factors. Factors considered included an evaluation of the following:

- Natural scenic features, including topography, water courses, and natural vegetation
- Positive and negative effects of man-made alterations and structures on visual quality
- Visual composition, including assessment of the complexity and vividness of patterns in the landscape
- Spatial organization

The relevance of these factors for landscape evaluation has been established by landscape perception and assessment research over the past 20 years. Based on these considerations, a group of landscape scholars at Virginia Technical University (Buhyoff et al. 1994) developed landscape quality ratings, specifically, the six landscape quality classes listed in Table 8.13-1. This scale provides a strong framework for qualitative ratings because it is based on findings of the full range of available research on the ways in which the public evaluates visual quality. In addition, the scale has a common-sense quality and is easily understood because it defines landscape quality in relative terms, contrasting landscapes that are low, below average, average, above average, high, and outstanding in visual quality.

Table 8.13-1. Landscape visual quality scale used in rating project area viewsheds.

Rating[1]	Explanation
Outstanding visual quality	A rating reserved for landscapes with exceptionally high visual quality. These landscapes are significant nationally or regionally. They usually contain exceptional natural or cultural features that contribute to this rating. They are what people think of as "picture post card" landscapes. People are attracted to these landscapes to view them.
High visual quality	Landscapes that have high quality scenic value. This may be due to cultural or natural features contained in the landscape or to the arrangement of spaces contained in the landscape that causes the landscape to be visually interesting or a particularly comfortable place for people. These are often landscapes that have high potential for recreational activities or in which the visual experience is important.
Moderately high visual quality	Landscapes that have above-average scenic value but are not of high scenic value. The scenic value of these landscapes may be due to man-made or natural features contained within the landscape, to the arrangement of spaces in the landscape, or to the two-dimensional attributes of the landscape.
Moderate visual quality	Landscapes that have average scenic value. They usually lack significant man-made or natural features. Their scenic value is primarily a result of the arrangement of spaces contained in the landscape and the two-dimensional visual attributes of the landscape.
Moderately low visual quality	Landscapes that have below average scenic value but not low scenic value. They may contain visually discordant man-made alterations, but the landscape is not dominated by these features. They often lack spaces that people will perceive as inviting and provide little interest in terms of two-dimensional visual attributes of the landscape.
Low visual quality	Landscapes with low scenic value. The landscape is often dominated by visually discordant man-made alterations, or they are landscapes that do not include places that people will find inviting, and they lack interest in terms of two-dimensional visual attributes.

[1] Rating scale based on Buhyoff et al. 1994.

KOP 1—Northwest Corner of the REP Site (Viewing South-Southeast)

Figure 8.13-7a represents the view of the project site as seen from KOP 1. This KOP is at the northwest corner of the project site, 330 feet east of the single-family residence and dog kennel that is 1,115 feet from the center of the power plant site (point midway between the stacks). This viewpoint was selected because it best represents the typical views from the three rural residences located north of the REP. Of these three, the house with the dog kennel at 5480 Phillip Road faces the road, with mature trees screening the rear of the house from views of the project area. The second residence, at 5490 Phillip Road, is accessed along a gravel driveway located along the northern boundary of the 40-acre REP parcel and is 1,125 feet north of the power plant site center. This house faces the project site without intervening screening or trees. The third residence is located at 4900 Phillip Road. It is located northeast of the REP, 1,815 feet from the center of the power plant site. It is accessed via a private driveway running north from Phillip Road east of the project. It is unlikely that residents within the house or in its yard areas will see the project, when built, because large oak trees flanking Pleasant Grove Creek lie between this house and the project site. The view from this KOP is somewhat closer to the REP than any of the three houses.

The visual quality of the KOP view is low to moderately low, since there are numerous visually discordant man-made elements in the viewshed, which, although they do not dominate the view, distract the viewer. These elements include numerous mobile homes, temporary structures, construction trailers, distribution poles and lines, construction debris, port-a-johns, earth mounds, and numerous large metal industrial buildings comprising the Pleasant Grove Waste Water Treatment Plant, in the distance. Open grassland lies to the west while linear masses of trees along Pleasant Grove Creek and Kaseberg Creek delineate riparian areas to the north and east, respectively. The only existing trees in the view are two small groups of fruitless mulberry trees in the middle of the power plant site. Th trees are the remnants of landscaping for a former rural residence.

Only residents living in the residence directly north of the site (5490 Phillip Road) will be able to see the REP from their house. Viewers at the two other residences will not see the site as readily since views will be blocked by trees near the homes. However, the residents will see the site during times of ingress and egress and will not be accustomed to seeing large, industrial buildings at close range from this locality. They may be accustomed to seeing industrial buildings from a middle distance since the waste water treatment plant has been under construction for some time. Though the sensitivity of the viewers is high, as residential viewers, only the small number of viewers at the three residences will see the REP frequently at these near distances.

KOP 2—Fiddyment Road South of Del Webb Boulevard (Viewing Northwest)

Figure 8.13-8a represents the view from KOP 2, which was selected because it represents the typical view of a driver traveling north on Fiddyment Road. The KOP is located approximately 1,100 feet south of Del Webb Boulevard, which is the entrance to Del Webb Sun City from Fiddyment Road.

Drivers traveling north on Fiddyment Road will be able to see the site through their front or side windshields at most points along the road that are south of Phillip Road. North of this point, large trees block the view. South of Pleasant Grove Boulevard, the project will be intermittently visible, or only the tops of the higher structures (stacks, HRSGs) will be visible. The distance to the REP from this KOP is approximately 1.8 miles. At this distance, the power plant site is along the horizon, with structures located in the PGWWTP and intermittent groves of trees.

The visual quality of this view is moderate. To the east of Fiddyment Road, a wall separates the Fiddyment right-of-way from the Sun City residential area. A sidewalk and a greenway with shrubs and trees create a pleasant, landscaped effect. To the west, the view extends across open, undulating plains towards the PGWWTP and project site. Groves of large oak trees loom up in the distance to the northwest in this view. Distribution poles and lines along Fiddyment Road and the structures of the PGWWTP create some visually discordant elements in this direction.

The traffic flow on Fiddyment Road is about 6,000 vehicles per day in the northbound lane. South of Phillip Road, the REP site will be visible, except in a few spots where small topographic rises west of the roadway may block the view. Viewer sensitivity is low to moderate. Most viewers will be commuters travelling to or from their residences.

The sensitivity of this view is moderately low due to the sensitivity of the viewers, distance to the site, and the fact that most of the viewers are commuters.

8.13.2 Environmental Consequences

8.13.2.1 Analysis Procedure

This analysis of visual impacts potentially caused by the REP is based on field observations and review of the following information: local planning documents, project maps and drawings, photographs of the project area, and computer-generated visual simulations for each of the KOPs.

Photographs are presented to represent the before-project conditions from each KOP. Visual simulations were produced to illustrate the project site after construction from viewpoints, providing the viewer with a clear image of the location, scale, and visual appearance of the proposed project. The "before" photos and the simulations of the "after" conditions are presented as pairs for comparison. The computer-generated simulations are the result of an objective analytical and computer modeling process described briefly below.

Site reconnaissance was conducted to view the site and surrounding area, to identify potential key viewpoints, and to take photographs of existing visual conditions. A single lens reflex (SLR) 35 mm camera with a 50 mm lens (view angle 40 degrees) was used to photograph the site. Computer modeling and rendering techniques were used to produce the simulation images. Existing topographic and site data provided the basis for developing an initial digital model. Project engineers provided site plans and details of the power plant. These were used to create three-dimensional (3-D) digital models of these facilities. These models were combined with the digital site model to produce a complete computer model of the generating facility.

For each viewpoint, a viewer location was digitized from topographic maps and scaled aerial photographs, using 5 feet as the assumed viewer eye level. Computer "wire frame" perspective plots were then overlaid on the photographs of the views from the KOPs to verify scale and viewpoint location. Digital visual simulation images were produced as a next step based on computer renderings of the 3-D model combined with high-resolution digital versions of base photographs. The final "hardcopy" visual simulation images that appear in this document were produced from the digital image files using a color printer. The images produced here are in 8.5- by 11-inch size. Images in 11- by 17-inch size have been provided to the CEC Staff and are available upon request.

8.13.2.2 Significance Criteria

Analysis of the project impacts was based on evaluation of the potential effect of changes to the existing viewsheds that will result from construction and operation of the REP. An important aspect of this analysis was evaluation of the "after" views provided by the computer-generated visual simulations, and their comparison to the existing visual environment. When making a determination of the effects of the visual changes, consideration was given to the following:

- The extent to which the affected environment contains places or features that have been designated in plans and policies for protection or special consideration
- The numbers of viewers, their activities, and the extent to which these activities are related to the aesthetic qualities affected by the likely changes
- The specific changes in the affected visual environment's composition, character, and any specially valued visual qualities
- The affected visual environment context

The determination of whether the project's adverse visual effects would be significant under the provisions of the California Environmental Policy Act (CEQA), was made in reference to Appendix G of the State CEQA Guidelines. The CEQA Guidelines define a "significant effect" on the environment to mean a "substantial, or potentially substantial, adverse change in any of the physical conditions within the area affected by the project, including objects of historic or aesthetic significance" (14 CCR, § 15382).

Appendix G of the Guidelines, under Aesthetics, lists the following four questions for lead agencies to address:

- Would the project have a substantial adverse effect on a scenic vista?
- Would the project substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?
- Would the project substantially degrade the existing visual character or quality of the site and its surroundings?
- Would the project create a new source of substantial light or glare that would adversely affect day or nighttime views in the area?

8.13.2.3 Project Appearance

Power Plant Site

The design and arrangement of the 160 MW natural gas-fired combined-cycle generating facility and electrical switchyard area are described in detail in Chapter 2.0, Project Description. Table 8.13-2 summarizes the equipment dimensions of the power plant major components.

Architectural Design

The oblique aerial rendering of the project found in Chapter 1, Figure 1.1-1, shows a general aerial view of the power plant facilities. The REP has designed the power plant to minimize visual impact on the surrounding area through the design and layout of the power plant, detailing of the major structures and creative use of form, line, color, and texture.

The Administration/Control building, Warehouse/Maintenance Building, and Water Treatment Building have been combined into one low-profile building to reduce their visual impact and will be constructed with a corrugated metal hip roof design. The low-profile design, coupled with off-white colored walls and light tan corrugated roof will complement the major power plant structures to the northeast and the surrounding golden colors of the grassland and will be consistent with the City of Roseville's architectural guidelines for industrial districts. The plant electrical building will match the administration/maintenance/water treatment building in color and architectural design. The cooling tower chemical feed building will also blend in with these buildings in design, color and form.

The larger storage tanks, which include the fire water storage tank, demineralized storage tank, and cooling tower blowdown storage tank, will also be grouped together east of the zero liquid discharge system. They will be low profile in form and will be painted neutral gray colors to blend with the tanks west and the cooling tower and equipment in the plant gas yard equipment area to the north.

Table 8.13-2. Roseville Energy Park equipment dimensions (GE LM600).

Feature	Height (feet)	Width (feet)	Length (feet)	Diameter (feet)
HRSG Units:				
HRSG casings	53'	15'	93'	N/A
To platform	60'	N/A	N/A	N/A
To top of highest drums	65'	N/A	N/A	N/A
To top of the top-works support steel	80.5'	N/A	N/A	N/A
To top of relief valves and vent silencers	88'	N/A	N/A	N/A
HRSG stacks	120'	N/A	N/A	11'
Gas Combustion Turbine Generators:				
Gas combustion turbines & generators	16'	14'	57'	N/A
Inlet air filters (located above CT)	35'	34'	34'	N/A
Steam Turbine Generator:				
STG enclosure (mounted on pedestal)	30'	N/A'	N/A	N/A
STG pedestal	15'	N/A	N/A	N/A
Condenser	32'	15'	32'	N/A
Auxilliary Boiler:				
Boiler	18'	25'	40'	N/A
Stack	30'	N/A	N/A	3'
Pipe Rack:				
Rack	32'	15'	255'	N/A
Platform tower	48'	20'	20'	N/A
Cooling Tower (4 cells):	see below	49'	193'	32'
To top of deck	30'	N/A	N/A	N/A
To top of fan shrouds (cones)	44'	N/A	N/A	N/A
Ammonia storage tank	15'	N/A	55'	13.5'
Cooling Tower Chemical Feed Shelter	18'	25'	55'	N/A
Zero Liquid Discharge System:				
Brine concentrators	80'	N/A	N/A	17'/10'
Crystallizers	70'	N/A	N/A	12'/8
Vapor compressors	8'	15'	10'	N/A
Filter press	18'	30'	15'	N/A
Tanks:	15	80	85	N/A
Service/firewater tank	40'	N/A	N/A	66'
Demineralized water storage tank	24'	N/A	N/A	35'
Cooling tower blowdown storage tank	32'	N/A	N/A	35'
Administration Building	16'	61'	112'	N/A
Warehouse/Maintenance Building	26'	61'	115'	
Water Treatment Building	22'	61'	30'	

Table 8.13-2. Roseville Energy Park equipment dimensions (GE LM600)

Feature	Height (feet)	Width (feet)	Length (feet)	Diameter (feet)
Plant Electrical Building	16'	60'	80'	N/A
Fire Pump House	10'	16'	13'	N/A
Switchyard:				
Switchyard bus structures	20'	2'	14'	N/A
Conductor take-off structures	50	N/A	N/A	2'
Switchyard control building	16'	60'	12'	N/A
Storm Water Retention Ponds:	Depth to 10'	N/A	N/A	N/A
Gas Compressor Station	12'	50'	80'	N/A
Gas Metering Station	10'	50'	100'	N/A

The combustion turbines and the generator housing, west of the HRSGs, have a low profile design with a stepped-down appearance. They will be painted a neutral gray color to match the HRSGs and cooling tower and blend in with the pipe rack structure. The two HRSGs west of the cooling tower structure will ramp up from the turbine generator to the exhaust stacks. These structures will have an accordion-style, "ribbed" appearance and a neutral gray color. This will enable the structures to visually blend with the combustion turbine and generator rotor housings. They are aligned in a row and are partially screened from Phillip Road, by large buildings and tanks along the Phillip Road frontage. The exhaust stacks will be painted a neutral gray color to blend in with the skyline and match surrounding structures. They will be as unobtrusive as possible. The pipe rack structure will be partially hidden from viewers to the north and east by the two gas turbine generators and combustion turbine generators. The pipe rack structure will be partially screened from view by drivers on Phillip Road, by the administration/maintenance/water treatment building to the south.

The new switchyard structure is located at the southwest end of the site. Circuit breakers, transformers, conductor takeoff structures, and conductor support poles connecting with the WRSP 60 kV transmission line will be galvanized metal, which will blend in with power plant structures and buildings to the east.

Screening Structures

Chain-link fencing 8 feet high will surround the power plant site, screening the view somewhat from adjacent roadways.

Landscaping

Under the WRSP, the segment of Phillip Road immediately south of the REP will become a private drive serving the REP and PGWWTP, and Phillip Road east of the project site will be realigned to continue north, instead of turning west. This section of Phillip Road will become a public road and will extend to the new alignment of Blue Oaks Boulevard, to the north, which will be extended west from Fiddyment Road. Though the REP site and adjacent City parcels are not in the WRSP, the frontages of realigned (future) Phillip Road and future Blue Oaks Boulevard are included in the WRSP. Therefore, adjacent development should follow the WRSP design standards. These standards call for a 25-foot-wide landscape easement along the west side of Phillip Road (east of the REP) and a 50-foot-wide easement along the south side of the extended Blue Oaks Boulevard, which will be to the north of the REP. The developers of West Roseville will be responsible for all frontage improvements along the roadways, such

as curb, gutter, sidewalk, and street lights. As an adjacent developer, however, Roseville Electric would be responsible for landscaping within the landscape easement. This landscaping will follow the design guidelines in the West Roseville Specific Plan which incorporates the following principles (among others):

- Primary street trees will be located next to the street
- Secondary street trees will be used to add contrast and background to the primary street trees
- Trees (both primary and secondary) will be spaced an average of 30-feet on center
- Trees in minimum 15-gallon containers
- Shrubs will be used to provide a visual barrier to fences, walls, and utility equipment
- Groundcovers will be used to cover areas not planted with shrubs
- Meet the City's criteria for a water-efficient landscape
- The landscaping will be drought-tolerant when established
- All plants will be from the City's approved plant pallette (pp. 12-9 and 12-12 of the WRSP)

The following design guidelines apply specifically to the easement for the new 60 kV transmission line (and thus to the landscaped street corridor east of REP site along the western edge of Phillip Road:

- Lighting structures and landscaping within the powerline easement (applies to the realignment of Phillip Road)
- Landscaping should not exceed 15-feet above-ground elevation
- Landscaping should not be within 25 feet of the nearest high-voltage transmission line conductor.
- Berms should not be placed next to the base of the powerline pole

Lighting

The REP will require nighttime lighting for operational safety and security. To reduce off-site impacts of this requirement, lighting at the facility will be restricted to areas required for safety, security, and operation. Lights will be turned off in areas where personnel are not present, if not otherwise deemed necessary for security. Exterior lights will be hooded, and lights will be directed on-site so that no significant light or glare will be dispersed or reflected onto adjacent properties.

Visible Plumes

The process of condensing the steam used in generating power in the steam turbine generator can cause the formation of visible water vapor plumes above the cooling tower during cold weather and high humidity.

Water vapor plumes from the HRSG exhaust stacks will not be visible with the design being used for the heat recovery steam generators, except under very limited circumstances.

8.13.2.4 Assessment of Visual Effects

The following section assesses the project's potential effects on visual resources by analyzing the visual changes that would occur at each key observation point. Table 8.13-3 summarizes this analysis.

Table 8.13-3. Summary of the KOP visual effects analysis.

KOP	Location	Visual Quality	Viewer Sensitivity	Number of viewers	Visual Contrast	Visual Dominance	Significant adverse Impact?
1	Northwest corner of power plant site viewing SSE	Low to moderately low	High (residential)	Few (three residences)	High	High	No
2	Northbound Fiddyment Road	Moderate	Low to moderate (commuter)	Low to moderate (6,000/day)	Low	Low	No

KOP 1—Northwest corner of the power plant site (Viewing South)

Figure 8.13-7b is a visual simulation of the completed project as seen from KOP 1. From this viewpoint, the power plant is immediate visible to residents to the north-northwest of the site. The cooling tower, HRSGs, stacks, combustion turbine generators, administration/control building, and switchyard are readily visible and loom large in the foreground. The ZLD units are visible behind the power block. The viewer sensitivity at the residences is high, and the power plant will appear as a massive and dominant structure in the viewshed. The effect will be adverse, but the impact does not reach the level of significance, because of the low-to-moderate viewshed quality and the low number of viewers,. The view from this KOP lacks scenic quality and contains visually discordant man-made alterations such construction trailers and permanent industrial buildings of the PGWWTP, temporary trailers, sheds, and port-a-johns. Trees currently screen many direct views from two of the residences. Landscaping along the south side of the extension of Blue Oaks Boulevard will screen the view of the power plant from the third residence when it is installed as part of the build-out of the WRSP.

KOP 2—Fiddyment Road South of Del Webb Boulevard (View Northwest)

Figure 8.13-8b (KOP 2) is a visual simulation representing the typical view of the project after construction. The viewer is a hypothetical driver traveling north on Fiddyment road, located at a point 1,100 feet south of Del Webb Boulevard, which is the entrance to Del Webb Sun City.

The existing visual quality is moderate, consisting of well-designed and maintained landscaping along the east side of Fiddyment Road, large oak groves to the northwest, and undulating plains to the west. Drivers travelling north on Fiddyment Road are mostly commuters and have relatively low viewer sensitivity. Residents within the Sun City development will not be able to see the site from their residences because of the large masonry wall and landscaping trees along Fiddyment Road. Though travelers will be able to see the project from just south of Pleasant Grove Boulevard to just north of Phillip Road, a distance of about 1.5 miles, the view will be very distant, and the project features, while visible, appear small and blend in with the other elements along the horizon, including the buildings at the PGWWTP and various groves of trees in the distance.

Thus, due to the distance to the site, the low visual contrast and dominance of the project, and the low to moderately low sensitivity of the viewers, the project will not cause a significant adverse visual impact to visual resources for viewers from this KOP.

Visible Plumes

It is likely that visible plumes will not be seen emanating from REP cooling towers under most circumstances. Cooling tower plumes may form under unusual conditions of high humidity and low temperature. Plumes will be likely to occur at night and in the early morning hours or during rain or fog, when they are least likely to be visible.

Light and Glare

The lighting impact on visual conditions during hours of darkness will be very limited. As indicated previously, some night lighting will be required for operational safety and security. High illumination areas not occupied on a regular basis and not required to be lighted to provide security will be provided with switches or motion detectors to light these areas only when occupied. At times when lights are turned on, the lighting level will be limited to that required for personal safety and security, will not be highly visible off-site, and will not produce off-site glare effects. The off-site visibility and potential glare of the lighting will be restricted by the use of hooded fixtures and placement of lights to direct illumination into only those areas where it is needed. Lighting will be restricted to areas required for safety, security and operational use. The location and design of the light fixtures will help shield lighting and prevent dispersal onto adjacent properties.

Natural Gas Pipeline

The design and layout of the natural gas line that will be constructed to serve this project are described in Section 5. The new natural gas pipeline will be underground and will follow existing streets. There are four alternative routes, labeled A, B, B-1, and C. They will all start at PG&E's Line 123 on Base Line Road.

Existing asphalt paving and excavated soil will be stockpiled along the route. The trench will be 2 to 3 feet wide by 6 to 8 feet deep, if shored, and up to 12 feet wide if not shored. After the gas pipeline is installed, trenches will be filled and compacted, and streets will be repaved and restriped. In areas where the piping will cross under vegetation, trenches will be filled and compacted, covered with imported topsoil, and replanted with the same species of plants. Since the new natural gas pipeline will be installed underground and surface conditions will be restored after trenching and construction, installation of the pipeline will not impact visual resources.

During construction, the area along the rights-of-ways will only be temporarily disrupted by machinery, excavated piles of soil, construction vehicles, and other minor visual disturbances associated with pipeline construction. These visual impacts will be minor, and temporary, and not significant.

Sanitary Sewer Pipeline

The sanitary sewer pipeline will be constructed next to Phillip Road using the same techniques as the natural gas pipeline. As with the gas pipeline, visual impacts will be minor, and temporary, and not significant.

Storm Water Outfall

The storm water outfall will be constructed using the same techniques as the natural gas pipeline. A portion of the outfall will be constructed underground (30-inch pipeline), and a portion will be

constructed as open ditch. The underground portion will not be visible after construction. The open portion will have very limited visibility from adjacent areas after construction. The visual impacts of the outfall would thus not be significant.

Construction Laydown and Worker Parking Areas

The laydown areas will be located to the north, northwest, and northeast of the power plant. Vehicles and equipment will only be stored in this area for a short time and the activities in the laydown areas will have relatively little effect on the overall character and quality of the area in which they are located. Due to the limited time involved, and the fact that the sites will be restored to their previous condition at the end of the construction period, the construction laydown areas will not create significant adverse visual impacts.

8.13.2.5 Impact Significance

The CEQA Guidelines define a "significant effect" on the environment to mean a "substantial, or potentially substantial, adverse change in any of the physical conditions within the area affected by the project, including objects of historic or aesthetic significance" (14 CCR, § 15382). The five questions related to aesthetics that are posed for lead agencies and the answers to them for the REP are as follows:

1. *Would the project have a substantial adverse effect on a scenic vista?*

   No. There are no developed or officially designated scenic vista areas in or near the project viewshed. The landscape is flat in all directions for several miles with no outstanding visual features.

2 *Would the project substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?*

   No. None of the project facilities falls within the boundaries or viewshed of a state scenic highway or other important scenic resource. Although there are natural amenities such as oak trees, creeks, or vernal pools within the viewshed, there are no natural amenities on-site, and construction of the project will not change or substantially damage any scenic resource.

3 *Would the project substantially degrade the existing visual character or quality of the site and its surroundings?*

   No. The project site does not contain any special aesthetic resources and the surroundings have a low to moderately low level of visual quality. Though the project will introduce new elements into the landscape, they are consistent with the adjacent PGWWTP and will not degrade the existing character and quality of the site or the surrounding area substantially.

4. *Would the project create a new source of substantial light or glare that would adversely affect day or nighttime views in the area?*

   No. As described in Section 8.13.2.4, project light fixtures will be restricted to areas required for safety, security, and operations. Lighting will be directed on-site, and lights will be shielded from public view. Switches, sensors, and timers will be selected to minimize the time that lights not needed for safety and security remain on. The project will be so far away from Fiddyment Road that lighting will be almost indiscernible from there. The visual impact of night lighting on residents to the north of the site will be minimal since all lighting will be directed downward and shielded from the resident's view.

With these measures, lighting associated with the project will not pose a hazard or adversely affect day or nighttime views toward the site. Therefore, the impacts of the project visual effects related to lighting will be less than significant.

5. *Would the project conflict with any applicable land use plan, policy, or regulation (including, but not limited to a general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an aesthetic effect?*

   No. As documented in the LORS analysis in Section 8.13.5, the project will be in conformance with the applicable implementing policies, ordinances, or other regulations specifically related to visual resources identified in the City of Roseville's General Plan, Community Development Guidelines and Zoning Ordinance, as well as Placer County's General Plan.

8.13.2.6 Alstom GTX100 Option

The project simulations and the equipment dimensions listed in Table 8.13-2 are based on the use of General Electric's LM6000 combustion turbine generator (CTG). The alternative CTG technology considered in this AFC is the use of the Alstom GTX100 CTG. This alternative technology would not, however, significantly affect the key aspects of project appearance considered in assessing visual resources effects: the overall form, color, massiveness, and visual dominance of the project features. This is because the CTG is a small structure relative to the HRSGs and stacks that are located next to it. In some profiles, the CTGs are not visible. Furthermore, the dimensions of the Alstom GTX100 do not significantly differ from those of the LM6000 (see Table 8.13-4).

Table 8.13-4. Alstom GTX100 turbine dimensions

Feature	Height (feet)	Width (feet)	Length (feet)	LM6000 Height
Gas Combustion Turbine Generators:				
Gas combustion turbines & generators	18'	18'	65'	16'
Inlet air filters (located above CT)	44'	23'	30'	35'
Generator housing	28'	23'	65'	25'

8.13.2.7 West Roseville Not Annexed

If West Roseville annexation is denied or delayed indefinitely, there will be only one significant difference in the project's visual effects on its surroundings. It will be necessary to construct a 60 kV transmission line from the REP site along Phillips Road to Fiddyment Road and along Fiddyment Road to the Fiddyment Receiving Station. The in-line conductor supports would be wooden poles and 65 feet or less in height. Conductor supports at turning points would be galvanized metal. Transmission lines of this type are an expected feature of rural roadways, and this transmission line would not cause a significant adverse effect on visual resources.

8.13.3 Cumulative Impacts

Though the REP and the PGWWTP increases the industrial character of the area, the two do not cause impacts that are individually less than significant but cumulatively significant. The WRSP is a reasonably foreseeable future development, but the WRSP has been planned with the REP in mind. Though the WRSP includes additional industrial areas near the REP, it also has large areas of open space and parks, landscaped arterial boulevards, and residential areas that will create a harmonious new visual and

preserve many of the most important local visual corridors and resources, such as oak groves along Kaseberg Creek, Pleasant Grove Creek, and the unnamed drainage southeast of the REP.

8.13.4 Mitigation Measures

The project will not cause significant adverse impacts to visual resources; therefore, significant mitigation measures are not necessary. The following design features have been incorporated, however, into the project plan to enhance the visual appearance of the power plant and associated facilities:

Careful site planning and landscape design, including the following:

- The administration/control room building, warehouse/maintenance building and water treatment building have been consolidated into one building (designed with a hip roof and painted to match the plant electrical building and cooling tower chemical feed building) and visually blend in with the other power plant structures. The light-colored walls and light tan roof will also blend with the surrounding natural oak/grassland area.
- Installation of tree and shrub planting in accordance with the WRSP the design guidelines, within the right-of-way and along the west side of the extension of Phillip Road east of the power plant, will significantly reduce the visual impact of the project as seen from residents to the east. Landscape installation within the right-of-way along the south side of Blue Oaks Boulevard will help screen the power plant from the north.

Additional features will include the following:

- All major power plant structures will be painted neutral colors to visually blend with each other and with the surrounding industrial buildings.
- The HRSG housing will be painted a soft neutral color to visually blend with the turbine generator housing.
- There will be minimal signage, and construction of project signs will use non-glare materials and unobtrusive colors. The design of any signs required by safety regulations will have to conform to the criteria established by those regulations.
- Night lighting will be limited to areas required for safety, security, or operations, and lighting will be installed with shields and directed downward to avoid dispersal of lighting onto nearby properties. Timers and sensors will be used to minimize the time that lights are on in areas where lighting is not normally needed for safety, security, or operation.

8.13.4.1 Pipelines

The following design features have been included as a part of the project to reduce the visual impacts of construction of the natural gas and wastewater discharge pipelines:

- Where the pipeline are installed through vegetation-covered areas, ground surfaces will be restored to their original condition, and any vegetation removed during the construction process will be replaced.
- Piles of soil, broken-up concrete and asphalt, and other debris resulting from trenching along the streets will be removed from the area, and the area will be restored to original conditions.
- After piping is installed and trenches are backfilled, streets will be repaved and restriped to conform to existing conditions.

8.13.5 Laws, Ordinances, Regulations, and Standards

This section describes the laws, ordinances, regulations, or standards relevant to the visual resource issues associated with the REP (Table 8.13-5). No federal, state, or regional LORS are known that will apply to the project visual resource issues. However, visual resource and urban design concerns pertinent to the project are addressed in the City of Roseville General Plan, Community Development Guidelines and Zoning Ordinance. The City's zoning ordinance does not have prescriptive standards (maximum building height, setbacks etc.), but rather these specifications are made on a case-by-case basis through a design review permit.

As discussed in Section 8.6, Land Use, the REP will require a use permit from the City of Roseville and will be subject to City's planning and zoning requirements, architectural guidelines, and tree preservation ordinance requirements.

Table 8.13-5. Laws, ordinances, regulations, and standards applicable to REP visual resources.

Document	Applicability	AFC Section	Agency/Contact
Roseville General Plan	Resolution 03-01 defines the goals and policies of community design; site design, landscaping, building design, Signage, Development review process, open space preservation and tree preservation regulations.	8.13.5.1	City of Roseville Planning Dept. Paul Richardson 311 Vernon Street Roseville, California 95678 (916) 774-5276
City of Roseville Zoning Ordinance	Chapter 19.14 defines industrial districts, zoning requirements. Chapter 19.55 provides the standards and requirements for power generating facilities. Projects exempt from a permit and those requiring a permit. Any setbacks, bldg. coverage or parking requirements are established as part of a design review process.	8.13.5.2	City of Roseville Planning Dept. Paul Richardson 311 Vernon Street Roseville, California 95678 (916) 774-5276
Community Development Guidelines	Resolution 95-347,Chapter 5 defines the goals, policies and design guidelines for industrial projects; site design, architectural guidelines, lighting, setbacks, streetscape design, vehicular circulation and parking, pedestrian/ bikeway & circulation.	8.13.5.3	City of Roseville Planning Dept Paul Richardson 311 Vernon Street Roseville, CA 95678 (916) 774-5276
Placer County General Plan	Defines the purposes and permitted uses in county zoning districts, such as the Farm District.	8.13.5.4	Placer County Planning Dept. Leia Gastman- Associate Planner 11444 B Avenue Auburn, California 95603 (530) 886-3091
City of Roseville- Sign Ordinance	Chapter 17.02 Defines the purpose of the ordinance. Lists and defines signs requiring a permit and those exempt from a permit. Defines the location, design, size, requirements and procedures for obtaining permits for signs requiring a permit.	8.13.5.5	City of Roseville Planning Dept. Paul Richardson 311 Vernon Street Roseville, CA 95678 (916) 774-5276

Table 8.13-5. Laws, ordinances, regulations, and standards applicable to REP visual resources.

Document	Applicability	AFC Section	Agency/Contact
City of Roseville-Tree Preservation Ordinance	Chapter 19.66 discusses procedures for removal of "protected trees" and discretionary permits, penalties for removal without City approval, oak tree planting and replacement program, and revegetation requirements.	8.13.5.6	City of Roseville Planning Dept. Paul Richardson 311 Vernon Street Roseville, CA 95678 (916) 774-5276

8.13.5.1 City of Roseville General Plan

Land Use Element—Under the Land Use Element of the General Plan, in Chapter D under Community Design, the Implementation Measures for any project within a Public/Quasi-Public(P/QP) Zone are discussed. No sketches, diagrams, plans, sections or any other form of graphics are used to depict the design guidelines as opposed to the community development guidelines which use extensive graphics to demonstrate guidelines and criteria for industrial projects.

Section 1 Community-wide Design Guidelines—In this section, the following are generally discussed: site design, landscaping, building design, signage, art in public places, and the location and design of projects at the entry points to the city. Under site design grading, on and off-site circulation, location of driveways, siting of buildings, protection of open space, trash enclosures, screening backflow preventers and parking layout are outlined.

Section 6 Tree Preservation Regulations—Stresses the importance of enforcing the Tree Preservation Ordinance to regulate removal, preservation and mitigation of native oak trees. This ordinance only pertains to native oaks, and no native oaks are proposed for removal. Therefore, the project complies with these regulations.

8.13.5.2 City of Roseville Zoning Ordinance

The zoning ordinance does not give any detailed information on setbacks, building coverage, floor-to-site coverage, parking, or development standards. Chapter 19.14, Industrial and Manufacturing Zones, Section 19.14.010, defines the different industrial zones and uses permitted and not permitted within those zones. Section 19.14.030 Industrial Zone General Development Standards, gives the height limit for different industrial zones. Chapter 19.55.020 gives the general requirements for projects within a Public/Quasi-Public Zone; acquiring permits, and development standards. More detailed information on zoning is described in the City's Community Development Guidelines. The specific zoning requirements for any project are determined when the project is submitted for a Use Permit. Detailed requirements are determined by the Design Review Committee or Planning Commission, on a case-by-case basis, upon approval of the Use Permit.

8.13.5.3 Community Development Guidelines

Table 8.13-6 presents an analysis of REP conformance with the Roseville Community Development Guidelines. The Community Development Guidelines provide detailed guidelines for all types of projects within the City. Chapter 5, *Design Guidelines for Industrial Districts,* covers site design, architectural guidelines, lighting guidelines and art work. All concepts and guidelines are illustrated with elevations, plans, sections and perspectives.

Table 8.13-6. Consistency with the City of Roseville Community Development Guidelines

Provision	Consistency
5.A.5 Pedestrian/Bikeway access and Circulation ***b. On-Site Pedestrian Circulation*** ***Intent:*** To provide safe and efficient pedestrian circulation systems between the project boundary and the building or buildings within an industrial project.	The power plant site has been designed to provide safe, efficient vehicular circulation within the site. Vehicular circulation has been separated from pedestrian circulation onsite from a functional and safety standpoint.
5.A.6 Grading ***Intent:*** To minimize the amount of cut and fill required to prepare a site for development and to preserve and accentuate the relationship between the natural features of the site and the proposed building.	The REP will be cut and filled as required to provide a level site, situated slightly above the surrounding area. The amount of cut and fill required will be the minimum amount necessary to achieve these objectives. Building locations will be designed such that no retaining walls are proposed.
5.A.7 Fencing ***Intent:*** To provide physical separation, security and privacy between projects and noise attenuation through the provision of appropriately placed and sized fences and walls.	The power plant does not abut any residential areas; therefore, perimeter walls are not required. The power plant will be surrounded by fencing.
5.A.8 Storage Outdoor storage in industrial projects should be located to minimize visibility from public ways by utilizing landscaping and berming, building siting, screening, setbacks, and/or location.	Storage areas, within the power plant, will be located to minimize visibility and screened from view of public areas.
5.A.10 Trash/Recycling Refuse containers shall be placed within screened storage areas. Enclosures should be located for easy access by users. Enclosures should be sized to receive the anticipated volume of refuse. Colors and materials of enclosures shall compliment the buildings. All enclosures shall be surrounded with 3 feet strip of landscaping.	All refuse shall be stored in containers screened by solid fencing or walls within the power plant and shall be easily accessible from the loop road system. Colors and materials shall match adjacent buildings or structures.
5.A.11 Landscaping ***Intent:*** To ensure that the characteristics of the site, with respect to soil type, topography, drainage, and solar orientation are considered and incorporated into the landscape design, and to enhance the visual image of Roseville by preserving and creatively blending the native and introduced landscape.	All plant materials shall be drought tolerant and acclimated to the climate and type of soil in the area. They shall be chosen to visually blend in with the natural landscape surrounding the site and meet the City's water efficient landscape criteria. Plants will be planted in large, irregular bands or groups grouped according to water needs. Trees shall be at least 15-gallon size and shrubs a minimum of 1-gallon size. Low growing, shrub-like ground cover will be incorporated into the design. All conceptual plans and landscape contract drawings will be prepared by a licensed landscape architect. An automatic irrigation system will be installed to water plants.
b. Parking Lot Shading and Planter Requirements ***Intent:*** To ensure the shading of parking lots and cars in the hot summer months to provide adequate planting and root zone space for shade trees, and to enhance the overall appearance of paved parking areas.	Trees shall be planted around parking areas to shade the parking area, as required by the City's design review.
c. Landscape Screening: ***Intent:*** To encourage the creative use of landscaping for effective screening, buffering and softening of various site elements.	Any plant material necessary for screening the power plant will be primarily evergreen and will be spaced to provide effective screening.

Table 8.13-6. Consistency with the City of Roseville Community Development Guidelines

Provision	Consistency
d. Landscape Maintenance ***Intent:*** To maintain the original appearance of the landscaping over the long term, to ensure the health of the introduced plant materials so they will reach their natural maturity and to preserve the visual image of the community.	All installed landscaping will be professionally maintained per City of Roseville maintenance requirements. Trees will pruned, re-guyed, berms rebuilt, weeds and trash removed, and the irrigation system repaired on a monthly basis.
B. ARCHITECTURAL GUIDELINES	
5.B.1 General Design Considerations ***Intent:***To promote high quality building designs that consist of durable and maintain able materials, that provide an aesthetically pleasing appearance to the public view.	All building and major structures reflect high-quality building designs. There will be no loading docks.
5.B.2 Massing and Form ***Intent:*** To ensure the architectural elements are in a balance within the design and convey and complement the function of the building elements.	Main buildings entrances will be emphasized through special design articulation. Entrances will be designed to meet handicapped access. Buildings and major structures have varying heights and facades articulated to break up expansive walls.
5.B.3 Material and Finishes ***Intent:*** To ensure the incorporation of a compatible variety of material and colors in building designs.	The power plant structures reflect very innovative use of durable, high-quality material such as steel and other materials.
5.B.4 Screening ***Intent:*** To screen undesirable view from public roads, adjacent properties and areas open to the public in a manner that is integrated with the overall building design.	The project will be located some distance from any public areas or thoroughfares. Landscaping will be required along the new alignment of Phillip Road and Blue Oaks Boulevard under the WRSP, and this will largely screen the plant from public view.
5.B.5 Signage ***Intent:*** To encourage thoughtful, integrated design themes and styles for project signage that conforms to the Roseville Sign Ordinance.	Sign type and location will be consistent throughout the project and will complement the overall power plant project design. Only the title of the power plant and the address of the project will be on the main identification sign, which will probably be wall-mounted on the south wall of the administration/control building, facing the street. There will be very few directional signs, and they will be as unobtrusive as possible.
C. LIGHTING GUIDELINES ***Intent:*** To improve the appearance of the City by creating livelier, friendlier, safer spaces through the artful illumination of buildings, streetscape, walkways, plazas, public art and other highlights	Lighting will comply with Building Security Ordinance and only be used for safety, security and operational purposes. Lighting fixtures will be very durable being of an industrial design. All light fixtures will be equipped with hoods and/or cut-off lenses and downlit to avoid light spillage onto adjacent properties. Accent lighting to enhance buildings or major structures will not be used since this is an industrial project.
5.C.2 Lighting Guidelines for Parking Areas, Driveways and Pedestrian Ways.	Parking areas shall be illuminated in accordance with City standards per City design review. Entry areas shall be illuminated for maximum safety, security and identification. Pedestrian walks within the power plant will be illuminated for safety and security. Light standards for pedestrian walks shall of appropriate scale, per City design review.

Table 8.13-6. Consistency with the City of Roseville Community Development Guidelines

Provision	Consistency
5.A.3 Streetscape Design ***Intent:*** To create an area adjacent to the street where landscaping and pedestrian amenities can established to create a public open space that expresses a common theme, provides a link among projects and emphasizes the concept that landscaping is a key element of the Roseville's overall community image.	The project will face Phillip Road, which will become a private drive as part of the development of West Roseville in accordance with the WRSP. In the future, there may be streetscaping along the new alignment of Phillip Road, which will be located to the east of the REP site. A streetscape design will also be required along the future extension of Blue Oaks Boulevard under the WRSP. These designs will include landscaping that will screen the project from public view. The minimum of number of parking stalls, per City Zoning Ordinance, shall be provided. Parking space and aisle dimension as well as handicapped requirements shall be met. If compact parking stalls are required, no more than 30% of the total stalls shall be compact stalls.
5.A.4 Vehicle Access, Circulation and Parking ***Intent:*** To encourage parking lot designs that meet established City standards, provide clarity and ease to the project site, provide on-site circulation, avoid dead end aisles, and minimize conflicts between vehicles and pedestrians, and between visitor and employee traffic and truck shipping and delivery.	Driveway locations and widths shall conform to City standards and adequate stacking for project entry gates shall be accounted for. Driveway access shall be designed for emergency access and there shall be no conflicts between truck and visitor traffic. On-site circulation shall be designed to avoid onsite speeding and speed limits signs will be posted, if necessary.
5.A.5 Pedestrian/Bikeway Access & Circulation ***a. Off-Site Circulation*** ***Intent:*** To ensure that industrial project designs provide safe and efficient access for pedestrians to and from public transportation systems, and to and from existing and planned pedestrian and bicycle circulation systems.	The REP will be located in a rural area along Phillip Road. As West Roseville develops, the portion of Phillip Road adjacent to the project will become a private drive that will be blocked from pedestrian access for security reasons. Public transportation will be available, however, along the new alignment of Phillip Road.

Source: City of Roseville Community Development Guidelines

8.13.5.4 Placer County General Plan

The Placerville County General Plan does not discuss the goals, policies and objectives of industrial projects in a Public/Quasi-public zone. It only defines the purpose and primary uses but not the standards for development within this zone. In the General Plan the goals and policies of community design, are defined for all zones within the county.

8.13.5.5 City of Roseville Sign Ordinance

Chapter 17.02 defines the purpose and intent of the sign ordinance, while Chapter 17.06 lists and defines signs that require a permit, and Chapter 17.10 lists and defines those signs that are exempt from a permit. Chapter 17.08 defines the procedures for filing a permit, processing a permit, variances, and appealing a denial. In Chapter 17.06, each type of sign requiring a permit is discussed in detail: location, height, number of signs, attachment, color, placement, the total square footage for all signs for a project and the total square feet for each sign. The proposed project will only be using five types of signs requiring a permit: building identification sign (wall sign), on-site directional signs, signs within a public right-of way, parking signs, and speed limit signs. The master identification sign of the project with an address is

considered a development project sign and is exempt. All signs will be designed and located to conform to the City's Sign Ordinance.

8.13.5.6 Tree Preservation Ordinance

The Tree Preservation Ordinance, Chapter 19.66, is actually part of the Zoning Ordinance, but is administered by the City Planning Department . This Chapter is divided into eight sections. Section 19.66.010 defines the purpose of the ordinance, Section 19.66.020 give definitions terms and items referred to in the ordinance such as "Arborist," "Protected Trees," etc. Section 19.66.030 defines what a tree permit is. Section 19.66.040 gives the Tree Permit Application Process. Section 19.66.050 summarizes the Arborist's Report. Section 19.66.060 gives standards, policies, and procedures for approval of tree removal. Section 19.66.070 defines the Oak Tree Planting and Replacement Program. Section 19.66.080 describes Violations and Enforcement procedures of the ordinance.

The Tree Preservation Ordinance was created primarily to protect native vegetation especially native oak trees and riparian vegetation that are an important asset of Roseville and the interior valley. "Native Oaks" are defined as valley oaks, interior live oaks and interior valley oaks. "Protected Public Trees" are all trees any protected tree with half or more of its trunk or canopy on or above public land. "Protected Trees" are native oak trees with a diameter of 6 inches or more, measured at breast height. Since there are no native oak trees or "Protected Trees" on the project site, a tree removal permit will not be required for construction of the power plant.

Unlike most city tree preservation ordinances, the City of Roseville's does not have a plant list. There is a plant list, however, for each specific plan area within the City. The lists are distributed by the City's Planning Department (Ogden 2003, personal communication).

No visual resource permits are required. However, a use permit will have to be approved by the Roseville Design Review Committee or the Planning Commission.

8.13.6 References

Buhyoff, G.J., P.A. Miller, J.W. Roach, D. Zhou, and L.G. Fuller. 1994. An AI methodology for landscape visual assessments. *AI Applications* Vol. 8, No 1.

City of Roseville. Community development guidelines. Undated. Roseville, CA

County of Placer, General Plan. Update. August 16, 1994. Auburn, CA

City of Roseville, Tree Preservation Ordinance. 1996 Chapter 19.66 of Zoning Ordinance. Roseville, CA

City of Roseville, Sign Ordinance. 1993. Title 17 of the Roseville Municipal Code. Roseville, CA

City of Roseville. General Plan. November 19, 1992. Roseville, CA.

Ogden, Derrick, 2003. Personal communication between Scott Muller (Tetra Tech, FW, Inc.) and Derrick Ogden (Assistant Planner, City of Roseville, CA Sept 3, 2003)

Pease, Kathy, 2003. Personal communication between Scott Muller (Tetra Tech, FW, Inc.) and Kathy Pease (Administrative Assistant, Planning department, City of Roseville-July 30,2003)

Rose, Jim, 2003 Personal communication between Scott Muller (Tetra Tech, FW, Inc.) and Jim Rose (Transportation Planner, Placer County Public Works Department, Auburn, CA August 19, 2003)

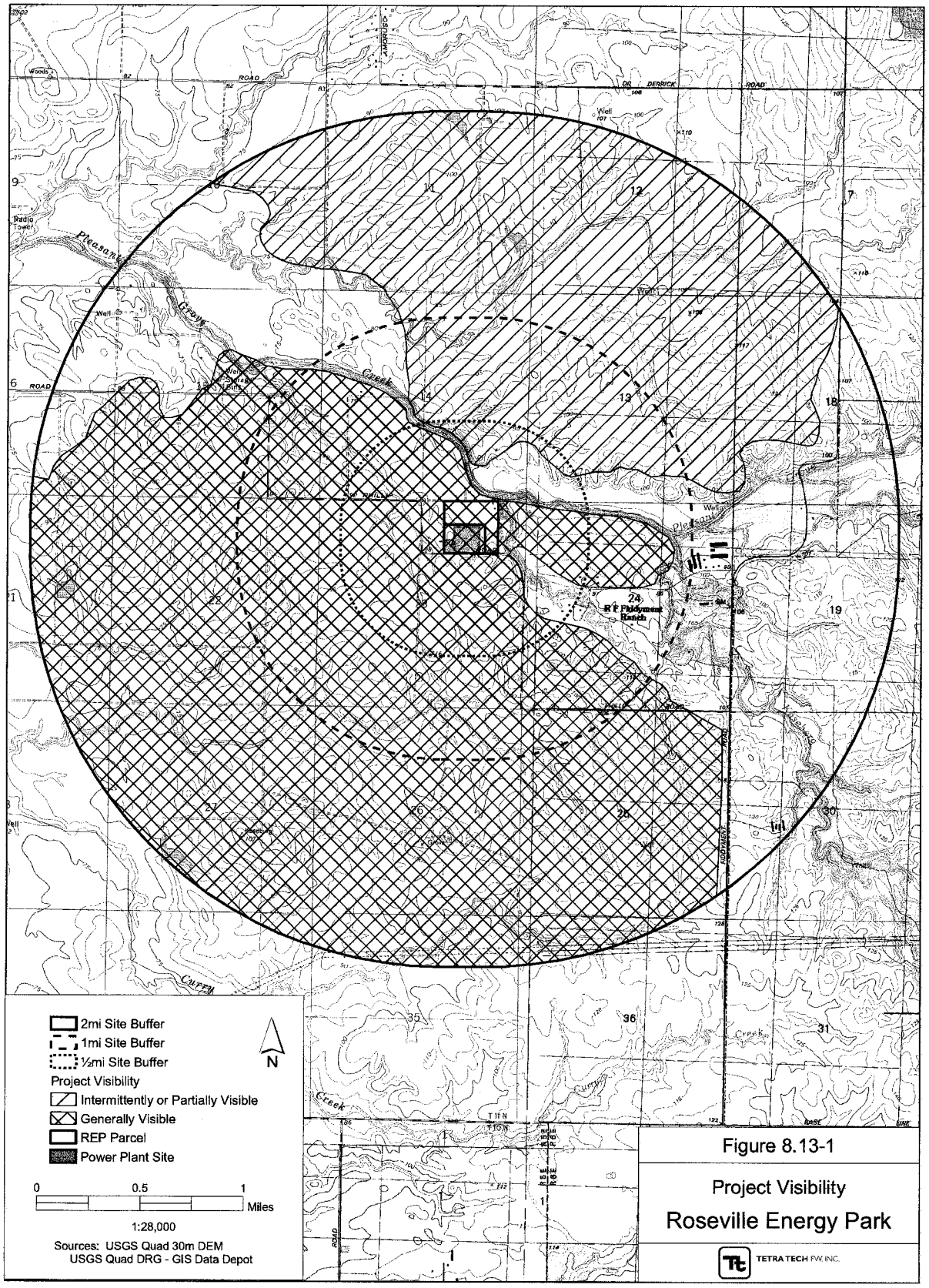

Figure 8.13-1

Project Visibility

Roseville Energy Park

TETRA TECH FW, INC.

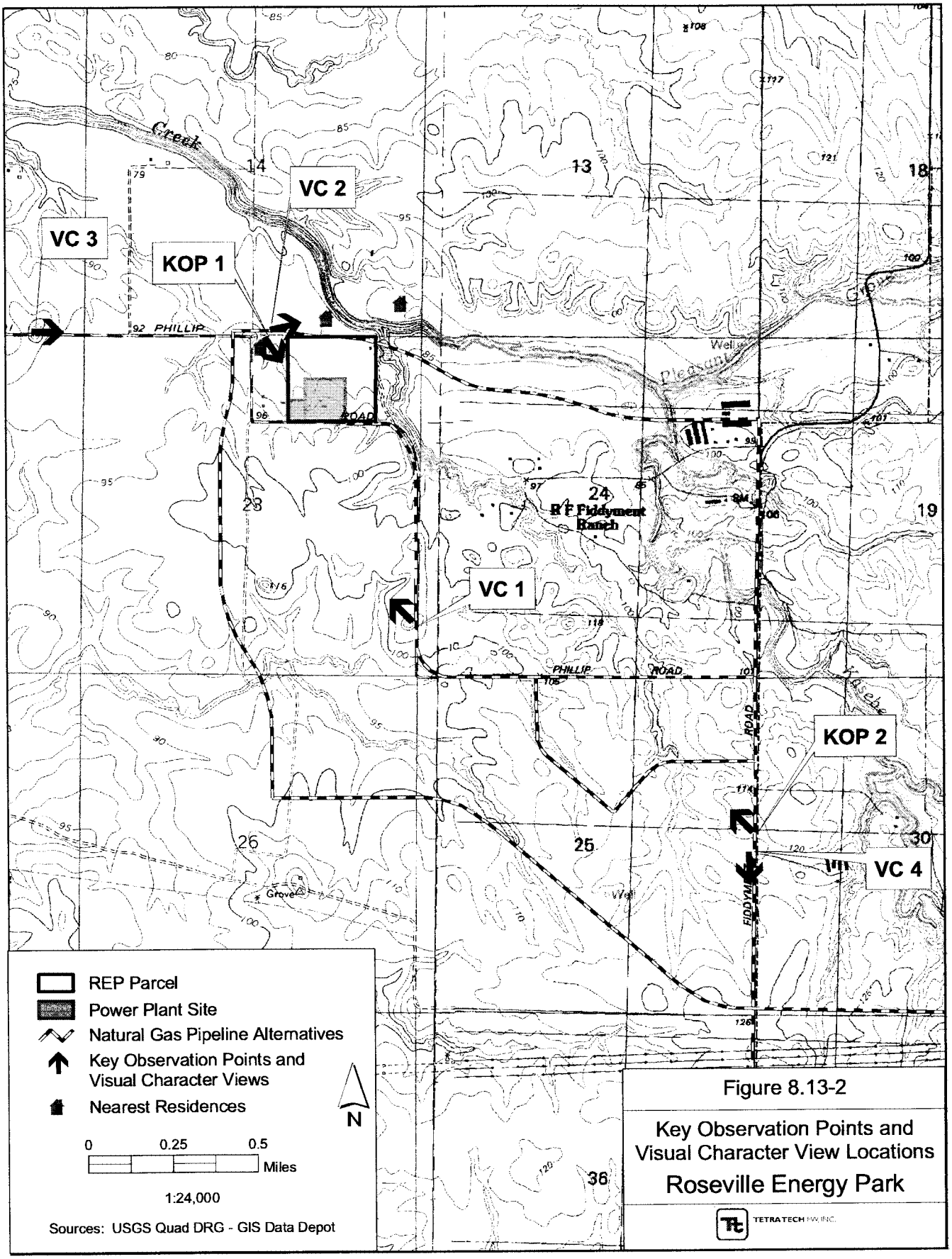

Figure 8.13-2

Key Observation Points and Visual Character View Locations

Roseville Energy Park

TETRA TECH EM INC.

Figure 8.13-3. VC-1: The PGWWTP, looking northwest along Phillip Road.

Figure 8.13-4. VC-2: Residence located north of the project site, looking northeast.

Figure 8.13-5. VC-3: View east towards project site along Phillip Road (kennel at left, REP site at left of center, PGWWTP at right).

Figure 8.13-6. VC-4: View south along Fiddyment Road, Del Webb Sun City landscape buffer at left.

Figure 8.13-7a. KOP 1—Existing view south-southeast from the northwest corner of the REP site.

Figure 8.13-7b. KOP 1—Simulated view with project.

Figure 8.13-8a. KOP 2—Existing view northwest from Fiddyment Road, 1,100 feet south of Del Webb Boulevard.

Figure 8.13-8b. KOP 2—Simulated view with project.

8.14 WASTE MANAGEMENT

This section presents an evaluation of potential effects on human health and the environment from non-hazardous and hazardous waste generated by the Roseville Energy Park (REP). Section 8.14.1 describes the current condition of the proposed power plant site. Section 8.14.2 describes the waste and waste streams that are expected to be generated by the project. Section 8.14.3 describes waste disposal sites for non-hazardous and hazardous waste. Section 8.14.4 describes Best Management Practices that will be employed to manage the generated waste and mitigate its potential impact on the environment. Section 8.14.5 discusses cumulative impacts and Section 8.14.6 describes waste monitoring. Section 8.14.7 presents laws, ordinances, regulations, and standards (LORS) that apply to the generated waste. Section 8.14.8 describes agencies that have jurisdiction over the generated waste and persons to contact in those agencies. Section 8.14.9 describes permits required for waste generated as well as a schedule for obtaining those permits. Section 8.14.10 lists the references cited in this section.

8.14.1 Affected Environment

8.14.1.1 Power Plant Site Environmental Site Assessments

A Phase I Environmental Site Assessment (ESA) update was prepared for the Pleasant Grove Wastewater Treatment Plant project in 1999 (EARTHTEC 1999); this ESA included parcels that make up the proposed REP site (APN: 17-100-17, -29, and -30). The ESA was conducted in accordance with American Society for Testing and Materials (ASTM) Standard E 1527, Standard Practice for Environmental Site Assessments. The purpose of the investigation was to identify recognized environmental conditions at the subject properties resulting from present or past activities. The Phase I ESA is included in Appendix 8.14-A and is incorporated here by reference.

According to the Phase I ESA update, a documented interview with a previous land owner and review of historical aerial photography both indicated that the REP project site was used historically for cattle grazing and other agricultural purposes. Parcel 17-100-17 was used by a previous owner as a junk storage yard for numerous old cars and trucks (EARTHTEC 1999). The ESA update concluded that there was moderate potential for soil or groundwater contamination on the subject properties based on past uses. The report recommended a more detailed reconnaissance of three parcels, including APN 17-100-17.

In April 1999, a Phase II ESA was performed for the three properties. The document recommended further evaluation (Anderson Consulting Group 1999). This Phase II ESA was performed in general accordance with ASTM Practice E 1527. During the site reconnaissance, it was noted that parcel 17-100-17 was littered with vehicles, debris, scrap material, and 150 to 200, 55-gallon drums. Most of the drums were empty; however, a few contained burned trash or rainwater. Only three drums were sealed, and their labels indicated that the original contents consisted of a poly resin product containing less than 3 percent styrene monomers. This Phase II ESA report is included in Appendix 8.14-B.

Based on recommendations of the 1999 Phase I ESA update, and findings from the detailed site reconnaissance done for the ESA update, five soil samples were collected from parcel 17-100-17 and analyzed for oil and grease, heavy metals, gasoline, and BTEX (benzene, ethylbenzene, toluene, and xylenes). Analytical results did not indicate the presence of gross contamination.

A Phase I ESA was prepared in August 2001 for the Roseville Energy Facility (URS 2001). This report is included in Appendix 8.14-C. This ESA did not indicate significant site contamination concerns.

In September, 2003, Tetra Tech FW conducted a subsequent Phase I ESA update in accordance with American Society for Testing and Materials (ASTM) Standard E 1527, Standard Practice for Environmental Site Assessments. The purpose of the investigation was to identify recognized environmental conditions at the subject properties associated with the property since the previous Phase I ESAs were prepared. The Phase I ESA is included in Appendix 8.14-D.

The site is currently being used as a construction staging and laydown area for the adjacent Pleasant Grove Wastewater Treatment Plant (PGWWTP). Several hazardous materials storage areas were observed; on-site hazardous materials types and uses are typical of industrial construction projects. As discussed in the Phase I ESA update, several minor hazardous materials management issues were noted. However, there were no indications of any significant site contamination.

8.14.2 Project Waste Generation

Waste will be generated at the REP site during both facility construction and operation. Types of waste will include sanitary wastewater, solid non-hazardous waste, and liquid and solid hazardous waste. The project will also generate solid non-hazardous waste during the construction of the natural gas pipeline, recycled water supply pipeline, storm water outfall pipeline, and sanitary sewer pipeline.

8.14.2.1 Construction Phase

During construction, the primary waste generated by the REP will be solid non-hazardous waste. However, some non-hazardous liquid waste and both solid and liquid hazardous waste will also be generated at the REP site. The types of waste and their estimated quantities are described below.

Non-Hazardous Solid Waste

Potential non-hazardous waste streams and their estimated quantities from removal of any existing debris on the property, as well as construction of the generating plant and associated linear facilities are discussed below.

Paper, Wood, Glass, and Plastics

Paper, wood, glass, and plastics will be generated from packing materials, waste lumber, insulation, and empty non-hazardous chemical containers. Approximately 50 tons of these wastes will be generated during construction of the project. These wastes will be recycled, where practical. Waste that cannot be recycled will be placed in on-site dumpsters and disposed of weekly in a Class III landfill.

Concrete

Approximately 30 tons of excess concrete will be generated during construction. Waste concrete will be disposed of on a weekly basis in a Class III landfill or at clean fill sites, if available.

Metal

Waste will include welding/cutting operations, packing materials, and empty non-hazardous chemical containers. Aluminum waste will be generated from packing materials and electrical wiring. Approximately 10 tons of metal waste will be generated during construction. Waste will be recycled where practical, and non-recyclable waste will be deposited in a Class III landfill.

Drilling Mud

Some drilling could be required to install the natural gas pipeline. Drilling mud, consisting of nontoxic bentonite clay, would be used to lubricate and cool the drilling bit. Up to 200 tons could be used in the drilling and would require disposal at a Class II or III landfill.

Non-Hazardous Wastewater

Power Plant Site

Wastewater generated will include sanitary waste and may include equipment wash water, storm water runoff, wastewater from pressure testing various pipelines after they are constructed, and water from excavation dewatering during construction. Sanitary waste will be collected in portable, self-contained toilets. Equipment wash water will be contained at specifically designated wash areas and disposed off-site. Storm water runoff during construction will be managed in accordance with the General Permit For Storm Water Discharges Associated With Construction Activity (General Permit) and with the EPA Phase II Final Rule (see Section 8.15). Construction dewatering will be performed in accordance with City of Roseville and RWQCB requirements.

Transmission Lines

Wastewater generated will consist only of sanitary wastewater, which will be collected in portable, self-contained toilets. The project will require an off-site transmission line only if the West Roseville annexation is denied or delayed indefinitely.

Natural Gas Pipeline

Wastewater generated will include sanitary waste and wastewater from pressure testing the gas supply line after it is constructed. Sanitary waste will be collected in portable, self-contained toilets. The gas supply pipeline hydrostatic test water will be filtered to collect any sediment and welding fragments. The water will be tested and, if not contaminated, will be discharged to Pleasant Grove Wastewater Treatment Plant (PGWWTP) in accordance with applicable regulatory requirements. Water unsuitable for discharge to the PGWWTP will be delivered to a permitted off-site treatment, storage, and disposal (TSD) facility.

Recycled Water Supply Pipeline

Procedures for managing non-hazardous wastewater will be the same as those described above for the natural gas pipeline.

Sanitary Sewer Pipeline

Procedures for managing non-hazardous wastewater will be the same as those described above for the natural gas pipeline.

Hazardous Waste

Power Plant Site

Most of the hazardous waste generated during construction will consist of liquid waste such as flushing and cleaning fluids, passivating fluid (to prepare pipes for use), and solvents. Some hazardous solid waste such as welding materials and dried paint may also be generated.

Flushing and cleaning waste liquid is generated when pipes and boilers are cleaned and flushed. Passivating fluid waste is generated when high temperature piping is treated with either a phosphate or nitrate solution. The volume of flushing and cleaning and passivating liquid waste generated is estimated

to be one to two times the internal volume of the pipes cleaned. The quantity of welding, solvent, and paint waste is expected to be minimal.

The construction contractor will be considered the generator of hazardous construction waste and will be responsible for proper handling of hazardous waste in compliance with all applicable federal, state, and local laws and regulations, including licensing, personnel training, accumulation limits and times, and reporting and record-keeping. The hazardous waste will be collected in hazardous waste accumulation containers near the points of generation and moved daily to the contractor's 90-day hazardous waste storage area. Before the end of the regulatory 90-day storage period, the waste will be delivered to an authorized hazardous waste management facility.

Transmissions Lines

Minimal quantities of welding, solvent, and paint waste will be generated during construction of the transmission lines. The project will require an off-site transmission line only if the West Roseville annexation is denied or delayed indefinitely.

Natural Gas Pipeline

Minimal quantities of welding, solvent, and paint waste will be generated during construction of the natural gas pipeline.

Recycled Water Supply Pipeline

Minimal quantities of welding, solvent, and paint waste will be generated during construction of the recycled water supply pipeline.

Sanitary Sewer Pipeline

Minimal quantities of welding, solvent, and paint waste will be generated during construction of the Sanitary Sewer Pipeline.

8.14.2.2 Operation Phase

During operation of the REP, the primary waste generated will be a relatively dry, non-hazardous salt cake from the zero liquid discharge (ZLD) system. Other non-hazardous solid waste, non-hazardous wastewater, and small quantities of both solid and liquid hazardous waste will also be generated periodically. The types of waste and their estimated quantities are discussed on the following pages.

Non-Hazardous Solid Waste

Power Plant Site

The REP will produce wastes typical of power generation operations. These will include rags, broken and rusted metal and machine parts, defective or broken electrical materials, empty containers, and other miscellaneous solid wastes, including the typical refuse that workers generate. The REP will generate about 30 cubic yards per year of typical non-hazardous solid waste.

The ZLD system is expected to generate approximately 867 tons per year of filter cake. The salt cake is expected to be a non-hazardous waste. Naturally occurring substances, such as trace metals present in the PGWWTP recycled water, will become concentrated in the salt cake produced by the ZLD system. The salt cake is not expected to exhibit either RCRA or California hazardous waste characteristics, based on the projected incoming water quality and will, therefore, not require special handling or disposal in a Class I or II landfill.

Transmission Lines

No solid wastes will be generated during operation of the transmission lines. The project will require an off-site transmission line only if the West Roseville annexation is denied or delayed indefinitely.

Natural Gas Pipeline

No solid wastes will be generated during operation of the natural gas pipeline.

Recycled Water Supply Pipeline

No solid wastes will be generated during operation of the recycled water supply pipeline.

Wastewater Discharge Pipeline

No solid wastes will be generated during operation of the wastewater discharge pipeline.

Non-Hazardous Wastewater

Power Plant Site

Waste water sources from the REP are described in detail in Chapter 7 and Section 8.15.

Transmission Lines

Minor amounts of waste water will be generated from the periodic washing of insulators. The project will require an off-site transmission line only if the West Roseville annexation is denied or delayed indefinitely.

Natural Gas Pipeline

No wastewater will be generated from the natural gas pipeline operations.

Recycled Water Supply Pipeline

No wastewater will be generated during operation of the recycled water supply pipeline.

Sanitary Sewer Pipeline

No wastewater will be generated during operation of the sanitary wastewater discharge pipeline (although it will be conveying wastewater).

Hazardous Waste

Power Plant Site

Hazardous waste generated during operation of the REP will include waste lubricating oil and spent lubrication oil filters from the combustion turbines as well as selective catalytic reduction (SCR) and oxidation (CO) catalyst units. The catalyst units must be replaced every 3 to 5 years. Because they contain heavy metals, they are considered hazardous. Roseville Electric will train workers to handle any hazardous waste generated at the site. Table 8.14-1 summarizes the hazardous wastes and the appropriate disposal locations.

Chemical cleaning wastes will consist of alkaline and acid-cleaning solutions used during pre-operational chemical cleaning of the HRSGs and acid cleaning solutions used for chemical cleaning of the HRSGs after the units are put into service. These wastes, which are subject to high metal concentrations, will be temporarily stored on-site in portable tanks. They will be disposed of off-site by a chemical cleaning contractor in accordance with applicable regulatory requirements.

Table 8.14-1. Hazardous wastes generated at the REP facility during operation.

Waste	Origin	Composition	Quantity	Classification	Disposal
Lubricating oil	Gas and steam turbine lubricating oil system	Hydrocarbons	Approximately 2,500 gal per year	Hazardous	Disposed by certified oil recycler
Lubricating oil filters	Gas and steam turbine lubricating oil system	Paper, metal, and hydrocarbons	Approximately 450 lbs per year	Hazardous	Recycled by certified oil recycler
Laboratory analysis waste	Water treatment	Sulfuric acid	Approximately 400 gal per year	Hazardous	Disposed of in a Class I landfill
SCR & CO catalyst units	SCR/CO catalyst systems	Metal and heavy metals, including vanadium	Approximately 25,000 pounds per 3 to 5 years	Hazardous	Recycled by catalyst manufacturer or disposed in Class I landfill
Oily rags	Maintenance, wipe-down of equipment, etc.	Hydrocarbons, cloth	Approximately 400 rags per year	Hazardous	Recycled by certified oil recycler
Oil sorbents	Cleanup of small spills	Hydrocarbons	Approximately 120 pounds per year	Hazardous	Recycled or disposed of by certified oil recycler
Chemical cleaning wastes	HRSG cleaning	Alkaline and acidic solution, metals	Approximately 50,000 gal initially and every 3 to 5 years	Hazardous	Offsite disposal by contractor
Washwater	Turbine and HRSG fireside washing	Water containing metals	Approximately 3,500 gallons per year	May be hazardous, but usually is not	Offsite disposal by contractor
Cooling tower sludge	Deposited in cooling tower basin by cooling water	Dirt from air, arsenic from water	Approximately 80 tons per year	May be hazardous, but usually is not	Class II LF if non-hazardous; Class I if hazardous
Salt cake	ZLD system	Salts with minor amounts of trace metals and contaminants from the source water	Approximately 867 tons per year	May be hazardous, but is expected to be non-hazardous	Class II or III if non-hazardous; Class I if hazardous
Spent Batteries	Station batteries	Lead-acid batteries	Approximately 40 pounds per year	Hazardous	Battery recycler

Transmission Lines

No hazardous wastes will be generated during operation of the on-site transmission line. The project will require an off-site transmission line only if the West Roseville annexation is denied or delayed indefinitely.

Natural Gas Pipeline

No hazardous wastes will be generated during operation of the natural gas pipeline.

Recycled Water Supply Pipeline

No hazardous wastes will be generated during operation of the recycled water supply pipeline.

Sanitary Sewer Pipeline

No hazardous wastes will be generated during operation of the Sanitary Sewer Pipeline.

8.14.3 Waste Disposal Sites

The removal of non-hazardous solid waste (often referred to as solid waste, municipal solid waste [MSW], or garbage) will be accomplished through recycling or, if not recyclable, through deposit in a Class III landfill. Non-hazardous liquid wastes (other than sanitary sewage) will be treated by the on-site ZLD system or discharged to the PGWWTP (see Chapter 7.0 for a description of the ZLD process). Sanitary sewage will be piped to the PGWWTP's influent junction structure east of the project site. Hazardous wastes, both solid and liquid, will be delivered to a permitted off-site treatment, storage, and disposal (TSD) facility or deposited in a permitted Class I landfill. The following subsections describe the waste disposal sites that are feasible for disposal of wastes associated with the REP.

8.14.3.1 Non-hazardous Waste Disposal Facilities

Solid waste facilities that could be used for recycling and disposal of solid waste generated during construction and operation of the REP are shown in Table 8.14-2. The City of Roseville's Solid Waste Division provides solid waste collection and transport services. Waste collected from the project area is taken to the Western Placer Waste Management Authority (WPWMA) Materials Recovery Facility (MRF) for recycling or disposal at the Western Regional Sanitary Landfill. Waste collection and disposal will be in accordance with applicable regulatory requirements to minimize environmental, health, and safety impacts.

The WPWMA MRF has not been subject to any enforcement actions. The WPWMA Western Region Sanitary Landfill has experienced recent exceedances in landfill gas concentrations at the site boundary. In April 2003, Placer County issued a notice of violation. The California Integrated Waste Management Board (CIWMB) has issued a letter of intent to place the landfill on their list of facilities not in compliance with the state minimum standards. The facility has indicated to the local enforcement agency (LEA), Placer County Department of Health & Human Services (DHHS), that the exceedances have been mitigated; however, DHHS has not yet performed an inspection to confirm resolution (Altman 2003, personal communication). To correct the violation, WPWMA expanded its landfill gas collection system by installing 16 additional extraction wells. Property boundary methane levels were back in compliance by July 2003 (Schwall 2003, personal communication).

Table 8.14-2. Solid waste disposal facilities for the REP waste.

Landfill/ Transfer Station	Location	Class	Permitted Capacity	Current Operating Capacity	Remaining Capacity	Estimated Closure Date	Comment
WPWMA MRF	Placer County (between Roseville - Lincoln)	MRF	1,200 tons/day	850 tons/day	N/A	N/A	No enforcement actions
WPWMA Western Regional Sanitary Landfill	Placer County (between Roseville - Lincoln)	II/III	1,200 tons/day	845 tons/day	million cubic yards (49 years)	2052	CIWMB letter of intent to place on state standards non-compliance list.

8.14.3.2 Hazardous Waste Disposal Facilities

There is a 90-day limit on the storage of hazardous waste generated at the facility. A permitted hazardous waste transporter will transfer the waste to a transfer, storage, and disposal (TSD) facility. These facilities vary considerably in what they can do with the hazardous waste they receive. Some can only store waste; others can treat the waste to recover usable products. Still others can dispose of the waste through incineration, deep well injection, or landfilling (although incineration and deep-well injection are not permitted in California).

According to U.S. Environmental Protection Agency (USEPA's) National Biennial Resource Conservation and Recovery Act [RCRA] Hazardous Waste Report (based on 1999 data), there are 140 RCRA TSD facilities in California (USEPA 2001). Many of these facilities are companies such as oil refineries or military facilities that do not take hazardous waste from other generators. For ultimate disposal, three hazardous waste (Class I) landfills are available. They are discussed below.

Clean Harbors (Formerly Safety-Kleen) Buttonwillow Landfill in Kern County

This landfill is permitted at 14.3 million cubic yards and has a remaining capacity of 10 million cubic yards (CIWMB 2003). This landfill has an estimated closure date of 2040. Buttonwillow has been permitted to accept all hazardous wastes except flammables, PCBs with a concentration greater than 50 ppm, medical waste, explosives, and radioactive waste with radioactivity greater than 20,000 picocuries. There have been no enforcement actions at this facility within the last year (Beig 2003, personal communication).

Clean Harbors (Formerly Safety-Kleen) Westmoreland Landfill in Imperial County

This landfill has reached capacity and is not currently accepting waste for disposal. Waste is being treated at this facility, then transferred to the Buttonwillow landfill in Kern County. Two future cells have recently been permitted. The capacity of the first cell is 1.8 million cubic yards, and it is expected to come online by late 2004. The proposed capacity of the second cell is 860,000 cubic yards; this cell will be constructed later. The landfill's conditional use permit prohibits the acceptance of some types of waste, including radioactive (except geothermal) waste, flammables, biological hazardous waste (medical), PCB, dioxins, air- and water-reactive wastes, and strong oxidizers. There have been no enforcement actions at this facility within the last year (Smith 2003, personal communication).

Waste Management Landfill in Kings County

The Class I portion of this landfill has approximately 6 million cubic yards of remaining capacity with a total permitted capacity of 10.7 million cubic yards (CIWMB 2003). This facility also has Class II and III landfills. The annual deposit rate is approximately 1 million cubic yards for the Class I and II landfills, combined. The remaining life of the Class I landfill, as currently constructed, is approximately 6 years or until 2009. With planned future construction, the life of this landfill is 50 years, or until 2053. The Class I landfill is permitted for and will accept all hazardous wastes except radioactive, medical, and unexpoded ordinance (UXO). There have been no enforcement actions at this facility within the last year (Beig 2003, personal communication).

There is no shortage of hazardous waste landfill capacity in California. The deposit rate has decreased by about 50 percent in the last several years due to source reduction by generators and the transfer of waste that is considered hazardous, under California's Hazardous Waste Control Law (HWCL), but not under RCRA, out of state.

In addition to landfills, there are 37 off-site commercial hazardous waste treatment and recycling facilities (DTSC 2001). These facilities have enough capacity to recycle and/or treat hazardous waste that is generated in California, but that does not go to landfills. All hazardous waste will be removed and delivered to a TSD facility. Used oily rags and oil sorbent will be collected by a permitted oil recycler.

8.14.4 Best Management Practices

The handling and management of wastes generated from the REP will follow a four-step hierarchical approach of source reduction, recycling, treatment, and disposal, as follows: 1) reduce the quantity of waste generated, if possible; 2) recycle the waste generated for reuse; 3) treat it so that the waste is no longer hazardous; 4) properly dispose of residual waste that is not treatable or recyclable.

The following subsections present the methods for managing both non-hazardous and hazardous waste generated.

8.14.4.1 Construction Phase

Non-hazardous solid waste generated during construction will be collected in on-site dumpsters, and one of the franchised collection companies will pick it up periodically. The waste will be taken to the WPWMA MRF where recyclables will be removed, and the residue will be deposited in the adjacent WPWMA Western Regional Landfill. Wastewater generated will include sanitary waste and may include equipment wash water and storm water runoff. Sanitary waste will be collected in portable, self-contained toilets. Equipment wash water will be contained at designated wash areas and disposed off-site. Storm water runoff will be managed in accordance with a storm water management plan, which will be required before starting construction. The generation of non-hazardous wastewater will be minimized through water conservation and water reuse measures.

Minimal hazardous waste will be generated during construction and will consist of liquid waste such as solvents and solid waste in the form of welding materials and dried paint. The construction contractor will be considered the generator of hazardous construction waste and will be responsible for the proper handling of hazardous waste in compliance with all applicable federal, state, and local laws and regulations, including licensing, training of personnel, accumulation limits and times, and reporting and record-keeping. The hazardous waste will be collected in hazardous waste accumulation containers near

the points of generation and moved daily to the contractor's 90-day hazardous waste storage area. Before the end of the regulatory 90-day storage period, the waste will be delivered to an authorized hazardous waste management facility.

8.14.4.2 Operation Phase

The primary waste generated during the operation phase of the REP will be non-hazardous ZLD system filter cake from the treatment of cooling water blowdown. Additional non-hazardous solid waste and wastewater will also be generated, as well as small quantities of liquid and solid hazardous waste. The handling and mitigation of these wastes are described in the following subsections.

Non-Hazardous Wastes

The wastewater from cooling tower blowdown will be managed with the on-site ZLD treatment system. Based on the projected recycled water quality, it is assumed that the resulting salt cake will be disposed of as a non-hazardous waste. This waste stream will be characterized to confirm landfill acceptability.

Sanitary wastewater from the REP will be collected from sinks, showers, and toilets and routed to the local sewer system. The waste water produced will be typical, both in type and quantity, of that generated by facility workers.

The City of Roseville Environmental Utilities Department will collect non-hazardous solid waste or refuse. The waste will be taken to the WPWMA MRF where recyclables will be removed, and the residue will be deposited in the adjacent WPWMA Western Regional Landfill (Class II/III). Waste deposited in the landfill is reduced or mitigated by removal of the material that can be recycled.

Hazardous Wastes

To avoid potential effects on human health and the environment from the handling and disposal of hazardous wastes, Roseville Electric will develop procedures at the REP that ensure proper labeling, storage, packaging, record-keeping, and disposal of all hazardous wastes. Roseville Electric will do the following:

- Apply to the California Environmental Protection Agency (CalEPA) for an EPA hazardous waste generator identification number before facility startup.
- Accumulate hazardous wastes according to Title 22 of the California Code of Regulations (CCR) and not store them on-site for more than 90 days.
- Store hazardous wastes in appropriately segregated storage areas surrounded by berms to contain leaks and spills; size the bermed areas to hold the full contents of the largest single container and, if not roofed, size them to allow for rainfall, as well as inspect these areas weekly.
- Authorize a licensed hazardous waste hauler to collect hazardous wastes using a hazardous waste manifest and manage these wastes only at an authorized hazardous waste management facility. Roseville Electric will prepare biannual hazardous waste generator reports, and submit them to the California Department of Toxic Substances Control (DTSC), and keep copies of manifests, reports, waste analyses, and other documents on-site and accessible for inspection for at least three years.
- Train employees in hazardous waste procedures, spill contingencies, and waste minimization.
- Develop procedures to reduce the quantity of hazardous waste generated, use non-hazardous instead of hazardous materials when feasible, and recycle wastes when feasible.

As for more specific measures for hazardous waste handling, Roseville Electric will implement the following procedures:

- A waste oil recycling contractor will recover and recycle waste lubricating oil and dispose of spent lubrication oil filters in a Class I landfill. The supplier will recycle spent SCR and oxidation capsules and catalysts, if possible, or dispose of them in a Class I landfill if recycling is not feasible.
- Chemical cleaning wastes will consist of alkaline and acid cleaning solutions used during pre-operational chemical cleaning of the boiler and pre-boiler systems of the HRSGs, acid cleaning solutions used for chemical cleaning of the HRSG after the unit is put into service, and turbine wash and HRSG fireside wash waters. These wastes, which are subject to high metal concentrations, will temporarily be stored on-site in portable tanks and disposed of off-site in accordance with applicable regulatory requirements. Disposal may consist of treatment, recovery of metals, and/or removal to an approved landfill.

8.14.4.3 Facility Closure

When the REP is closed, both non-hazardous and hazardous wastes must be properly handled. Closure can be temporary or permanent. Temporary closure will be for a time greater than that required for normal maintenance, including overhaul or replacement of the combustion turbines. Causes for temporary closure could be a disruption in the supply of natural gas, flooding of the site, or damage to the plant from earthquake, fire, storm, or other natural causes. Permanent closure would consist of a cessation in operations with no intent to restart operations, it could be due to age of the plant, damage to the plant beyond repair, economic conditions, or other unforeseen reasons. Handling of wastes for these two types of closure are discussed below.

Temporary Closure

If the REP were to be temporarily closed (with no release of hazardous materials), Roseville Electric would deploy security personnel on a 24-hour basis and notify the California Energy Commission (CEC). Depending on the length of shutdown necessary, Roseville Electric would implement a contingency plan for the temporary cessation of operations. This plan will be prepared before the REP startup. The plan will be developed to ensure conformance with all applicable LORS and protection of public health and safety and the environment. The plan will include the draining of all chemicals from storage tanks and other equipment and the safe shutdown of all equipment, depending on the expected duration of the shutdown. All wastes will be disposed of according to applicable LORS, as discussed in Section 8.14.7.

Where the temporary closure includes damage to the facility, or where there is a release or threatened release of hazardous waste (or materials) into the environment, the procedures followed will be set forth in an emergency action plan (EAP). The EAP is described in Section 8.16.2.2. Procedures include methods to control releases, notification of applicable authorities and the public, emergency response, and training for power plant personnel in responding to and controlling releases of hazardous materials and hazardous waste. Once the immediate problem of hazardous waste and materials release is contained and cleaned up, temporary closure will proceed as described for a closure where there is no release of hazardous materials or waste.

Permanent Closure

The planned life of the REP is 30 years, although operation could be longer. Whenever the REP is permanently closed, the handling of non-hazardous and hazardous waste and hazardous materials will be part of a general closure plan (see Section 4) that will attempt to maximize the recycling of facility components. Unused chemicals will be sold back to the suppliers or other purchasers or users. All equipment containing chemicals will be drained and shut down to protect public health and safety and the environment. All non-hazardous wastes will be collected and disposed in appropriate landfills or waste collection facilities. All hazardous wastes will be disposed according to applicable LORS. The site will be secured 24 hours per day during decommissioning activities.

8.14.4.4 West Roseville Not Annexed

The management of project wastes would be not be significantly different if the West Roseville annexation were denied or delayed indefinitely. Though the transmission and natural gas pipeline routes would differ somewhat from the expected scenario under which the annexation of West Roseville takes place, these changes would have little effect on the levels of waste generated during project construction and operation or the management of those wastes.

8.14.5 Cumulative Impacts

The REP site will generate non-hazardous solid waste that will add to the total waste generated in Placer County and in California. However, there is adequate recycling and landfill capacity in Placer County to recycle and dispose of the waste for the next 30 to 40 years. This capacity is described in Section 8.14.3.1. Therefore, the impact of the project on solid waste recycling and disposal capability would not be cumulatively significant with other developments in the project area, including the City's annexation of West Roseville and the build-out of the West Roseville Specific Plan.

Hazardous waste generated at the REP plant will consist of waste turbine oil and oil filter elements, SCR and oxidation catalysts, and fluids used to clean the HRSGs and piping. The waste turbine oil and catalysts will be recycled. Cleaning and flushing fluids will be removed and either treated to a non-hazardous condition or disposed of in a Class I landfill. Cleaning and flushing will occur only periodically. Hazardous waste treatment and disposal capacity in California is more than adequate, and the REP will not cause a significant adverse impact cumulatively with other developments in the locality, region, and state.

8.14.6 Monitoring

Since the environmental impacts caused by construction and operation of the REP are expected to be minimal, extensive monitoring programs are not required. Generated waste, both non-hazardous and hazardous, will be monitored during project construction and operation in accordance with the monitoring and reporting requirements mandated by the regulatory permits to be obtained for construction and operation.

8.14.7 Laws, Ordinances, Regulations and Standards

The handling of non-hazardous and hazardous waste at the REP is governed by federal, state, and local laws. Applicable laws and regulations address the proper handling, storage, and disposal of waste to protect the environment from contamination and to guard facility workers and the surrounding

community from exposure to non-hazardous and hazardous waste. The following LORS are applicable to the handling of waste at the REP. These LORS are summarized in Table 8.14-3.

Table 8.14-3. LORS applicable to waste management.

LORS	Applicability	Conformance	AFC Reference
Federal:			
RCRA			
Subtitle D	Controls solid waste collectors, recyclers, and depositors.	Solid waste will be collected and disposed of by a collection company in conformance with Subtitle D.	Sections 8.14.3.1, 8.14.4, and 8.14.7.1
Subtitle C	Controls storage, treatment, disposal of hazardous waste.	Hazardous waste will be handled by contractors in conformance with Subtitle C.	Section 8.14.4
CWA	Controls discharge of waste water to the surface waters of the U.S. Applies to waste water returned to the City of Roseville sanitary sewer system.	Discharge will be in accordance with publicly owned treatment works (POTW) pretreatment standards, which conform to the CWA. Ultimate discharge will take place under the City's NPDES permit.	Sections 8.14.2, 8.14.6, and 8.14
California:			
CIWMA	Controls solid waste collectors, recyclers, and depositors.	The REP solid waste will be collected and disposed of by a collection company in conformance with the CIWMA.	Sections 8.14.3.1, 8.14.4.1, and 8.14.4
HWCL	Controls storage, treatment, disposal of hazardous waste.	Hazardous waste will be handled in conformance with the HWCL.	Sections 8.14.4.1 and 8.14.4.2
Porter-Cologne Water Quality Control Act	Controls discharge of waste water to the surface and ground waters of the State. Applies to waste water returned to the City of Roseville sanitary sewer system.	Discharge will be in accordance with pretreatment standards under the City's NPDES permit.	Sections 8.14.2, 8.14.6, and 8.14
Local:			
City of Roseville Industrial waste permit	Controls industrial waste water discharge to the public sewer system.	The REP will apply for a City industrial waste permit.	Sections 8.14.3.1, 8.14.4.1, and 8.14.4

8.14.7.1 Federal

Wastewater is regulated by the EPA under the Clean Water Act (CWA). Plant drainage and sanitary waste from the project operations building will be discharged to the City of Roseville sanitary sewer system. Cooling tower blowdown will be treated by the on-site ZLD system. Chemical cleaning wastewater will be managed by an industrial waste subcontractor.

The federal statute that controls both non-hazardous and hazardous waste is RCRA, 42 United States Code (USC) Sections 6901et seq. and its implementing regulations found at 40 Code of Federal Regulations (CFR) 260 et seq. Subtitle D makes the regulation of non-hazardous waste the responsibility of the states; federal involvement is limited to establishing minimum criteria that prescribe the best practicable controls and monitoring requirements for solid waste disposal facilities. Subtitle C controls the generation, transportation, treatment, storage, and disposal of hazardous waste through a comprehensive "cradle to grave" system of hazardous waste management techniques and requirements. It applies to all states and to all generators of hazardous waste (above certain levels of waste produced). The REP will conform with this law in its generation, storage, transportation, and disposal of any hazardous waste generated at the facility. The EPA is responsible for implementing the law.

8.14.7.2 State

Non-hazardous solid waste is regulated by the California Integrated Waste Management Act (CIWMA) of 1989, found in Public Resources Code (PRC) Section 40000, et seq. This law provides an integrated statewide system of solid waste management by coordinating state and local efforts in source reduction, recycling, and land disposal safety. Counties are required to submit integrated waste management plans to the state. This law directly affects Placer County and the solid waste hauler and disposer that will collect solid waste from the REP. It also affects the REP to the extent that hazardous wastes are not to be disposed with solid waste.

Discharged wastewater is regulated by the State and Regional Water Quality Control Boards under the Porter-Cologne Water Quality Control Act. Plant drainage and sanitary waste will be discharged to the City of Roseville sanitary sewer system. Chemical cleaning process wastewater will be managed by an industrial waste subcontractor (see also Chapter 7 and Section 8.15).

RCRA allows the states to develop their own programs to regulate hazardous waste. The programs developed must be at least as stringent as RCRA regulations. California has developed its own program by passage of the California Hazardous Waste Control Law (HWCL). This statute is found in Health and Safety Code Section 25100, et seq. Administration and enforcement of the HWCL were originally seated with the former Department of Health Services (DHS), then transferred to the CalEPA, which became the DTSC. Some of the elements of implementation of the HWCL were delegated to local health departments by DHS via a memorandum of understanding. The DTSC continues to recognize these local programs.

The HWCL performs essentially the same regulatory functions as RCRA and is the law that actually regulates hazardous waste, since California has elected to develop its own program. The HWCL, however, includes hazardous wastes that are not classified as hazardous waste under RCRA. Although the hazardous waste generated at the REP during both construction and operation will be removed (e.g., HRSG flushing chemicals, catalysts, and used oil), the HWCL requires the applicant to adhere to storage, record-keeping, reporting, and training requirements for these wastes.

8.14.7.3 Local

The Placer County Department of Health and Human Services will have the primary responsibility for administering and enforcing the CIWMA for solid, non-hazardous waste for the REP.

For hazardous waste, local regulation consists primarily of administration and enforcement of the HWCL. The Roseville Fire Department is the local agency that will regulate hazardous waste at the REP. For emergency spills, the Roseville Hazardous Materials Emergency Response Unit is responsible for containment and cleanup.

8.14.7.4 Codes

The design, engineering, and construction of hazardous waste storage and handling systems at the REP will be in accordance with all applicable codes and standards, including the following:

- The Uniform Fire Code, 2001
- The Uniform Building Code, 2001
- The Uniform Plumbing Code, 2001

8.14.8 Involved Agencies

A number of agencies will regulate the non-hazardous and hazardous waste generated at the REP. At the federal level is the EPA, and at the state level is CalEPA. The administration and enforcement of the hazardous waste laws, however, is primarily through a local agency or agencies. For the REP, the local agency will be the Roseville Fire Department. The agencies and persons to contact for each type of waste are shown in Table 8.14-4.

8.14.9 Permits Required and Permit Schedule

A consolidated permit will cover hazardous waste generation at the REP. A hazardous materials business plan must be submitted as part of the application for the permit. The permit will be obtained prior to storage of hazardous materials at the site. Specific permitting requirements are discussed in Section 8.5 (Hazardous Materials Handling).

In addition, the project must obtain an EPA hazardous waste generator identification number. The number will be obtained before construction begins. The hazardous materials business plan will be submitted to the Roseville Fire Department, as discussed in Section 8.5. The NPDES permit that will be required for the discharge of storm water is discussed in Section 8.15 (Water Resources).

Table 8.14-4. Agency contacts.

Type Waste	Agency	Contact	Title	Telephone
Industrial Waste	City of Roseville	Art O'Brien	Wastewater Utility Manager	(916) 774-5754
Solid Waste	Placer County Department of Health & Human Services	David Altman	Environmental Health Specialist	(530) 889-7348
Hazardous Materials	Roseville Fire Department	Ken Wagner	Fire Chief	(916) 774-5800
Hazardous Materials	Department of Toxic Substances Control	California EPA ID Number	-	(800) 618-6942
Haz Mat Emergency	Roseville Fire Department	Ken Wagner	Fire Chief	(916) 774-5800 or 911

8.14.10 References

Altman, D. 2003. Personal communication between David Altman, Placer County Department of Health and Human Services and Doug Urry of Tetra Tech FW on July 24, 2003.

Anderson Consulting Group. 1999. Phase II Environmental Site Assessment, Pleasant Grove Wastewater Treatment Plant, Adjacent Properties, Roseville, California. April 6, 1999.

Beig, A. 2003. Personal communication between Dr. Abdul Hamid Beig (CPSS, Hazardous Substances Scientist, Department of Toxic Substances Control, Statewide Compliance Division, Northern California Branch) and Doug Urry of Tetra Tech FW on August 27, 2003.

CIWMB. 2003. California Integrated Waste Management Board Solid Waste Information System (SWIS) Database. August 27, 2003.

Department of Toxic Substance Control (DTSC). 2001. California commercial offsite hazardous waste management facilities. DTSC Hazardous Waste Management Program February 14, 2001.

EARTHTEC, Ltd. 1999. Phase I Environmental Site Assessment Update, Pleasant Grove Wastewater Treatment Plant, Phillip Road, Placer County, California, APN: 17-100-20, 27, 18, 17, 29, 30, 31, 15, 35, 34, and 28. January 7, 1999.

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Smith, A. 2003. Personal communication between Allen Smith, Clean Harbors Westmoreland Facility Environmental Manager and Doug Urry of Tetra Tech FW on August 27, 2003.

URS Corporation. 2001. Phase I Environmental Site Assessment for the Roseville Energy Facility, LLC. August 2001. Prepared for Roseville Energy Facility, LLC. Prepared by URS Corporation.

U.S. Environmental Protection Agency (USEPA). 2001. Executive Summary—the National Biennial RCRA Hazardous Waste Report (based on 1999 data). June 2001

8.15 WATER RESOURCES

This section provides a discussion of the existing water resources in the vicinity of the Roseville Energy Park (REP) site and assesses the potential effects of project construction and operations on water resources. Specifically, this chapter discusses the REP and its potential effects in the following areas:

- Use of recycled water for cooling and process water
- Water supply and quality
- Disposal of waste water
- Compliance with state water policies
- Storm water discharge
- Flooding

Section 8.15.1 discusses the existing hydrologic environment. Potential environmental effects of the REP construction and operation on water resources are assessed in Section 8.15.2. Section 8.15.3 discusses proposed mitigation measures that will prevent significant impacts. A discussion of cumulative project impacts is presented in Section 8.15.4. Section 8.15.5 presents applicable laws, ordinances, regulations, and standards (LORS) related to water resources. Section 8.15.6 lists relevant regulatory agencies and contacts. Section 8.15.7 discusses project permits that relate to water resources and presents a schedule for obtaining those permits. References cited are listed in Section 8.15.8.

8.15.1 Affected Environment

The REP is located on Phillip Road, north of the Pleasant Grove Waste Water Treatment Plant (PGWWTP) in the City of Roseville, Placer County, California. The City of Roseville is located at the southern end of Placer County, and is bounded on the north and west by unincorporated lands, on the south by Sacramento County, and on the east by the unincorporated community of Granite Bay. The REP is located in part of a flat to gently rolling, low-gradient alluvial fan within the Pleasant Grove and Kaseberg creek watersheds.

The REP project site includes generation facilities, control/administration building, switchyard, emission control equipment, storage tanks, and a parking area. The project site is level, with an average elevation of approximately 92 feet above mean sea level (MSL) and an average grade of about 5 percent. Ground elevations vary rather uniformly, between 89 and 107 feet MSL, across the 40-acre site.

8.15.1.1 Climate and Precipitation

The climate in the project area is mediterranean (NOAA Division CA-04) with hot, dry summers and mild, wet winters. Monthly average temperatures range from 40.5°F to 94.7°F. Temperatures exceeding 90°F occur on average 87 days per year and temperatures below 32°F on average happen 3 days per year (NCDC 2003).

The City of Sacramento is located approximately 16 miles southwest of the REP project site. Average annual temperature and precipitation data in the City of Sacramento was obtained from 1993 through 2002. During this period of record, the mean average temperature was 63.9 °F. Average annual precipitation over this same period averaged from 11.82 inches (1999) to 28.90 inches (1998), with a

10-year average annual precipitation of 21.1 inches (NCDC 2003). Table 8.15-1 lists the 10-year average rainfall amounts by month in the City of Sacramento.

Table 8.15-1. Ten-year average monthly precipitation in Sacramento (inches).

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
4.98	4.06	2.40	1.31	1.15	0.28	0.00	0.02	0.10	0.72	2.36	2.93

Annual 10-year average (1993 to 2002) =21.1 inches
Source: National Climatic Data Center, Annual Summary 2003

8.15.1.2 Groundwater Resources

The project site is situated within the North American Subbasin of the Sacramento Valley Groundwater Basin (Figure 8.15-1). The North American Subbasin is bordered by the Bear River to the north, the Feather River to the west, and the American River to the south. The eastern boundary for this subbasin is a line that can be drawn from north to south, extending from the Bear River to Folsom Lake. The North American Subbasin of the Sacramento Valley Basin is approximately 30 miles long and 25 miles wide with a surface area of approximately 548 square miles (Department of Water Resources [DWR] 2003a). The North American Subbasin and Sacramento Valley Groundwater Basin fall under the jurisdiction of the Central Valley Regional Water Quality Control Board (CVRWQCB).

Hydrostratigraphy

The North American Subbasin contains both an upper and lower aquifer system. Most of this groundwater is produced in the northern portion of the subbasin. Within the interior portion of the groundwater basin, upon which the REP project site is located, the water-bearing materials are continental deposits of Late Tertiary and Quaternary age. Deposits include Miocene/Pliocene volcanic materials, older alluvium, and younger alluvium (DWR 2003a). The maximum depth of these deposits is approximately 2000 feet. In general, the upper aquifer system is comprised of older and younger alluvium and is unconfined to semi-confined within 300 feet of ground surface. The lower aquifer system is comprised of the Miocene/Pliocene volcanic deposits and can be found deeper than 300 feet from ground surface. This lower system shows a delayed response to stresses in the upper system indicating possibility of being more confined (DWR 2003a).

Recharge to the North American Subbasin comes mostly from natural groundwater recharge. Natural groundwater recharge includes recharge from rainfall, net leakage from pipelines, seepage from surrounding hills, seepage into and out of the groundwater basin, and net irrigation return flows to the basin. The greatest percentage of natural groundwater recharge for the subbasin comes from the northern Sacramento Valley, with Placer County contributing approximately 1.6 percent. No artificial recharge is known to occur within the subbasin (DWR 1979). However, the City of Roseville is evaluating a feasibility study for aquifer storage and recovery where surface water would be injected into the aquifer during wet years for storage, and then pumped out of wells during dry years (City of Roseville 2002). Recharge to aquifers in this subbasin comes almost exclusively from runoff from the Sierra Nevada. Even then, annual precipitation amounts are exceeded by the evapotranspiration rate, resulting in minimal groundwater recharge potential to the area.

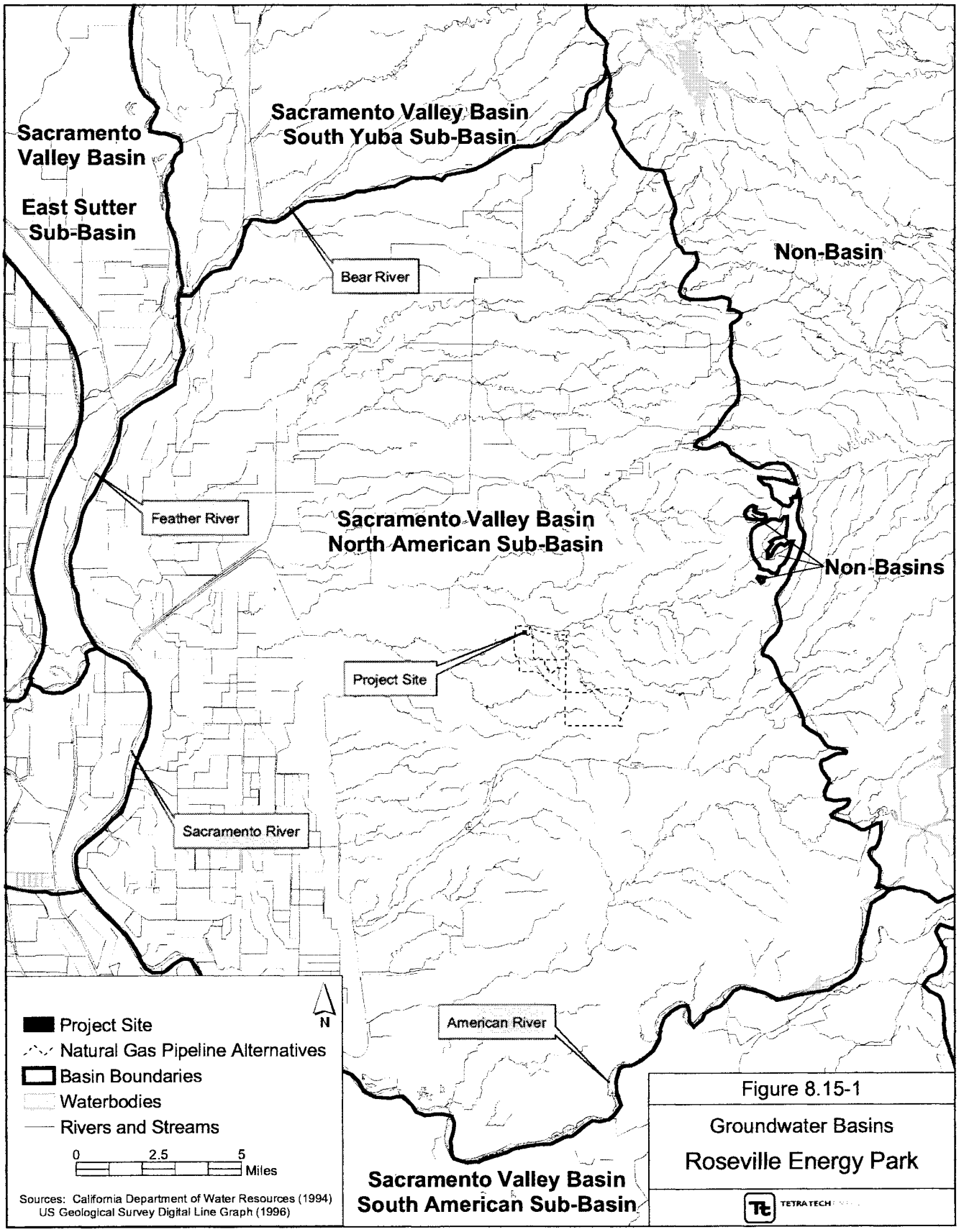

Figure 8.15-1

Groundwater Basins

Roseville Energy Park

TETRA TECH

Upper Aquifer System

The upper aquifer system of the North American River Subbasin consists of the Riverbank, Modesto, Turlock Lake, and Laguna geologic formations. Groundwater within this system occurs under unconfined conditions within its uppermost few hundred feet. Depth to groundwater within the upper aquifer has been measured at an average of 106.5 feet from the ground surface (DWR 2003a). The upper aquifer system contains loosely to moderately compacted sands, silt, and gravel of older alluvium, covered by silts and clays interbedded with stream channel deposits of younger alluvium. The upper aquifer system represents the principal source of groundwater for use in the City of Roseville. Recharge to the upper aquifer zone is primarily a result of direct infiltration of precipitation, net leakage from pipelines, recharge from rivers and creeks, and seepage into and out of the basin.

Lower Aquifer System

The lower aquifer system occurs beneath the upper aquifer system and is comprised of the Mehrten geologic formation. The lower aquifer system shows signs of being confined (i.e., under pressure) and water in this system is found at depths of 300 feet or greater. This system consists of "black sands," stream gravels, silt, and clay interbedded with layers of "tuff breccia" associated with volcanic deposits. Natural groundwater recharge enters the lower confined aquifer zone primarily via deep infiltration, seepage from surrounding hills, and from groundwater flow into and out of the basin.

Regional Geologic Cross-Section

Figure 8.15-2 shows a generalized regional cross-section of the Sacramento Valley Groundwater Basin. This cross-section provides a conceptual geologic model rather than detailed stratigraphic data. The cross-section extends from the Sierra Nevada in the east to the Sacramento River at the west. Major geological formations are identified by strata in the cross-section. The approximate vertical extent of both the upper and lower aquifer zones is also shown on this figure.

Land Subsidence

Significant groundwater use in the Sacramento Valley began in the early 1900s with irrigated agriculture becoming common in the form of rice cultivation (USGS 1995). Land subsidence was first noticed in the 1950s as a consequence of groundwater pumping. By 1977, at least half of the valley (5,200 square miles) had subsided by 1 foot. The greatest subsidence occurred in Mendota where the land has subsided by as much as 30 feet between the 1920s and the 70s (USGS 1995). Major withdrawals occurred during the 1976-77 drought, which resulted in increased subsidence. In the late 1970s importation of surface water and reduction in groundwater pumping allowed for some recovery of groundwater levels, in many cases restoring levels to pre-1960's levels (USGS 1995). Ground subsidence was most drastically observed in the southern and western parts of the San Joaquin Valley

Ground subsidence near the REP has been minimal. Current groundwater management programs of the City of Roseville ensure that groundwater resources are protected and sustained by natural recharge. According to the City's Urban Water Management Plan (City of Roseville 2002), groundwater is currently only used as short-term backup supply and has not been used since the drought condition of 1991. Additionally, DWR has monitored groundwater levels near the REP for the last 30 years. DWR indicated that groundwater levels in one well, Well 11N/05E/23B001M (located within 0.25-mile of the REP site), have remained constant since about 1990 (DWR 2003a). The most recent monitoring (July 2003) shows groundwater at 108.5 feet below ground surface level. Land subsidence in the REP area is, therefore, not expected due to groundwater extraction.

Basin Groundwater Quality

Groundwater monitoring results for wells in the North American Subbasin show that water quality is good in most of the subbasin with marginal quality water in a few localized areas (DWR 2003). Water types in the subbasin consist of the calcium-magnesium-bicarbonate/magnesium-calcium-bicarbonate type, the magnesium-sodium-bicarbonate/sodium-magnesium-bicarbonate type, and the sodium-calcium-bicarbonate/calcium-sodium-bicarbonate type. Table 8.15-2 presents a statistical summary of important dissolved constituents found in natural groundwater within the Sacramento Valley Groundwater Basin.

Table 8.15-2. Statistical summaries of Sacramento Valley Basin groundwater data and water quality objectives.

Constituent [1]	Median Concentration in Groundwater Basin	Drinking Water Standard [2,3]
Arsenic (µg/L[4])	5	50[2]
Bromide (mg/L)	0.06	None
Boron (µg/L)	68	None
Calcium (mg/L)	15	None
Chloride (mg/L)	16	500[3]
Fluoride (mg/L[5])	0.3	1.8[2]
Iron (µ/L)	< 3.0	300[3]
Magnesium (mg/L)	11	None
Manganese (µg/L)	< 1	50[3]
Nitrate (mg/L)	<0.01	45[2]
Potassium (mg/L)	0.9	None
Silica (SiO_2) (mg/L)	74	None
Sodium (mg/L)	19	None
Sulfate (mg/L)	5.2	500[3]
Total Dissolved Solids (mg/L)	205	1,000[3]
pH	7.3	N/A
Dissolved Oxygen (mg/L)	6.0	N/A

1. For common inorganic water quality constituents
2. Maximum contaminant level as specified in Table 64431-A of Section 64431, Title 22, of the California Code of Regulations
3. Secondary maximum contaminant level as specified in Table 64449-A and Upper Recommended Contaminant Ranges as outlined in Table 64449-B of Section 64449, Title 22, of the California Code of Regulations
4. µg/L = micrograms per liter
5. mg/L = milligrams per liter

Source: Groundwater basin, USGS 1998

In addition to the inorganic constituents listed in Table 8.15-2, volatile organic compounds (VOCs) have been detected within the Sacramento Valley Groundwater Basin. VOCs in groundwater are typically associated with releases from industrial facilities, gasoline stations, and dry cleaners. These pollutants

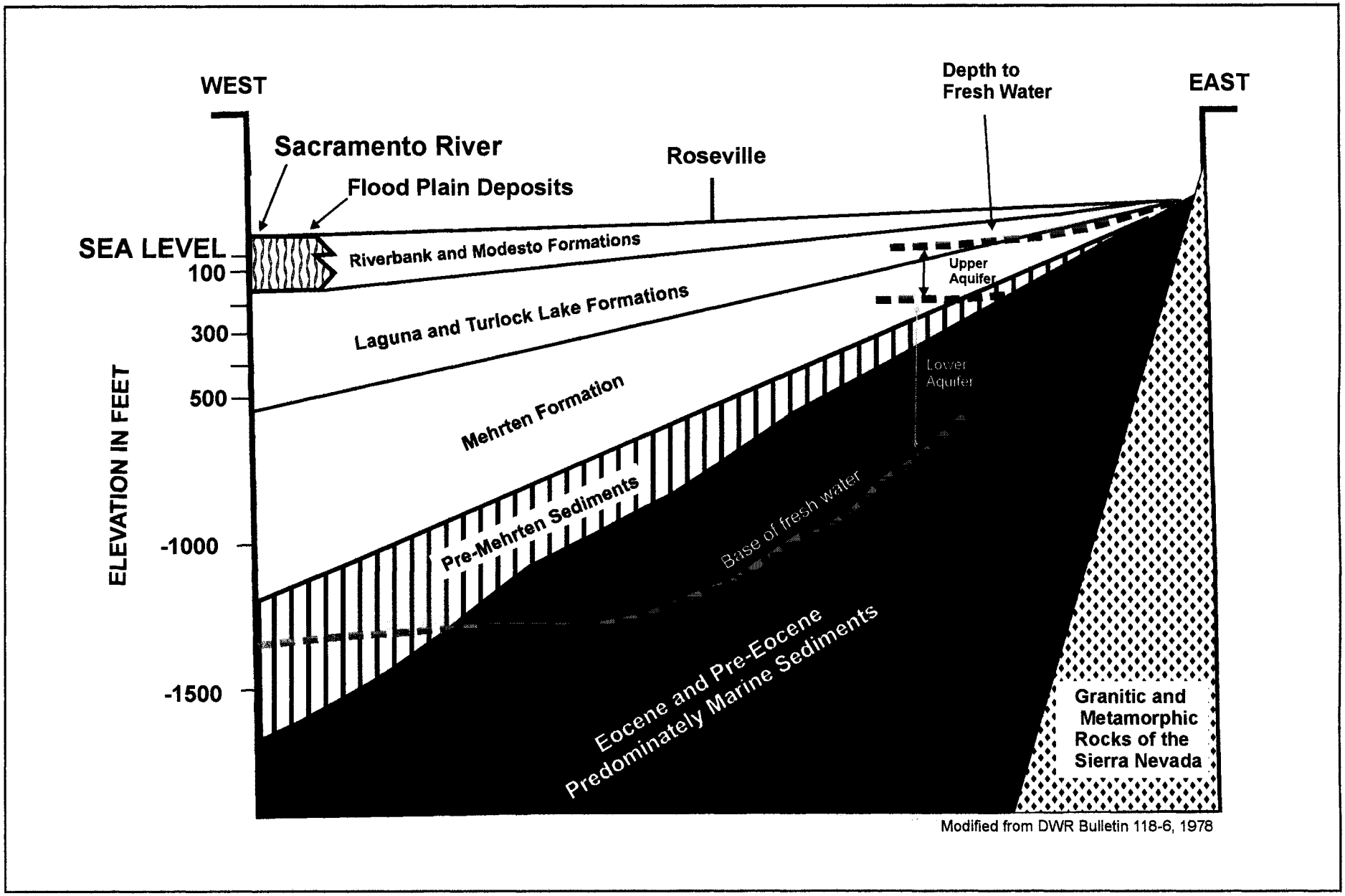

Figure 8.15-2. Sacramento Valley groundwater basin cross-section.

include petroleum products, liquids containing heavy metals such as lead and chromium, organic solvents such as acetone and benzene, coliform bacteria, and many others. Point sources that have had a past release or have the potential to experience future releases of hazardous materials include the Union Pacific Railyard in Roseville and the former McClellan Air Force Base. These sites are within 5 miles of the REP site. Current water quality data indicate that, although VOCs are present in the groundwater, VOC concentrations are well below the maximum contaminant levels of Title 22 of the California Code of Regulations (USGS 1998).

8.15.1.3 Surface Water Resources

Surface Water Drainage

Principal drainages within the North American Subbasin include the Sacramento, American, Feather, and Bear rivers. The REP is situated within the Pleasant Grove Creek watershed. Pleasant Grove Creek is located 0.25-mile north of the site. Smaller creeks and tributaries to Pleasant Grove Creek are situated to the east of the project site, with the closest being approximately 0.9-mile.

Pleasant Grove Creek drains from foothills approximately 1.5 miles north of Rocklin into the Natomas Main Drainage Canal. From the Natomas Main Drainage Canal, water from Pleasant Grove Creek eventually enters the Sacramento River about 15 miles downstream from the project site. Two other main tributaries to Pleasant Grove Creek, Kaseberg Creek and South Branch Pleasant Grove Creek, are located within 2 miles east of the REP site.

Surface water flow in Dry Creek, a major creek located 6 miles southeast of the project site, has been measured by the USGS since 1996 (USGS 2001). The maximum measured discharge for the period of record is 7,950 cubic feet per second (cfs) (January 22, 1997). For the water year from October 2000 to September 2001, the maximum monthly flow occurred in February 2001 with a flow of 636 cfs. The lowest flow occurred in June 2001 (7.8 cfs).

Water quality data for the North American Subbasin are collected by the United States Geological Survey. According to the USGS, water quality in the Sacramento River and major tributaries is good, with low dissolved solids and nitrates in drinking water. Areas where drinking water standards were exceeded were generally associated with agricultural sites, especially rice farming (DWR 2000).

Wetlands

Several seasonal wetlands, wet swales, and a vernal pool exist on the REP site. In addition, vernal pools are found near of the natural gas pipeline. The Biological Resources Section (8.2) discusses these in greater detail.

Floodplains

The Federal Emergency Management Agency (FEMA) has issued flood insurance rate maps for the vicinity of the REP (FEMA 1996). A reproduction of the FEMA map showing the flood zones in relation to REP site is provided in Figure 8.15-3. This map indicates that the REP project site is not located within a 100-year floodplain (Zone A). Natural gas pipeline Alternative A crosses the 100-year floodplain of Kaseberg Creek and also the 100-year floodplain of the unnamed tributary to Pleasant Grove Creek that is located a few hundred feet east of the project site.

8.15.1.4 Water Agencies

City of Roseville

The City of Roseville obtains its potable water supply from Folsom Lake. The raw water is supplied to Roseville via intake pipelines owned by the U.S. Bureau of Reclamation (USBR). Additionally, raw water from the Placer County Water Agency (PCWA) is transported through USBR facilities. The Folsom Lake water supply provides 99 percent of the potable water used by Roseville. The remaining 1 percent is recycled water generated by the City's waste water treatment plants (City of Roseville 2002b). The City's entitlement to surface water from these sources includes 32,000 acre-feet per year (afy) from the USBR, 30,000 afy from PCWA, and 800 afy contracted through the San Juan Water District (SJWD). Total contracted supplies equal 62,800 afy. Roseville's diversion limit through the Water Forum Agreement, however, is a maximum of 55,700 acre-feet (af) in wet years, 39,800 in dry years. The City uses groundwater only for short-term backup supply during dry years. The City has four wells for this use. These are capable of producing up to 6,600 afy.

The City of Roseville 2002 Urban Water Management Plan (UWMP) summarizes existing water supply conditions and provides a discussion of strategies to meet future projected water demands. This document defines future water supply for the City of Roseville. Current demand in the City of Roseville for potable water is approximately 33,000 afy (City of Roseville 2003b). The City has a sufficient water supply in years of average precipitation to meet projected customer demand through 2020.

The development of West Roseville includes plans to extend the 24-inch main from the intersection of Blue Oaks and Del Webb Boulevards westward to Fiddyment Road. This line would be extended into West Roseville within the planned roadways. The REP will connect to the City's potable water system some time after the water main system is extended to the project vicinity. Meanwhile, REP's small potable water demand (0.5 gpm, on average) will be supplied by groundwater from an existing on-site well.

Process water for the REP will be supplied by the City of Roseville through the City's PGWWTP. The PGWWTP will supply tertiary-treated recycled water for use in cooling tower and process blowdown through screening, grit removal, extended aeration, secondary clarification, filtration, chlorination, and dechlorination. The recycled water will meet the California Administrative Code (CAC) Title 22 Division 4 requirements for "unrestricted use." The users of recycled water must ensure that a number of regulatory requirements specified in CAC Title 22 are met.

The PGWWTP is designed and permitted to treat approximately 12.0 million gallons per day (mgd) average dry weather flow. The plant will provide an average annual supply of recycled water of approximately 6.5 mgd in 2005, increasing to 12.5 mgd by 2020 (HydroScience Engineers 2003). The PGWWTP will begin operation in late 2003. Before the construction of the PGWWTP, the source of treated wastewater in the City was the Dry Creek Waste Water Treatment Plant (DCWWTP). The average processing volume at the DCWWTP was approximately 15 mgd before the PGWWTP began operation. Approximately 4.0 to 6.5 mgd will be diverted to the PGWWTP as it goes on line, by early 2004. Recycled water from the DCWWTP has been used for landscape irrigation at Sun City Roseville, Woodcreek Oaks, Diamond Oaks, and Morgan Creek golf courses; in the Junction Boulevard Streetscapes; and Elliot Park. Demand has averaged 1.3 mgd (1,458 afy).

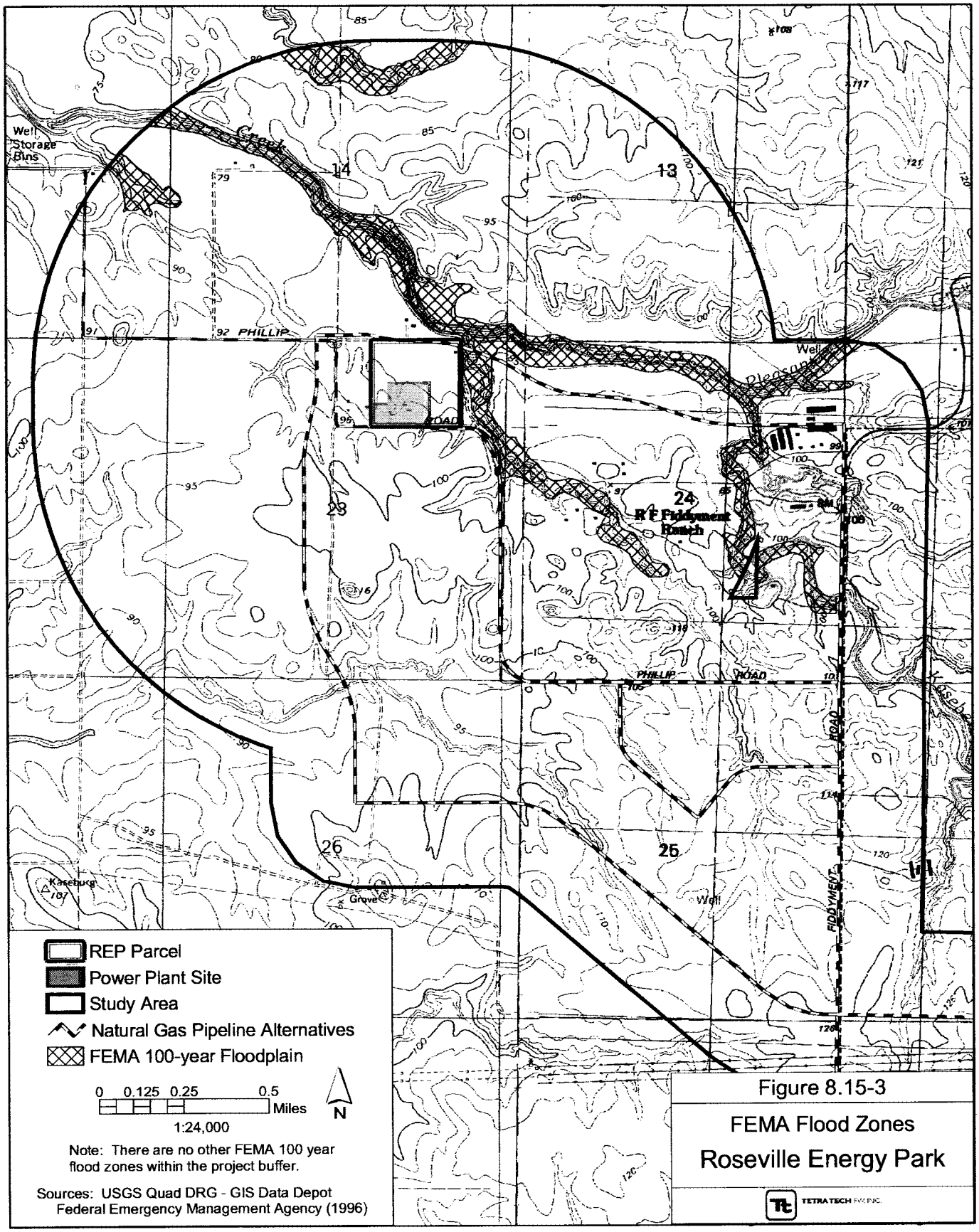

Figure 8.15-3

FEMA Flood Zones

Roseville Energy Park

Total average recycled water supply by 2030 is projected to be 26.2 mgd (11.9 mgd from the PGWWTP, and 14.3 mgd from the DCWWTP) (HydroScience Engineers 2003).

The City of Roseville has calculated that, under average annual conditions, the amount of recycled water supply available for use from the PGWWTP for projects other than the WRSP and the remainder area (areas to the north and south of the WRSP that are part of a sphere of influence amendment that is concurrent with the WRSP annexation) would be 5.24 mgd in 2005, increasing to 9.12 mgd in 2010 and 10.49 mgd in 2020 (City of Roseville 2003b). Under peak day conditions, the amount available from the PGWWTP for projects other than the WRSP and the new sphere of influence area (remainder area) would be 3.4 mgd in 2005, 6.5 mgd in 2010, and 6.5 mgd in 2020. These calculations include the potential demand stemming from the build-out of West Roseville (average recycled water demand of 1.56 mgd, peak day demand of 3.91 mgd) and additional areas outside of West Roseville in the City's sphere of influence that could be developed in the near future. Therefore, these calculations indicate the City's ability to provide approximately 1,000 gpm of recycled water from the PGWWTP to the REP.

8.15.2 Environmental Consequences

The potential effects of the project on water resources have been evaluated in terms of the following:

- Water supplies
- Use of recycled water for process and cooling water
- Disposal of waste water
- Compliance with state water policies
- Surface water quality and flooding hazards
- Groundwater degradation

8.15.2.1 Significance Criteria

The project would cause a significant environmental impact if it would cause substantial flooding, erosion, or siltation; substantially degrade surface water quality; substantially degrade or deplete groundwater resources; interfere substantially with groundwater recharge; or contaminate a public water supply.

8.15.2.2 Water Supply

Recycled Water for Project Cooling

The project's cooling water and process makeup water will be supplied entirely by tertiary treated recycled water from the PGWWTP via a pipeline that crosses Phillip Road. Recycled water will also be used on-site for fire suppression and landscape irrigation. A "will-serve" letter describing the City's water supply capabilities is included in Appendix 7-A. A 1-million gallon, above-ground storage tank will be constructed on the REP site to hold the recycled water for use at the site and provide capacity for intermittent daily peak loads.

As described in Chapter 7, operation phase water demand for the REP is as follows:

- Average daily: 0.71 mgd /491 gpm (gallons per minute) (based on 62 °F ambient temperature)
- Maximum daily: 1.71 mgd /1,189 gpm (assumes 99 °F and 24 hours of duct firing)

- Maximum annual: 1,247 afy (assumes maximum allowable annual duct firing based on the assumptions used for air permitting)

The recycled water is suitable for use as cooling tower make-up and as feedwater for the power cycle makeup water treatment system. No additional treatment is expected to be required for the makeup water to the cooling tower. Process water make-up will be demineralized, as required by the various uses, including makeup to the steam cycle, periodic washing of the combustion turbines, and injection into the combustion turbines to boost the power (LM6000 only) and to control oxides of nitrogen (LM6000 only).

Use of recycled water ensures the least impact to the local environment. Use of recycled (or reclaimed) water is consistent with state water policy for water conservation and maximum reuse of waste water (see Section 8.15.2.5, below for a discussion of state water policy). The total availability of recycled water from the PGWWTP in 2005 will be 5.24 mgd, even assuming the full build-out of West Roseville, which will actually take place over 15 years. Since the project will use 0.71 mgd of recycled water for cooling under average conditions (1.71 mgd under maximum conditions), there will be enough of recycled water available from the PGWWTP to supply the needs of the REP and other recycled water needs, such as landscaping water for parklands in the West Roseville Specific Plan (WRSP) area. The City's will-serve letter in Appendix 7-A describes the availability of recycled water for the REP and other potential uses.

Water quality parameters of similar tertiary treated effluent from the City's DCWWTP Treatment Facility is shown on Table 8.15-3. The recycled water from the PGWWTP will be similar to the water from the DCWWTP (Derrick Whitehead 2003, personal communication).

All recycled water pipelines, storage tanks, and ancillary facilities will be constructed in compliance with California Code of Regulations, Titles 17 and 22. Title 17 addresses the requirements for backflow prevention and cross-connections, while Title 22 addresses other health-related issues. A Title 22 Engineer's Report must be submitted and approved by the State Department of Health Services and the CVRWQCB. The CVRWQCB will issue reclamation requirements to ensure that the recycled water is properly treated and safely used.

Potable Water

The REP site will also require potable water for domestic uses. Water required for this use will be provided through a groundwater well at the REP site. The City has tested one of the three existing wells on the project parcel and determined that its quality and pressure are sufficient to serve the project (MWH Laboratories 2003, Appendix 8.15-A). The anticipated REP demand for water from this well is estimated to be approximately 0.5 gpm, on average (less than 1 acre-foot annually). Groundwater will not be used for power plant cooling.

In addition, the Roseville City Council has approved the annexation to Roseville of West Roseville, a 3,162-acre area surrounding the REP project area on the west, south, and east and development of this area in accordance with the West Roseville Specific Plan (WRSP). As part of the eventual build-out of the WRSP, the City will construct a 24-inch pipeline to the project area for domestic potable water supply. Once this water main is in place, the REP will connect with it for potable water supply. Completion of the water main system near of the REP will be likely to take place by 2010. Water quality parameters for the City's potable water supply are provided in Table 8.15-3.

Table 8.15-3. Summary of average influent water quality for REP water supply.

Water Quality Parameter[a]	PGWWTP Recycled Water[b] (Primary Supply)	On-site Well[c]	Drinking Water Standard[d,e]
General Parameters			
Alkalinity, Total (mg/L)	60	101	None
Bicarbonate (mg/L)	N/T	N/T	None
Hardness (as $CaCO_3$) (mg/L)	107.5	109	200
Nitrate (as NO_3) (mg/L)	6.5	1	45[e]
pH	6.9	8.0	6.0 – 9.0
Total Dissolved Solids (mg/L)	398.5	250	1,000[d]
Chemical Parameters			
Arsenic (g/L)	<1.0	5.1	50[e]
Boron (mg/L)	267.5	0.17	None
Cadmium (µg/L)	<0.2	N/T	5[e]
Calcium (mg/L)	40.2	19	None
Chloride (mg/L)	103.5	34	500[d]
Chromium, Total (µg/L)	1.2	7.5	50[e]
Copper (µg/L)	4.9	N/T	1,000[d]
Fluoride (mg/L)	1.25	0.21	1.8[e]
Lead (µg/L)	<1	N/T	Action Level = 15
Magnesium (mg/L)	4.45	15	None
Manganese (mg/L)	0.054	N/T	2[e]
Nickel (µg/L)	2.3	N/T	100[e]
Potassium (mg/L)	12	1.3	None
Silver (µg/L)	0.014	N/T	100[e]
Sodium (mg/L)	75	24	None
Sulfate (mg/L)	37	7.1	500[d]
Zinc (µg/L)	46	N/T	5000[d]

[a] For common inorganic water quality constituents
[b] Based on quality of recycled water from the City's Dry Creek Waste Water Treatment Plant
[c] Source: MWH Laboratories, 2003.
[d] Maximum contaminant level as specified in Table 64431-A of Section 64431, Title 22, of the California Code of Regulations
[e] Secondary maximum contaminant level as specified in Table 64449-B of Section 64449, Title 22, of the California Code of Regulations

mg/L = milligrams per liter
µg/L = micograms per liter
<MDL = below method detection limit
N/T = Not tested by City

8.15.2.3 Construction Water Supply

During construction of the proposed project, water will be required primarily for dust suppression. Because of the short duration of construction activities and the relatively limited water requirements (less than 200 gpm for 1 hour for dust control and soil compaction, at peak use) of the construction phase of the project, no significant adverse impacts to water supply are expected to result. Potential water supply

impacts due to construction will be limited to surface water runoff during excavation and construction of these elements of the infrastructure. Such construction impacts are small and can be controlled through implementing a Storm Water Pollution Prevention Plan and associated best management practices and proper housekeeping at the construction site. Estimates of usage rates are provided as follows:

- Average daily: 50 gpm x 4 hours = 12,000 gallons per day (gpd) (based on size of site)
- Maximum daily: 200 gpm x 10 hrs = 0.12 mgd (conservative high estimate)
- Average annual: 180 days x 12,000 gpd = 2.16 mgy
- Maximum annual: Same as above

8.15.2.4 Waste Water Disposal

Cooling Tower Blowdown

Circulating (or cooling) water system blowdown will consist of recycled water that has been concentrated at approximately 5 cycles of concentration and residues of the chemicals added to the circulating water. These chemicals will control scaling and biofouling of the cooling tower and corrosion of the circulating water piping and condenser tubes. Cooling water treatment will require the addition of a pH control agent (acid), a mineral scale dispersant (i.e., polyacrylate polymer), corrosion inhibitors (phosphate based), and biocide (i.e., sodium hydroxide or equivalent). The waste stream will be treated in an on-site zero liquid discharge (ZLD) system where the liquid waste will be recovered for reuse within the REP. The volume of this waste stream going to the ZLD is expected to be about 96 to 116 gpm under average conditions and about 267 to 278 gpm under peak conditions.

Sanitary Waste Water

Sanitary waste water from sinks, toilets, showers, and other sanitary facilities will be collected and discharged to the PGWWTP via a 3- to 6-inch pipeline that will connect to the existing PGWWTP influent junction structure located approximately 800 feet east of the REP site. The daily sanitary waste water discharge flow will average 720 gpd (0.5 gpm).

Plant Drainage

Miscellaneous general plant drainage will consist of sample drainage, equipment leakage, and drainage from facility containment areas. Water from these areas will be collected in systems of floor drains, sumps, and pipes within the REP and discharged to an oil-water separator. The oil-free discharge water will be recycled to the cooling tower basin. Oil collected by the oil-water separators will be periodically trucked off-site for disposal. Storm water runoff will be collected in the on-site storm water detention ponds and sent through a 30-inch outfall drain and/or an open ditch to the unnamed tributary of Pleasant Grove Creek that lies about 720 feet east of the power plant fenceline. Storm water management practices will follow the California Storm Water Quality Association (CASQA) California Stormwater BMP Handbook, Sections TC-20 and TC-22.

Temporary Construction Site Discharge

Power Plant Process and Cooling

The construction phase of REP will require no, or at least very minimal, dewatering requirements. All excavations will be above the existing water table. Being above the local water table should result in no dewatering requirements except for possible storm water collection in the excavations when the storm water is not routed to the stormwater collection system. This quantity of collected storm water is

expected to result in only several days of dewatering during construction. With an unusual storm year, this number could be as many as 5 to 10 days. Under a worst-case storm scenario where all of the stormwater would be collected in excavations, the water collected from a 10-year, 24-hour storm could be pumped out over 24-hours at a 50-gpm rate. For the REP project, it is expected that the potential for site dewatering will only occur over a single rain season. Therefore, the maximum daily dewatering discharge would be 72,000 gallons and, for the sake of providing a quantity, an extreme worst-case annual maximum of 0.72 mg, based on the worst-case daily amount for 10 days in a year.

During the early phases of construction, temporary erosion and sedimentation control measures will direct storm water runoff to the natural runoff swale at the northeastern end of the site. Standard construction equipment will be used for erosion and sediment control, wind erosion control, tracking control, non-storm water management, and materials pollution control. Later during the construction phase, after final site grading and construction of the storm water detention ponds, storm water runoff will be directed to the detention ponds. Storm water in the detention ponds will then be discharged to an unnamed tributary of Pleasant Grove Creek lying 700 feet to the east of the project site via a 30-inch storm water outfall drain. Appendix 7-B provides a preliminary grading and drainage plan (drawing) and a grading, drainage, runoff, and storm water computation sheet. This plan, along with the requirements of the City of Roseville's drainage design (City of Roseville, Department of Public Works, Improvement Standards), forms the basis for the drainage facilities design criteria. The drainage plan shows the direction of drainage after the project is constructed to be towards two hydraulically connected detention ponds that will have a single drainage outlet (these ponds will become the permanent storm water ponds that will be used for the operations phase of the project). Water pollution control during construction will be addressed through a Storm Water Pollution Prevention Plan (SWPPP) as required by the CVRWQCB and local agencies.

Water used for dust control and soil compaction during construction will not result in discharge. During the construction period, sanitary waste will be collected in portable toilets (no discharge) supplied by a licensed contractor for collection and disposal of sanitary wastes at an appropriate receiving facility. Equipment wash water will be collected and disposed of offsite.

Natural Gas Pipeline

The natural gas pipeline will be a 10- to 16-inch-diameter pipe that will be constructed from the REP site to the existing PG&E gas connection point to Line 123 along Baseline Road, approximately 600 feet east of Country Club Lane. Currently, there are four alternative routes being considered for the natural gas pipeline. The routes are shown in Figure 5.1-1 in Section 5 Natural Gas Supply. The first route (Route A) will cross several major waterways including Kaseberg Creek. Table 8.15-4 shows the water bodies that will be crossed by construction of the natural gas pipeline alternative routes.

Construction impacts will include soil disturbance associated with trenching or jack-and-bore and horizontal directional drilling pipeline installation methods appropriate for the route selected. There is also potential for a small amount of accelerated erosion to occur during construction. The proposed project will minimize the potential for accelerated erosion by using appropriate erosion control, best management practices, and prompt backfilling of trenches. Therefore, no significant impacts are expected to water bodies due to construction of the natural gas pipeline. Depending on the construction methods used, California Department of Fish and Game 1601 Streambed Alteration Agreements and

U.S. Army Corps of Engineers nationwide permits may be required to cross the water bodies. See Section 8.15.5 for a discussion of the permit requirements.

Hydrostatic test water for the natural gas pipeline (see discussion in AFC Section 5) will be drawn from City potable water supplies. It will be chemically analyzed for contaminants and discharged into a dewatering structure consisting of hay bales, geotextile fabric, and silt fencing. The discharged water will filter through the hay bales and silt fence before it is discharged. These measures will be 90 percent or more effective in removing any sediments and other solids that may accumulate in the test water before discharge. The water will be discharged into the City of Roseville sanitary sewer system (urban areas) or to tributary drainages to Pleasant Grove Creek (WRSP areas) under the appropriate City permit. None of the project discharges will thus affect waters of the state and a report of waste discharge is not required. Approximately 50,000 gallons of water will be used for hydrotesting power plant piping.

Sanitary Sewer Pipeline

The sanitary sewer pipeline will be a 3- to 6-inch-diameter, 800-foot line constructed from the REP site to the PGWWTP influent junction structure located east of the REP. Construction impacts will include soil disturbance associated with trenching construction methods. There is also potential for a small amount of accelerated erosion to occur during construction. The sanitary sewer pipeline will be constructed across an unnamed tributary to Pleasant Grove Creek. The proposed project will minimize the potential for accelerated erosion through the use of appropriate erosion control, best management practices, and prompt backfilling of trenches. Therefore, no significant impacts are expected to surface water resources due to construction of the sanitary sewer pipeline. Table 8.15-4 shows the surface water features that will be crossed by construction of the waste water and natural gas pipelines. Depending on the construction method used to cross the tributary to Pleasant Grove Creek, a California Department of Fish and Game 1601 Streambed Alteration Agreement and a U.S. Army Corps of Engineers Nationwide permit may be required for the REP project.

8.15.2.5 Surface Water Quality and Storm Water Management

Site Drainage

The site grading and drainage will be designed to comply with all applicable federal, state, and local regulations. The general site grading will establish a working surface for construction and plant operating areas, and will provide positive drainage from buildings and structures, and adequate ground coverage for subsurface utilities.

At completion of the REP, on-site drainage at REP will be accomplished through gravity flow. The surface grading will direct storm water runoff to the proposed storm water detention ponds via overland flow at a minimum slope of 0.5 percent. The main plant complex area will be graded with moderate slopes (1 percent minimum preferred) for effective drainage. Two hydraulically connected storm water detention ponds will be constructed on-site, at the northeast corner of the property and will contain storm water runoff. The detention ponds will be constructed for sediment and contamination control. Storm water detention is not necessary or desirable at this location because of regional hydrology (see storm water pond sizing criteria discussion in Appendix 7-C). Since the portion of Pleasant Grove Creek into which the project will drain is immediately downstream of developed areas in the City of Roseville, it is preferable for storm water from this location to be continuously released during a storm event, rather

Table 8.15-4. Water bodies crossed by REP pipelines (from REP site to PG&E connection)

Pipeline	Crossing No.	Water Body
Natural Gas Pipeline Alternative A	A-1	Unnamed tributary to Pleasant Grove Creek
	A-2	Kaseberg Creek Crossing #1
	A-3	Unnamed tributary to Kaseberg Creek
	A-4	Kaseberg Creek Crossing #2
	A-5	Unnamed tributary to Kaseberg Creek
	A-6	Kaseberg Creek Crossing #3
	A-7	Kaseberg Creek Crossing #4
	A-8	Curry Creek
Natural Gas Pipeline Alternative B	B-1	Unnamed tributary to Curry Creek
	B-2	Unnamed tributary to Curry Creek
	B-3	Unnamed tributary to Pleasant Grove Creek
	B-4	Curry Creek
Natural Gas Pipeline Alternative B1	B1-1	Unnamed tributary to Curry Creek
	B1-2	Unnamed tributary to Curry Creek
	B1-3	Unnamed tributary to Pleasant Grove Creek
	B1-4	Curry Creek
Natural Gas Pipeline Alternative C	C-1	Unnamed tributary to Curry Creek Crossing
	C-2	Unnamed tributary to Curry Creek Crossing
	C-3	Unnamed tributary to Kaseberg Creek
	C-4	Kaseberg Creek Crossing #1
	C-5	Kaseberg Creek Crossing #2
Sanitary sewer pipeline	S-1	Unnamed tributary to Pleasant Grove Creek

than detained, based on City of Roseville guidance. Discharged storm water will follow all guidelines required by an SWPPP and by the CVRWQCB and local agencies.

The buildings and structures will be located with the ground floor elevation a minimum of 6 inches above the finished grade. The preferred slope of the graded areas away from the structures will be one percent. Currently, the City of Roseville is revising its best management practices and storm water ordinances concerning construction and storm water runoff. The REP site drainage facilities will be designed to convey the flow of the storm event specified by the new ordinances.

Surface Water Quality and Storm Water Discharge

The process drainage system will include an oil-water separator that will receive drainage from process equipment and storm water from hazardous material containment areas (those areas with walls or dams built to contain spillage). The separator will be an underground or aboveground vault with baffles to collect oils and solids. Waste water will be routed through the baffles, allowing oils to rise to the surface and solids to settle to the bottom. The vault will be pumped out periodically. Oils will be removed using oil-absorbent pillows or other acceptable methods and transported to an approved disposal facility. After passing through the oil-water separator, waste water will be recycled to the cooling tower basin. Storm

water falling outside of hazardous material containment areas (e.g., on plant roads and other paved or gravel surfaced areas and landscaped areas) will be collected by a system of catch basins and ditches and directed to the storm water detention basins. The storm water detention basin outlet will be constructed with a weir and seal such that oils associated with runoff from plant roads will be collected on the surface of the ponds and prevented from being discharged offsite.

Hazardous material containment areas (those areas with walls or dams built to contain spillage) will use an independent collection and treatment system. This system is separate from the storm water collection and treatment system described in the prior paragraph.

Storm Water Management During Construction Activities

During construction, approximately 50 acres of land associated with the plant site and other facilities will be disturbed (including construction laydown and worker parking areas). Surface water impacts are anticipated to be related primarily to short-term construction activity and consist of increased turbidity due to erosion of newly excavated or placed soils. Activities such as grading can potentially destroy habitat and increase rates of erosion during construction. In addition, construction materials could contaminate runoff or groundwater if not properly stored and used. Compliance with engineering and construction specifications, following approved grading and drainage plans, and adhering to proper material handling procedures will ensure effective mitigation of these short-term impacts. In this way, possible erosion and other water quality degradation impacts will be reduced to less than significant levels. Best management practices (BMPs) for erosion control will be implemented. Additionally, erosion and sediment controls, surface water pollution prevention measures, and other BMPs will be developed and implemented for both construction and operational phases. These plans will be prepared in accordance with the NPDES construction permit issues by the RWQCB and local agency requirements for a Phase II small MS4.

Pre- and Post- Development Runoff Conditions

The peak flow associated with the 10- and 100-year storm events at the site before construction (pre-development) was compared to the post-development (after construction) conditions. The result of this evaluation indicates that pre-project runoff conditions for the 10-year and 100-year storm events are approximately 5.7 cfs and 13.4 cfs, respectively. Post development runoff conditions for the same storm events were calculated to be 9.1 and 18.1 cfs. Therefore, the REP site development will result in an estimated net increase in surface water runoff of 3.4 cfs (10-year storm) and 4.7 cfs (100-year storm). Storm water runoff will be directed to storm water detention ponds located on-site at the REP and released to an unnamed tributary of Pleasant Grove Creek. Peak runoff flows will not cause a flooding hazard in the Pleasant Grove Creek drainage system. This tributary of Pleasant Grove Creek does not lie within the West Roseville Specific Plan and annexation area.

Under post-development conditions, the runoff that previously drained toward adjacent properties will be redirected on-site and collected. Future site grading will continue to drain runoff to the northeast of the property and towards the storm water detention ponds. Appendix 7-B contains the grading and drainage plan. Appendix 7-C is a discussion of the sizing criteria for the storm water detention ponds. According to City of Roseville staff, storm water detention is not desirable at the REP site. The City would rather see the REP's runoff released into the Pleasant Grove Creek drainage system in advance of peak runoff from developed areas upstream in the city. For this reason, the storm water detention ponds would function more to capture and control salts and petroleum products than for flood control.

Sound engineering practices and BMPs will be used in the project design and operation. Therefore, no significant impacts to surface water quality or quantity are expected during construction or operation of the proposed facility. The site, in addition, will operate under an NPDES permit for industrial operation.

8.15.2.6 Groundwater

REP site activities will have very little potential to impact groundwater resources in the project area. The depth to groundwater beneath the site is estimated to be more than 100 feet below ground surface (DWR 2003). Storm water runoff from the hazardous materials containment portions of the plant site will be discharged through an oil-water separator, and then to the cooling basin, and then to on-site detention basins. No releases of contaminated storm water from the plant site operation are expected. Storm water runoff from other portions of the plant site will be directed by surface flow through a collection of catch basins and ditches to on-site storm water detention ponds. No underground chemical storage tanks are proposed at the project site. Solid wastes and small amounts of hazardous waste that are generated will be properly accounted for, tracked, handled, and disposed of off-site using licensed transporters. No significant impacts to the beneficial use of groundwater are expected from the construction or operation of the REP project.

The project will include sanitary facilities designed to handle the plant's domestic sewage needs. Sanitary wastes from the REP will be conveyed via pipeline to the PGWWTP. Because no septic tanks are proposed at the plant site and all sanitary waste waters are disposed offsite, no potential adverse impacts to groundwater sources are anticipated.

Groundwater will be used for domestic purposes only and will not be used for power plant cooling. Recycled water from PGWWTP will be the sole water source for cooling and process makeup. Domestic groundwater demands by the REP are expected to be approximately 0.5 gpm, on average (less than 1 acre-foot annually). Groundwater will be pumped from an existing on-site well. The City has tested the well and confirmed that it meets quality and pressure standards for use as a potable water source by the REP. The City of Roseville's Water Forum Agreement (WFA) allows the City use of a maximum of 6,500 afy, which is also the pumping capacity of the wells in the City of Roseville. Additionally, in the West Roseville Specific Plan Draft EIR, 6,500 afy is projected to be the sustainable groundwater extraction amount. Based on this information and the fact that the groundwater usage by the REP will be less than 1 afy, it is expected that the REP will use less than 0.02 percent of the groundwater resources allotted to the City of Roseville, a negligible amount. Furthermore, since the City of Roseville's water management plan states that groundwater will only be used in the City during dry years, as defined by the WFA, the amount of groundwater the REP will use is would amount to a less than significant effect on groundwater resources.

The REP plans to include an on-site storage tank as a backup water supply to be used if that the PGWWTP supply is unavailable due to equipment failure or other reasons. Because the PGWWTP is a new facility and is located very near the project, there is less chance of pipeline failure causing a disruption of service. Failure of the water supply is, therefore, unlikely to occur.

Once the City has installed a 24-inch water main in the portion of West Roseville near the project site, the project will access potable water for on-site domestic uses through the City's main.

8.15.2.7 Compliance with State Water Policies

Power Plant Cooling Policy (SWRCB Resolution 75-58)

In 1975, the State Water Resources Control Board (SWRCB) issued a policy on the use and disposal of inland surface waters used for power plant cooling (Resolution No. 75-58). The policy contains the following principles that are applicable to this project:

- The order of priority of water sources for power plant cooling was established subject to site specifics such as environmental, technical, economic, and feasibility considerations. The priority order for water sources is the following: 1) waste water being discharged to the ocean, 2) ocean water, 3) brackish water from natural sources or irrigation return flows, 4) inland waste waters of low TDS, and 5) other inland waters.
- The use of inland waters for power plant cooling must analyze the impact on Delta outflow and Delta water quality objectives.
- The discharge of blowdown water from cooling towers must not cause a violation of water quality objectives or waste discharge requirements established by Regional Boards.

The REP project will not apply for new water rights. Therefore SWRCB Resolution No. 75-58 will not apply to the REP facility.

California Water Conservation Policy and State Water Resources Control Board Resolution 77-1

California Water Code, Section 461 and SWRCB Resolution 77-1 require all water users to conserve and reuse available water supplies to the maximum extent possible. The REP will comply with these water conservation policies. The project has been designed to reduce cooling water requirements and discharge of waste water. Design considerations include the selection of a very efficient combined cycle system that requires less heat rejection than conventional steam cycle systems, and cooling towers that use less cooling water than once-through cooling systems. Water conservation measures include using recycled water for cooling and process. Although the REP design incorporates a ZLD system to eliminate the discharge of the process wastewater, water conservation is a secondary benefit of the ZLD system.

Porter-Cologne Water Quality Control Act/State Water Resources Control Board

The Porter-Cologne Water Quality Control Act of 1972 establishes nine Regional Water Quality Control Boards under the State Water Resources Control Board. These regional boards were set up to control pollutant discharges to surface and groundwater resources. The U.S. Environmental Protection Agency (EPA) issues an NPDES permit for discharge of pollutants into surface and groundwater resources. The NPDES permit program is administered by the State Water Resources Control Board and is enforced by the regional boards. For the REP, storm water discharge from the storm water detention ponds into Pleasant Grove Creek will require that an SWPPP be submitted to the CVRWQCB and that RE obtain an NPDES permit for industrial operation.

California Safe Drinking Water and Toxic Enforcement Act (Proposition 65)

The Safe Drinking Water and Toxic Enforcement Act prohibits the discharge of any substances known to cause cancer and birth defects into sources of drinking water. Discharged water from the REP will not be released into drinking water sources. Discharged water will follow NPDES permit requirements and storm water pollution prevention standards.

8.15.2.8 West Roseville Not Annexed

If the West Roseville annexation is denied or delayed indefinitely, the only significant differences in the project design would be the following: 1) natural gas pipeline alternative B1 would be the preferred route and 2) RE would construct a double-circuit 60 kV transmission line to connect the project with the Fiddyment Receiving Station. The route for this transmission line would be the same as for gas pipeline route B1. Beginning at the REP site, the route would run south, then east on Phillip Road. It would then turn south on Fiddyment Road and run to the Fiddyment Receiving Station. These design differences would lead to no significant changes in the use of water resources.

8.15.3 Proposed Mitigation Measures

This section presents mitigation measures proposed to reduce impacts to water resources in areas affected by the proposed project, including the plant site and ancillary facilities.

- Implement BMPs designed to minimize soil erosion and sediment transport during construction of the plant site and project corridor features. Design appropriate erosion and sediment controls for slopes, catch basins, culverts, stream channels, and other areas prone to erosion.
- Conduct operations at the plant site in accordance with the EPA's Storm Water Phase I Final Rule (for construction activities disturbing 1 acre or more). Design and implement the BMPs to prevent or control pollutants potentially associated with the operation of the plant from entering storm water sewers.
- Perform refueling and maintenance of mobile construction equipment only in designated lined and/or bermed areas located away from stream channels. Prepare and implement spill contingency plans in areas where they are appropriate.
- During construction of pipelines implement BMPs to control soil erosion.
- Prepare and submit a Title 22 Engineer's Report to the State DOHS and CVRWQCB to ensure safe use of recycled water for the cooling water. Adhere to Reclamation Requirements issued by the CVRWQCB.
- Prepare and submit an SWPPP to ensure quality of discharged storm water. Obtain concurrence with the CVRWQCB for the SWPPP.
- Fence the boundaries of the 50-acre construction site that are located near off-site wetland and vernal pool areas where these resources are located adjacent to the construction laydown and worker parking areas to avoid any potential indirect impacts (see also Section 8.2, Biological Resources).

The mitigation measures proposed are prescribed by storm water and erosion control management programs mandated under the NPDES permitting system. These programs have been in place for a number of years and the prescribed measures have proven effective. Under the General NPDES Permit for Construction, for example, various specific measures are prescribed, and a program of monitoring is required. Table 8.15-5 lists applicable laws, ordinances, regulations, and standards. Table 8.15-6, lists the monitoring measures required under the General NPDES construction permit program. Table 8.15-7 lists the water quality testing methods prescribed for monitoring water quality in association with these programs. The programs are 90 percent effective or better, have been in place, as mandated by the Clean Water Act, for a number of years and have proven effective.

8.15.4 Cumulative Impacts

The REP will not cause or contribute to cumulative impacts on water resources. Good engineering practices and BMPs will be used in the project design and operation. Process waste water will be eliminated through a ZLD. Storm water discharge will adhere to an SWPPP and CVRWQCB and local agency water quality standards. No significant impacts to surface water or groundwater quality are expected during construction or operation of the project.

West Roseville may be annexed by the City of Roseville and will be developed over 15 years under the West Roseville Specific Plan (WRSP). As part of the City, the WRSP will use the City's domestic water supply. No cumulative impacts are expected to groundwater resources initially, since REP will use an on-site well for the relatively small quantity of water required for potable water supply. Once the City's water main is extended in West Roseville near the project site, the project will connect with the City's system for potable water. The amount of water the REP needs to meet the project's potable needs is small enough so that the water demands of the REP and West Roseville cumulatively would not cause a significant adverse impact.

8.15.5 Applicable Laws, Ordinances, Regulations and Standards

Construction and operation of the proposed project, including pipelines and ancillary facilities will be conducted in accordance with all LORS related to water resources, as discussed below.

8.15.5.1 Federal

Clean Water Act

The Clean Water Act (CWA), as amended, Title 40 CFR Parts 112, 122, and 125, strives to protect waters of the United States. by restoring and maintaining the chemical, physical and biological properties of these waters. The CWA authorizes the EPA to regulate discharges of waste water and storm water into surface waters by using NPDES permits and pretreatment standards. These permits are implemented at the state level by the State Water Resources Control Board (SWRCB). The REP will prepare and submit an SWPPP to the CVRWQCB for storm water discharge to Pleasant Grove Creek. The REP will be required to obtain an NPDES General Industrial Storm Water Permit under the State Water Quality Control Board Order No.91-B-DWQ (as amended by the Water Quality Order No. 02-01-DWQ), General Permit No. CAS000001 (General Permit).

NPDES General Industrial Storm Water Permit

The CVRWQCB NPDES permit for industrial storm water discharges meets all applicable provisions of Sections 301 and 401 of the Clean Water Act (CWA). These provisions require control of pollutant discharges using the best available technology economically achievable (BAT) and the best conventional pollutant control technology (BCT). The General Industrial Storm Water permit has three main components: 1) Preparation of an SWPPP, 2) the development of a monitoring program and 3) permit compliance responsibility.

Initially, the REP will submit a Notice of Intent (NOI) for coverage under this General Permit and will develop an SWPPP in accordance with Section A of the permit. The REP, as a new discharger, will be required to file a NOI at least 14 days before beginning operations. A Waste Discharger Identification Number (WDID) will be issued within 10 business days after the CVRWQCB receives the completed NOI package (which will include the original signed NOI, vicinity map, and fee).

Table 8.15-5. Applicable laws, ordinances, regulations, and standards.

LORS	Applicability	REP Project Conformance
Federal:		
Clean water Act (CWA) Sections 307, 318, 401, 402 (p), 404, and 405	Regulates discharges of wastewater and storm water in order to protect nation's waters. Applies to storm water runoff discharge and construction discharge into waters of the United States.	• Storm water discharges are subject to the NPDES General Industrial Storm Water discharge permit. This permit is obtained from the CVRWQCB. Under this permit, REP will prepare a Storm Water Pollution Prevention Plan (SWPPP), and a monitoring program; permit compliance responsibility is required. Tables 8.15-6 and 8.15-7 outline monitoring and analyses that will be completed as a part of the permit. • Construction discharge into waters of the U.S. will require a Nationwide permit from the U.S. Army Corps of Engineers. • Wetland fills larger than a certain acreage require an individual permit under Section 404 of the CWA, and a water quality certification from the Regional Water Control Board under Section 401 of the CWA.
Title 40 of the U.S. Code of Federal Regulations, part 423.17	Pretreatment standards for cooling tower blowdown for new sources.	Will not apply to the REP, because all cooling tower blowdown will be eliminated through the Zero Liquid Discharge system.
Resource Conservation and Recovery Act	Controls storage, treatment, disposal of hazardous waste.	Hazardous waste will be handled and stored in conformance with Subtitle C. Section 8.13.4. On-site conditioning, treatment, discharge systems will be monitored under the NPDES permitting process.
Comprehensive Environmental Response, Compensation and Liability Act	Places responsibility for releases of hazardous materials into the environment.	Obtain waste generator number and waste discharge/disposal permits as appropriate.
California:		
State Water Resources Control Board	Regulates industrial storm water discharges during construction of the facility.	• As part of EPA Storm Water Phase I Ruling, an NPDES permit will be required and a SWPPP will be prepared for the Regional Water Quality Control Board. • During construction, the following specific measures will be implemented to prevent storm water pollution and to minimize potential sediment runoff during construction:

Table 8.15-5. Applicable laws, ordinances, regulations, and standards.

LORS	Applicability	REP Project Conformance
		• Use silt fencing to retain sediment on the project site. • Provide temporary cover of disturbed surfaces to help control erosion during construction • Provides permanent cover to stabilize disturbed surfaces after construction has been completed.
Porter-Cologne Water Quality Control Act	Controls discharge of waste water to the surface and groundwaters of the state.	Not applicable to cooling tower discharge since this is eliminated by the ZLD.
California Water Code Section 461 & SWRCB Resolution 77-1	Encourages water conservation and use of recycled water.	• Effective practices for water use and conservation were engineered into the facility. • PGWWTP water will be used as the primary non-potable water supply for the REP.
Title 22 of the California Code of Regulations	Provides requirements for the use of recycled water in cooling towers.	The REP will conform to regulations. Specifically, a Title 22 Engineer's Report will be prepared. The report will contain a description of the design of the proposed recycled water use system. The Title 22 report will also contain a contingency plan, which will ensure that no untreated or inadequately treated wastewater will be delivered to inappropriate areas.
Local:		
Various	Addresses issues such as drainage, erosion control, hazardous material spill control, facility siting in flood zones, storm water discharge, and discharge of wastewater to the municipal sewer system.	The project will comply with the General Plan of the City of Roseville and all applicable ordinances.

Table 8.15-6. Monitoring activities required by the General NPDES Industrial Storm Water Permit.

Activity	Description	Permit Section	Location	Frequency	Restrictions
Quarterly inspections	Visually inspect all areas of industrial activity and associated potential pollutant sources. Inspect all authorized non-storm water discharges and look for the presence of unauthorized non-storm water discharges.	A.8.B.IX	All areas of industrial activity and all drainage areas	Once per quarter	Within 16 weeks, during daylight hours, days without precipitation, and scheduled facility operating hours.
Annual Comprehensive Site Compliance Evaluation (ACSCE)	Review all records, visually inspect all potential pollutant sources, review and evaluate all BMPs and revise as necessary, visually inspect equipment needed to implement SWPPP, prepare evaluation report.	A.9	NA	Annually	Within 8-16 months of prior ACSCE
Monthly storm water visual observations	Visually observe storm water discharge quality. Record and maintain observations, dates, locations, and responses.	B.4	All storm water discharge locations	Once per month (October-May)	During first hour of discharge, daylight hours, facility operating hours, and preceded by 3 working days without discharge.
Documentation of non-discharging storm events	Document storm events that do not produce a discharge but that occur before a monthly visual observation.	B.4.e	NA	Daily (October-May)	Only document events during each month prior to performing monthly storm water visual observations
Drainage area inspections	Inspect all storm water drainage areas for spills and leaks.	B.3	All storm water drainage areas	Prior to anticipated storm events	None
Storm water sample collection	Collect samples of storm water discharges and submit for laboratory analyses.	B.5	All storm water discharge locations	Twice annually (October-May)	First and second storms of wet season, during first hour of discharge and scheduled facility operating hours preceded by 3 working days without discharge
Storm water storage and containment area inspections	Visually inspect storm water storage and containment areas.	B.4.D	Storm water storage and containment areas	Monthly	None

Source: State Water Resources Control Board. Division of water quality. http://www.swrcb.ca.gov

Once the NOI is received, the SWPPP will be implemented. Table 8.15-6 summarizes specific NPDES Industrial Storm Water Permit monitoring requirements and Table 8.15-7 presents storm water analyses (and EPA protocols) that will be included in the SWPPP and followed for the REP. The monitoring activities and testing methods required under these permits will ensure that the mitigation measures will

Table 8.15-7. Recommended methods, General Industrial NPDES Storm Water Permit.

Parameter	Test Method	Detection Limit	Reporting Units
pH*	Field Test with Calibrated Paper and/or EPA 9040	1-14	NA
Total Suspended Solids (TSS)*	EPA 160.2 SM2540-D	1.0	mg/L
Specific Conductance (S/C)*	EPA 120.1 SM 2510-B	1.0	µohms/cm
Total Oil & Grease (TOG)*	EPA 413.2 EPA 1664	1.0	mg/L
Total Organic Carbon(TOC)*	SM 5310C	0.01	mg/L
Iron**	EPA200.7	0.05	mg/L

* Required analyses
** Additional analysis required for Steam Electric Power Generating Facilities

be effective and that the project will not cause any significant adverse impacts to the surface water quality in the project area.

In accordance with reporting requirements of the General Permit, the REP will conduct one comprehensive site evaluation in each reporting period (July 1 through June 30). Evaluations will include 1) a review of all visual observation records, inspection records and sampling and analysis results; 2) a visual inspection of all areas of industrial activity associated with potential pollutant sources; and 3) a review and evaluation of all BMPs for each area of industrial activity.

40 CFR 423.17 Pretreatment Standards for New Sources

To address indirect discharges from industries to publicly owned treatment works (POTW), the EPA through its CWA authority established the National Pretreatment Program as a component of the NPDES Permitting Program. The National Pretreatment Program requires industrial and commercial dischargers to treat or control pollutants in their wastewater before discharge to the POTW. The federal pretreatment standards for cooling tower blowdown from new sources (40CFR 423.17) would not apply to the REP, since all discharge from the cooling system will be eliminated through the ZLD facility.

Resource Conservation and Recovery Act

The Resource Conservation and Recovery Act (RCRA) of 1976 (40 CFR Part 260 et seq.) seeks to prevent surface and groundwater contamination, sets guidelines for determining hazardous wastes, and identifies proper methods for handling and disposing of those wastes. Appropriate RCRA guidelines and procedures will be followed with respect to disposal of any hazardous wastes. Section 8.14 (Waste Management) includes additional information of hazardous materials handling. The REP will comply with any Phase I requirements.

Porter-Cologne Water Quality Control Act of 1972

The Porter-Cologne Water Quality Control Act of 1972 established jurisdiction of the nine RWQCBs to control pollutant discharges to surface and groundwaters. The RWQCB is the local enforcement agency overseeing the REP's SWPPP. The RWQCB will issue a waste discharge permit for project water that is to be discharged from the site.

Comprehensive Environmental Response, Compensation, and Liabilities Act

The Comprehensive Environmental Response, Compensation, and Liabilities Act of 1980 (CERCLA) (40 CFR Parts 300 to 355) places responsibilities on the government and industry for the release, or threatened release, of hazardous materials into the environment. All chemicals will be stored, handled, and used in accordance with applicable laws, ordinances, regulations, and standards to minimize the potential for releases to the environment. Chemical storage and chemical feed areas will be designed to contain leaks and spills. Chemicals will be stored in appropriate chemical storage facilities.

8.15.5.2 State

California Public Resources Code/California Environmental Quality Act

The California Environmental Quality Act (CEQA) Guidelines (CEQA Appendix G) define water resources impacts.

State Water Resources Control Board

In 1990, EPA promulgated rules establishing Phase I of the NPDES storm water program. Phase I addresses, among other discharges, discharges from large construction activities disturbing 1 acre or more of land.

Under the Phase I Final Rule, operators of Phase I construction sites will be required to obtain an NPDES permit and to implement practices to minimize pollutant runoff. For the Phase I construction program, program requirements are not fully defined in the rule, but rather in the NPDES permit issued by the NPDES permitting authority.

California Water Code, Section 461 & SWRCB Resolution 77-1—Resolution 77-1 outlines the State of California's policy with respect to water conservation and reclamation. The resolution encourages water conservation and the use of recycled water. The REP will comply with this resolution by using recycled water from the PGWWTP for non-potable uses. Average and peak water supply requirements of 0.72 and 1.77 mgd will be met using the recycled water supply.

Title 22 Code of Regulations, Sections 60313 to 60316—the Department of Health Services (DHS) established water quality standards and treatment criteria for water recycling under Title 22, Chapter 4 of the California Code of Regulations (CCR). Title 22 also specifies the reliability and redundancy for each recycled water treatment and use operation. For recycled wastewater piping, DHS has requirements for preventing backflow of recycled water into the potable water supply system and for avoiding cross-connection between recycled and potable water supply systems.

There will be no cross-connections of the REP recycled water and potable water systems. The REP will also provide equipment labels, signs, and notice for those pipelines carrying recycled water.

RE will prepare an Engineer's report in accordance with Title 22, Section 60323, which will include the following information:

- A detailed description of the intended use of the recycled water
- Plans and specifications of the recycled water system
- Methods to be used by the City of Roseville to ensure that the installation and operation of the dual plumbed system will not result in cross-connections between the recycled water piping system and the potable water piping system. All recycled wastewater lines and valve boxes will be clearly identified to distinguish between recycled wastewater and potable water system.

The REP will also designate an on-site water supervisor who will have responsibility for the protection of the potable water system. The water supervisor will be responsible for the installation, operation and maintenance of the recycled wastewater and potable water systems; prevention of potential hazards; and implementation of Title 22 guidelines with the DHS. Authorization of REP piping changes or additions to the potable or recycled wastewater systems will be subject to review and approval by the REP water supervisor.

Safe Drinking Water and Toxic Enforcement Act (Proposition 65)

The Safe Drinking Water and Toxic Enforcement Act (Proposition 65) prohibits the discharge of any substance known to cause birth defects or cancer into sources of drinking water.

8.15.5.3 Local

Local ordinances typically address water-related issues such as drainage, erosion control, hazardous material spill control, flood zone construction, well construction, storm water discharge, and discharge of waste water to the municipal sewer system.

City of Roseville City Code

The City of Roseville Municipal Code regulates discharges to the City's sanitary sewer system. The City will require the REP to obtain an Industrial Wastewater Discharge Permit for discharge to the sanitary sewer system and the PGWWTP. The Industrial Wastewater Discharge Permit issued by the City of Roseville (Municipal Code Chapter 14.26 Industrial Wastewater) will also include a statement of duration, statement of non-transferability, self-monitoring requirements, a statement of applicable civil and criminal penalties, notification of spills, notification of significant change in discharge, notification of violation/resample requirement, and a sludge discharge control plan requirement. The project will also require a recycled water use permit.

Other local ordinances address water-related issues such as drainage, erosion control and storm water discharge. An ordinance for land grading has been established by the City of Roseville (Ordinance 3000, Chapter 16.20, Grading). This ordinance establishes minimum requirements for all grading work completed within the city.

8.15.5.4 LORS Compliance Strategy

Within the specified regulatory framework, the REP will comply with federal, state, and local LORS governing water resources. A conformance summary is provided in Table 8.15-5.

A Pollution Prevention Plan and a Monitoring Plan will be implemented for REP operation. The California Stormwater Quality Association Stormwater Best Management Practice Handbook, Industrial and Commercial (January 2002) will be used to provide general measures for control of erosion/sedimentation, discharge velocity, and other water quality concerns.

An SWPPP will be developed before submitting an NOI with the State Water Resources Control Board for storm water discharge. The SWPPP will be implemented when the REP facility begins operation. A water quality monitoring program will be developed and implemented concurrently with the commencement of industrial activities.

At least 30 days before starting operations, the REP will file an NOI to comply with the terms of the General Permit to discharge storm water associated with industrial activities.

8.15.6 Involved Agencies and Agency Contacts

Regulatory agencies and agency contacts related to water resources for the REP Project are summarized in Table 8.15-8.

8.15.7 Permits Required and Permit Schedule

A schedule for agency required permits related to water resources is summarized in Table 8.15-8. Information required to obtain each permit is also included. Agencies will be contacted to obtain the necessary permits at the appropriate time. The required permits and the permit schedules are provided in Table 8.15-9.

Table 8.15-8. Involved agencies and agency contacts.

Agency/Address	Contact/Telephone No.	Permit Requirement/Reason for Involvement
City of Roseville	Mr. Derrick Whitehead Director, Environmental Utilities Phone: (916) 774-5770	Will-serve letter for PGWWTP recycled water Municipal Storm Water Management Program Recycled Water Permit
Central Valley Regional Water Quality Control Board	Mr. Jacque Kelley Water Quality Engineer Phone: (916) 255-3064	Storm Water Pollution Prevention Plan and Monitoring Plan Water Quality Certification
State Water Resources Control Board	Mr. Bruce Fujimoto Supervising WRC Engineer Phone: (916) 341-5523	NPDES Permit
California Department of Fish and Game	Mr. Banky Curtis Regional Manager (916) 358-2899	1601 Streambed Alteration Agreement
U.S. Army Corps of Engineers	Mr. Justin Cutler Phone: (916) 557-5258	Nationwide Permit

Table 8.15-9. Required permits and permit schedule.

Permit	Schedule
General NPDES for construction, Storm Water Pollution Prevention Plan, Notice of Intent: • Submit NOI, including facility information, receiving water information, implementation requirements, site map, and certification • Prepare an SWPPP • Prepare an SWMP	Submit NOI at least 30 days prior to beginning construction.
Title 22 Reclamation Requirements: • Sufficient information to show treatment and reliability commensurate with proposed use; no health hazard or nuisance • Contingency plans, supplemental supply • Monitoring plan • Transmission and distribution systems • Area uses, description and map • Wind data	Submit Engineer's Report 120 days prior to start of operation.
Army Corps of Engineers Nationwide Permit for construction	Apply concurrent with AFC filing
Army Corps of Engineers CWA Section 404 permit for wetland fill	Apply concurrent with AFC filing
Clean Water Act Section 401, Water Quality Certification	Apply concurrent with AFC filing
Grading and Excavation Permit:	30 days prior to start of construction activities
California Department of Fish and Game Streambed Alteration Agreement	Apply concurrent with AFC filing
City of Roseville Recycled Water use Permit	30 days prior to use

8.15.8 References

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Whitehead, Derrick. 2003. Personal communication with Derrick Whitehead, Department of Environmental Utilities, City of Roseville. July 28, 2003.

8.16 WORKER HEALTH AND SAFETY

This section outlines plans and programs that would be implemented at the Roseville Energy Park (REP) to protect the worker health and safety, during both construction and operation. During its construction, the project will provide short-term job opportunities for 114 workers on average and 206 workers at peak construction employment. During its operation, the REP is expected to employ approximately 25 people in full-time, on-site positions.

Due to the subject matter, this section follows a slightly different format than other sections in Chapter 8. Instead of a standard discussion of affected environment, followed by the project's environmental consequences and proposed mitigation measures for significant impacts, this section describes the plans and programs that are proposed to protect worker health and safety during construction and operation, then follows with lists of permits required for construction and operation and their issuing agencies. The contractors selected for this project and the operators of the facility will develop specific plans and programs as described.

The analysis presented in this section meets all requirements of the CEC and CAL-OSHA. Section 8.16.1 provides an overview of the proposed REP work sites and an explanation of the hazards that may conceivably be encountered during construction and routine operations. Section 8.16.2 outlines the health and safety programs to be implemented at the REP. A Fire Protection and Prevention Plan is one of these programs, and Section 8.16.2 discusses the proposed onsite fire suppression system to be used during construction and operation of the REP. Section 8.16.3 outlines the safety training programs that Roseville Electric will use to educate workers on hazards and hazard controls. Section 8.16.4 presents applicable laws, ordinances, regulations, and standards (LORS). Section 8.16.5 references permit requirements and the schedule to obtain those permits; Section 8.16.6 references agency contacts. At this point, many of the programs presented in Section 8.16 are generic. As the design of the facility proceeds, however, these programs will be updated to reflect current conditions and knowledge. Implementing the programs outlined here will prevent impacts to worker health and safety. No additional mitigation measures will be required.

8.16.1 Workplace Description

Workers will potentially be exposed to hazards during construction and routine operations of the REP. Section 2.2 of this AFC contains detailed information regarding the power plant layout, conceptual design, and operation. Section 2.3 discusses facility safety design and Section 2.4 discusses facility reliability. These sections are also relevant to worker health and safety.

Table 8.16-1 provides a general hazard analysis that identifies the anticipated hazards to be encountered during construction of the REP. This table also lists health and safety program components that will be implemented to control each hazard. The project's Health and Safety Officer can expand this hazard analysis to greater detail and implement appropriate hazard controls as each task is scheduled for implementation.

Table 8.16-2 provides a hazard analysis that identifies the anticipated hazards and hazard controls for the operation of the REP during normal operations after construction. While the types of hazards identified in this table are similar to those identified for construction (Table 8.16-1), workers may encounter these same hazards under different situations during operation. There is considerable duplication between the

tables for this reason. A major component of a safety program for normal operations is the development of standard operating procedures that incorporate the elements of the hazard analysis to assure that workers implement the safety measures.

Table 8.16-1. Construction hazard analysis.[1]

Activity	Hazard	Control
Heavy equipment use	Employee injury and property damage from collisions between people and equipment	Heavy Equipment Safety Program
Forklift operation	Same as heavy equipment	Forklift operator training
Trenching and excavation	Employee injury and property damage from the collapse of trenches and excavations	Trenching and Excavation Safety Program Use of Excavation Permits per Cal-OSHA
Working at elevated locations	Falls from same level and elevated areas	100% Fall Protection Program Scaffolding Safety Program
Use of cranes or derricks	Property damage from falling loads Employee injuries from falling loads Injuries and property damage from contact with crane or derrick	Obtain Crane permits as required per Cal-OSHA Hoisting and Rigging Safety Program
Working with flammable and combustible liquids	Fire	Flammable and Combustible Liquid Storage and Handling program Fire Prevention Program Fire Protection Program Housekeeping Policy and Program
Working with hazardous materials and hazardous waste	Employee injury due to ingestion, inhalation, dermal contact	HAZWOPER[2] training, as required for hazardous wastes Hazard Communication Program (hazardous substances and information training)
Hot work (including cutting and welding)	Employee injury and property damage from fire Exposure to fumes during cutting and welding Ocular exposure to ultraviolet and infrared radiation during cutting and welding	Hot Work Permit Program Respiratory Protection Program Industrial Hygiene Monitoring Program Personal Protective Equipment (PPE) Program Housekeeping Policy and Program
Troubleshooting and maintenance of plant systems and general construction activities	Employee injury and property damage from contact with hazardous energy sources (electrical, thermal, mechanical, etc.)	Hazardous Energy Control (Lockout/Tagout) Program
Working on electrical equipment and systems	Employee contact with live electricity	Electrical Safety Program PPE Program Hazardous Energy Control (Lockout/Tagout) Program
Confined space entry	Employee injury from physical and chemical hazards	Permit Required Confined Space Entry Program

Table 8.16-1. Construction hazard analysis.[1]

Activity	Hazard	Control
General construction activities	Employee injuries from hand and portable power tools	Hand and Portable Power Tool Safety Program PPE Program
General construction activities	Employee injury and property damage from inadequate walking and work surfaces	Housekeeping Policy and Program
General construction activities	Employee overexposure to occupational noise	Hearing Conservation Program PPE Program
General construction activities	Employee injury from improper lifting and carrying	Safe Lifting Program—Provide adequate material handling equipment
General construction activities	Employee injury and property damage from unsafe driving	Safe Driving Program
General construction activities	Employee overexposure to hazardous gases, vapors, dusts, and fumes	Hazardous Substances and Information Training Program Respiratory Protection Program PPE Program Industrial Hygiene Exposure Monitoring
Construction, testing, troubleshooting, maintenance and repair of high pressure steam and air systems	Employee injury and property damage due to failure of pressurized system components or unexpected release of pressure	Installation of proper relief valves and institution of a relief valve maintenance and testing program Proof testing of pressure system components Pressure Vessel Permit to Operate (Cal-OSHA) as required by 8 CCR 450 Hazardous Energy Control (Lockout/Tagout) Program Line Breaking Safety Program

[1] The hazard and hazard controls provided are generic to construction activities. As the design and construction of the facility proceeds, these analyses will be updated to reflect current conditions and knowledge.

[2] HAZWOPER = Hazardous Waste Operation Emergency Response

Table 8.16-2. Operations hazard analysis.[1]

Activity	Hazard	Control
Heavy equipment use	Employee injury and property damage from collisions between people and equipment	Heavy Equipment Safety Program
Working at elevated locations	Falls from same level and elevated areas	100% Fall Protection Program Scaffolding Safety Program

Table 8.16-2. Operations hazard analysis.[1]

Activity	Hazard	Control
Working with flammable and combustible liquids	Fire	Flammable and Combustible Liquid Storage and Handling program Fire Prevention Program Fire Protection Program Housekeeping Policy and Program
Working with hazardous materials and hazardous waste	Employee injury due to ingestion, inhalation, dermal contact	HAZWOPER[2] training, as required for hazardous wastes Hazard Communication Program (hazardous substances and information training)
Hot work (including cutting and welding)	Employee injury and property damage from fire Exposure to fumes during cutting and welding Ocular exposure to ultraviolet and infrared radiation during cutting and welding	Hot Work Permit Program Respiratory Protection Program Industrial Hygiene Monitoring Program Personal Protective Equipment (PPE) Program Housekeeping Policy and Program
Troubleshooting and maintenance of plant systems and general operation activities	Employee injury and property damage from contact with hazardous energy sources (electrical, thermal, mechanical, etc.)	Hazardous Energy Control (Lockout/Tagout) Program
Working on electrical equipment and systems	Employee contact with live electricity	Electrical Safety Program PPE Program Hazardous Energy Control (Lockout/Tagout) Program
Confined space entry	Employee injury from physical and chemical hazards	Permit Required Confined Space Entry Program
General operation activities	Employee injuries from hand and portable power tools	Hand and Portable Power Tool Safety Program PPE Program
General operation activities	Employee injury and property damage from inadequate walking and work surfaces	Housekeeping Policy and Program
General operation activities	Employee overexposure to occupational noise	Hearing Conservation Program PPE Program
General operation activities	Employee injury from improper lifting and carrying	Safe Lifting Program - Provide adequate material handling equipment
General operation activities	Employee injury and property damage from unsafe driving	Safe Driving Program
General operation activities	Employee overexposure to hazardous gases, vapors, dusts, and fumes	Hazardous Substances and Information Training Program Respiratory Protection Program PPE Program Industrial Hygiene Exposure Monitoring

Table 8.16-2. (continued.)

Activity	Hazard	Control
Operation, testing, troubleshooting, maintenance and repair of high pressure steam and air systems	Employee injury and property damage due to failure of pressurized system components or unexpected release of pressure	Installation of proper relief valves and institution of a relief valve maintenance and testing program Proof testing of pressure system components Pressure Vessel Permit to Operate (Cal-OSHA) as required by 8 CCR 450 Hazardous Energy Control (Lockout/Tagout) Program Line Breaking Safety Program

[1] The hazard and hazard controls provided are generic to operational activities. As the design and construction of the facility proceeds and routine operations are initiated, these analyses will be updated to reflect current conditions and knowledge.

[2] HAZWOPER = Hazardous Waste Operation Emergency Response

8.16.2 Health and Safety Programs

During construction of the REP, a number of programs will be implemented by the selected contractor that are designed specifically to mitigate hazards and, in accordance with applicable regulations, to protect the safety and health of the workers. Because Roseville Electric will own and operate the REP, they will be responsible for implementing the applicable safety programs to protect workers at the REP site during operations, per Cal-OSHA regulations. The following sections outline the content of these construction and operations programs.

8.16.2.1 Construction Health and Safety Program

The key health and safety programs for project construction include:

- Injury and Illness Prevention Plan
- Fire Protection and Prevention Plan
- Personal Protective Equipment Program
- Construction Written Safety Program

The following are brief outlines of these programs.

Injury and Illness Prevention Plan

This plan implements the requirements of the Cal-OSHA program, as specified in Title 8 CCR Section 1509, for construction and includes:

- Responsibility and authority for implementing the plan
- Safety and Health Policy
- Work rules and safe work practices
- Systems for ensuring that employees comply with safe work practices
- Employee communications protocols
- Identification and evaluation of workplace hazards
- Methods and/or procedures for correcting unsafe or unhealthy conditions, work practices and work procedures in a timely manner based on the severity of the hazards

- Specific safety procedures (e.g. fall protection, lockout/tagout, respiratory protection)
- Training and instruction

Fire Protection and Prevention Plan

This plan implements the requirements of the Cal-OSHA occupational health and safety program, as specified in Title 8 CCR Section 1920, and includes:

- General requirements
- Housekeeping requirements
- Employee alarm/communication system
- Portable fire extinguisher placement and operation
- Fixed fire fighting equipment placement and operation
- Fire control methods and techniques
- Hot work (welding, torches, cutting) safety procedures
- Flammable and combustible liquid storage methods
- Flammable and combustible liquids use procedures
- Techniques for dispensing and disposing of liquids
- Methods for servicing and refueling vehicles
- Fire prevention training programs and requirements

The permanent facility fire suppression system will be placed in service as early as practicable during construction. These fire suppression systems are described in Section 2.2.17.2; the fuel handling system is described in Section 2.2.6. Project staff will pay special attention to operations involving open flames, such as welding, and the use of flammable liquids and gases. Project personnel will maintain a fire watch during hazardous or hot work operations, using the appropriate class of extinguishers or other equipment. Site personnel will not be expected to fight fires past the incipient stage.

The on-site construction fire suppression system will include portable and fixed fire-fighting equipment. Portable fire fighting equipment will consist of fire extinguishers and small hose lines in conformance with Cal-OSHA and the Uniform Fire Code Appendices 3A and 3B. The contractor's safety representative will conduct periodic fire prevention inspections. The safety representative will inspect fire extinguishers monthly and replace them immediately if defective or in need of recharge. All fire-fighting equipment will be located to allow for unobstructed access to the equipment and will be conspicuously marked. Flammable materials will be stored in designated and approved storage areas and storage containers with adequate fire prevention systems available in these areas.

The Roseville City Fire Department will provide site fire suppression support. The closest fire station to the REP is Fire Station #5, located at 1567 Pleasant Grove Boulevard in Roseville, is approximately 3.8 miles from the REP site. The estimated response time to the REP site is approximately 8 to 10 minutes (Wagner 2003, personal communication). The contractor's safety representative will contact the Roseville City Fire Department prior to construction to brief the department on planned construction activities and to cooperatively review the project work plans.

Personal Protective Equipment Program

The REP's program to provide personal protective equipment to construction workers implements the requirements of Cal-OSHA Title 8 CCR Section 1514-1522 and 3401-3411 and includes:

- Head protection equipment (hard hats, etc.)
- Eye and face protection equipment (such as safety glasses)
- Body protection equipment
- Ear plugs
- Hand protection equipment (gloves)
- Foot protection equipment (steel-toed boots)
- Sanitation equipment (hand washing, etc.)
- Safety harnesses and lifelines
- Electric shock protection equipment
- Medical services and first aid equipment
- Respiratory protection equipment (respirators, supplied air equipment)

Construction Written Safety Program

Roseville Electric and its selected contractor will make written safety program procedures available to all workers and regulatory agencies during the life of the project. These written procedures include, but are not limited to:

Organization, Communication, and Record Keeping Procedures:

- Employer and employee rights and responsibilities under the health and safety programs
- Hazard communication program including hazardous waste control, hazardous material handling, and California Proposition 65
- Recordkeeping procedures
- Injury and accident reporting and recording procedures
- "Toolbox/tailgate" safety meetings
- Supervisor safety and health orientations
- Communications and information programs
- First aid and medical services
- Smoking policy

Work Safety and Emergency Response Programs and Procedures:

- Confined space entry and rescue procedures
- Electrical equipment safety procedures
- Lockout/tagout procedures
- Hearing conservation and noise control programs
- Bloodborne pathogens program

- Emergency action plan, including evacuation procedure
- Fire prevention and protection plan
- Medical record access procedures
- Housekeeping, material handling and storage procedures
- Welding and cutting procedures
- Crane and hoist procedures
- Project safe work procedures and standard operating procedures
- Subcontractor safety programs
- Security programs
- Excavation and trenching program
- Fall protection
- Inspections
- Sign, tags, and barricades

Equipment and Equipment Use:

- Personal protective equipment
- Respiratory protection program including fit-testing procedures.
- Work clothing
- Ventilation requirements
- Ergonomic precautions
- Compressed gas and air handling procedures
- Equipment inspection programs

8.16.2.2 Operation Health and Safety Program

After construction, the construction-phase safety and health program will transition into a program that is oriented towards routine project operation. Key health and safety programs that will be implemented by Roseville Electric for project operation are as follows, outlined below:

- Injury and Illness Prevention Program
- Fire Protection and Prevention Plan
- Emergency Action Plan
- PPE Program

Injury and Illness Prevention Program

The Injury and Illness Prevention Plan implements the requirements of the Cal-OSHA program as specified in Title 8 CCR Section 3203 for project operations and includes:

- Responsibility and authority for implementing the plan
- Safety and health Policy
- Work rules and safe work practices
- Systems for ensuring that employee comply with safe work practices

- Employee communication procedures
- Identification and evaluation of workplace hazards
- Methods and/or procedures for correcting unsafe or unhealthy conditions, work practices and work procedures based on the severity of the hazards
- Specific safety procedures (e.g. fall protection, lockout/tagout, respiratory protection)
- Training and instruction plans

Fire Protection and Prevention Plan

The Fire Protection and Prevention Plan implements the requirements of the Cal-OSHA program, as specified in Title 8 CCR Section 3221, and includes:

- General requirements
- Housekeeping requirements
- Employee alarm/communication system
- Portable fire extinguisher placement and operation
- Fixed fire fighting equipment placement and operation
- Fire control methods and techniques
- Hot work (welding, torches, cutting) safety procedures
- Flammable and combustible liquid storage methods
- Flammable and combustible liquids use procedures
- Techniques for dispensing and disposing of liquids
- Methods for servicing and refueling vehicles
- Fire prevention training programs and requirements

The on-site fire suppression system for project operation will include both portable and fixed fire-fighting equipment. Portable fire fighting equipment will consist of fire extinguishers and hose lines in conformance with Cal-OSHA and the NFPA. Roseville Electric's safety representative will conduct periodic fire prevention inspections. The safety representative will inspect fire extinguishers monthly and replace them immediately if defective or in need of recharge. All fire-fighting equipment will be located strategically to allow for unobstructed access to the equipment and will be conspicuously marked.

Flammable materials will be stored in designated and approved storage areas and storage containers with adequate fire prevention systems available in these areas. For the benefit of emergency responders, hazard warning (NFPA) signage will be posted in areas where hazardous materials will be stored in quantities that require a permit or where such quantities exceed those listed in the California Fire Code (CFC) Tables 105-A and 105-C. For the Safety of workers, NO SMOKING and NO WELDING signs will be posted in areas where flammable and combustible liquids are stored or dispensed.

Fixed fire suppression systems will include:

- Carbon dioxide (CO_2) which protect the combustion turbine-generator enclosure from fire. The system will have automatic fire detection sensors.

- Deluge type spray systems which provide fire protection for the steam turbine lube oil skid and combustion turbine lube oil skids.
- Fire hydrants and hose stations that will supplement the plant fire protection system.

As described in Section 8.16.2.1, the Roseville City Fire Department will provide offsite fire suppression support. The closest fire station to the REP is Fire Station #5, located at 1567 Pleasant Grove Boulevard in Roseville, is approximately 3.8 miles from the REP site. The estimated response time to the REP site is approximately 8 to 10 minutes (Wagner 2003, personal communication).

Personal Protective Equipment Program

This REP project's program to provide personal protective equipment to construction workers implements the requirements of Cal-OSHA Title 8 CCR Section 3401-3411 and includes:

- Head protection equipment (hard hats, etc.)
- Eye and face protection equipment (such as safety glasses)
- Body protection equipment
- Ear plugs
- Hand protection equipment (gloves)
- Foot protection equipment (steel-toed boots)
- Sanitation equipment (hand washing, etc.)
- Safety harnesses and lifelines
- Electric shock protection equipment
- Medical services and first aid equipment
- Respiratory protection equipment (respirators, supplied air equipment)

Emergency Action Plan

The Emergency Action Plan implements the requirements of Cal-OSHA Title 8 CCR Section 3220 and includes:

Organization of Emergency Response:

- Incident reaction responsibilities
- Incident Command System
- Position description assignments
- Response and notification plan (points of contact)
- Supervisor/Emergency Coordinator role
- Health and Safety Manager role

Communications:

- Documentation and recordkeeping procedures
- Public relations (news media, etc.) procedures
- Emergency notification list

- Emergency telephone number list
- Emergency equipment locations
- Plant plans and diagrams
- Accident reporting and investigation procedures
- Hazard communication procedures
- Spill containment and reporting procedures
- Releases into the environment and reporting

Hazard Characteristics:

- Hazardous waste or chemical spill
- Fire
- Earthquake
- Bomb threat
- Pressure vessel release

Emergency Response Procedures:

- Response procedures
- Site security measures
- Evacuation routes, assembly areas, and procedures
- Emergency plant shutdown procedures
- Fire response procedures
- Emergency medical treatment and first aid
- Reference procedures
- Decontamination procedures
- Evacuation plan
- Systems and shut down procedures
- Lockout/Tagout procedures
- Accidents involving serious injury and/or death

Standards and Requirements:

- Respiratory protection requirements
- Personal protective equipment requirements
- Sanitation requirements
- Inspection requirements

8.16.3 Safety Training Programs

For both construction and operation, Roseville Electric and the selected contractors will implement comprehensive training programs to ensure that employees recognize and understand how to protect

themselves from hazards. Table 8.16-3 provides an overview of training programs that will be provided to personnel.

8.16.4 Laws, Ordinances, Regulations and Standards (LORS)

The construction and operation of the REP will be conducted in accordance with all LORS. Tables 8.16-4 through 8.16-7 provide an overview of those LORS relating to worker health and safety.

Table 8.16-3. Construction and operation training program.

Training Course	Target Employees
Injury and Illness Prevention Plan	All
Emergency Action Plan	All
PPE Program	All
Heavy Equipment Safety Program	Employees working on, near, or with heavy equipment
Forklift Operator Training	Employees working on, near, or with forklifts
Trenching and Excavation Safety Program Use of Excavation Permits per Cal-OSHA	Employees involved with the conduct of trenching or excavation
100% Fall Protection Program	Employees required to use fall protection
Scaffolding Safety Program	Employees required to erect or use scaffolding
Hoisting and Rigging Safety Program	Employees responsible for the oversight or conduct of hoisting and rigging
Crane Safety Program	Employees supervising or performing crane operations
Flammable and Combustible Liquid Storage and Handling	Employees responsible for the handling and storage of flammable or combustible liquids or gasses
Hot Work Permits	Employees performing hot work
Hazardous Energy Control (Lockout/Tagout)	Employees performing lockout/tagout
Electrical Safety	Employees required to work on electrical systems and equipment
Permit Required Confined Space Entry	Employees required to supervise or perform confined space entry
Hand and Portable Power Tool Safety	All
Housekeeping Policy and Program	All
Hearing Conservation	All
Safe Lifting Program	All
Safe Driving Program	Employees supervising or driving motor vehicles
Hazardous Substances Program (Hazard Communication)	All
Pressure Safety	Employees supervising or working on pressurized systems or equipment
Line Breaking Safety	Employees performing general maintenance or working on pressurized systems or equipment
Relief Valve Maintenance and Testing	Employees performing maintenance or testing of relief valves
Respiratory Protection Program	All employees required to wear respiratory protection
Fire Prevention Program	All
Fire Protection Program	All
HAZWOPER/First Responder	Employees working around hazardous materials or waste

Table 8.16-4. Federal LORS.

Law, Ordinance, Regulation, or Standard	Applicability
Title 29 Code of Federal Regulations (CFR) Part 1910[1]	Minimum occupational safety and health standards for general industry in the United States
Title 29 CFR Part 1926 [1]	Minimum occupational safety and health standards for the United States construction industry

[1] Primary laws and regulations governing worker health and safety in California are provided in Table 8.16-6. These regulations are for reference and apply as referenced by California occupational safety and health regulations. Where a particular situation is not addressed by those regulations, the CFR will be consulted for guidance.

Table 8.16-5. State LORS

Law, Ordinance, Regulation, or Standard	Applicability
California Occupational Safety and Health Act, 1970	The Act establishes minimum safety and health standards for construction and general industry operations in the State of California
8 California Code of Regulations (CCR) 339	Requires list of hazardous chemicals relating to the Hazardous Substance Information and Training Act
8 CCR 450	Addresses the hazards associated with pressurized vessels
8 CCR 750	Addresses hazards associated with high pressure steam
8 CCR 1509	Addresses the requirements for Construction, Accident, and Prevention plans
8 CCR 1509 et seq. and 1684 et seq.	Addresses construction hazards, including head, hand, foot injuries, noise, and electrical shock
8 CCR 1528 et seq. and 3380 et seq.	Requirements for personal protective equipment
8 CCR 1597 et seq. and 1590 et seq.	Requirements addressing the hazards associated with traffic accidents and earth moving
8 CCR 1604 et seq.	Requirements for construction hoist equipment
8 CCR 1620 et seq. and 1723 et seq.	Addresses miscellaneous hazards
8 CCR 1709 et seq.	Requirements for steel reinforcing, concrete pouring, and structural steel erection operations
8 CCR 1920 et seq.	Requirements for fire protection systems
8 CCR 2300 et seq. and 2320 et seq.	Requirements for addressing low voltage electrical hazards
8 CCR 2395 et seq.	Addresses electrical installation requirements
8 CCR 2700 et seq.	Addresses high voltage electrical hazards
8 CCR 3200 et seq. and 5139 et seq.	Requirements for the control of hazardous substances
8 CCR 3203 et seq.	Requirements for operational accident prevention programs
8 CCR 3270 et seq. and 3209 et seq.	Requirements for evacuation plans and procedures
8 CCR 3301 et seq.	Requirements for addressing miscellaneous hazards including hot pipes, hot surfaces, compressed air systems, relief valves, enclosed areas containing flammable or hazardous materials, rotation equipment, pipelines, and vehicle loading dock ops.

Table 8.16-5. (continued.)

Law, Ordinance, Regulation, or Standard	Applicability
8 CCR 3360 et seq.	Addresses requirements for sanitary conditions
8 CCR 3511 et seq. and 3555 et seq.	Requirements for addressing hazards associated with stationary engines, compressors, portable, pneumatic, and electrically powered tools
8 CCR 3649 et seq. and 3700 et seq.	Requirements for addressing hazards associated with field vehicles
8 CCR 3940 et seq.	Requirements for addressing hazards associated with power transmission, compressed air, and gas equipment
8 CCR 5109 et seq.	Requirements address construction accident and prevention programs
8 CCR 5139 et seq.	Requirements for addressing hazards associated with welding, sandblasting, grinding and spray-coating
8 CCR 5150 et seq.	Requirements for confined space entry
8 CCR 5160 et seq.	Requirements for addressing hot, flammable, poisonous, corrosive, and irritant substances
8 CCR 5192 et seq.	Requirements for conducting emergency response operations
8 CCR 5194 et seq.	Requirements for employee exposure to dusts, fumes, mists, vapors, and gases
8 CCR 5405 et seq., 5426 et seq., 5465 et seq., 5500 et seq., 5521 et seq., 5545 et seq., 5554 et seq., 5565 et seq., 5583 et seq. and 5606 et seq.	Requirements for flammable liquids, gases and vapors
8 CCR 5583 et seq.	Requirements for the design, construction and installation of venting, dikes, valves, and supports
8 CCR 6150 et seq., 6151 et seq., 6165 et seq., 6170 et seq. And 6175 et seq.	Provides fire protection requirements
24 CCR 3 et seq.	Incorporates current addition of Uniform Building Code
8 CCR, Part 6	Provides health and safety requirements for working with tanks and boilers
California Fire Code (CFC) Article 74	Addresses the hazards associated with pressurized vessels
CFC Article 87	Addresses requirements for General Construction
La Follette Bill (Health and Safety Code Section 25500 et seq.)	Requires that every new or modified facility that handles, treats, stores, or disposes of more than the threshold quantity of any of the listed acutely hazardous materials prepare and maintain a Risk Management Plan
Health and Safety Code Sections 25500 through 25541	Requires the preparation of a Hazardous Material Business Plan which details emergency response plans for a hazardous materials emergency at the facility

Table 8.16-6. Local LORS.

Law, Ordinance, Regulation, or Standard	Applicability
Required by the local fire department:	
Specific hazardous material handling requirements	Provides response agencies with necessary information to address emergencies
Emergency Response Plan	Allows response agency to integrate the REP emergency response activities into any response actions
Hazardous Materials Business Plan	Provides response agency with overview of the REP hazardous materials storage quantities and storage locations
Risk Management Plan	Provides response agency with a detailed review of risks and hazards associated with RMP regulated substances located at the REP and the mitigation implemented to control the risks or hazards

Table 8.16-7. Applicable national consensus standards.

LORS	Applicability
Uniform Fire Code, Article 80	Addresses the prevention, control and mitigation of dangerous conditions related to storage, dispensing, use and handling of hazardous materials and information needed by emergency response personnel
National Fire Protection Association (NFPA) 10, Standard for Portable Fire Extinguishers	Requirements for the selection, placement, inspection, maintenance and employee training for portable fire extinguishers
NFPA 11, Standard for Low Expansion Foam and Combined Agent Systems	Requirements for installation and use of low expansion foam and combined agent systems
NFPA 11A, Standard for Medium and High Expansion Foam Systems	Requirements for the installation and use of medium and high expansion foam systems
NFPA 12, Standard on Carbon Dioxide Extinguishing Systems	Requirements for installation and use of carbon dioxide extinguishing systems
NFPA 13, Standard for Installation of Sprinkler Systems	Guidelines for the selection and installation of fire sprinkler systems
NFPA 13A, Recommended Practice for the Inspection, Testing and Maintenance of Sprinkler Systems	Guidance for the inspection, testing, and maintenance of sprinkler systems
NFPA 14, Standard for the Installation of Standpipe and Hose Systems	Guidelines for the selection and installation of standpipe and hose systems
NFPA 15, Standard for Water Spray Fixed Systems	Guidelines for the selection and installation of water spray fixed systems
NFPA 17, Standard for Dry Chemical Extinguishing Systems	Guidance for the selection and use of dry chemical extinguishing systems
NFPA 20, Standard for the Installation of Centrifugal Fire Pumps	Guidance for the selection and installation of centrifugal fire pumps
NFPA 22, Standard for Water Tanks for Private Fire Protection	Requirements for water tanks for private fire protection

Table 8.16-7. (continued.)

LORS	Applicability
NFPA 24, Standard for the Installation of Private Fire Service Mains and their Appurtenances	Requirements for private fire service mains and their appurtenances
NFPA 26, Recommended Practice for the Supervision of Valves Controlling Water Supplies	Supervision guidance for valves controlling water supplies
NFPA 30, Flammable and Combustible Liquid Code	Requirements for the storage and use of flammable and combustible liquids
NFPA 37, Standard for the Installation and Use of Stationary Combustion Engines and Gas Turbines	Fire protection requirements for the installation and use of combustion engines and gas turbines
NFPA 50A, Standard for Gaseous Hydrogen Systems at Consumer Sites	Fire protection requirements for hydrogen systems
NFPA 54, National Fuel Gas Code	Fire protection requirements for the use of fuel gases
NFPA 59A, Standard for the Storage and Handling of Liquefied Petroleum Gases	Requirements for the storage and handling of liquefied petroleum gases
NFPA 68, Guide for Explosion Venting	Guidance in the design of facilities for explosion venting
NFPA 70, National Electric Code	Guidance on the safe selection and design, installation, maintenance and construction of electrical systems
NFPA 70B, Recommended Practice for Electrical Equipment Maintenance	Guidance on electrical equipment maintenance
NFPA 70E, Standard for Electrical Safety Requirements for Employee Workplaces	Employee safety requirements for working with electrical equipment
NFPA 71, Standard for the Installation, Maintenance, and Use of Central Station Signaling Systems	Requirements for the installation, maintenance, and use of central station signaling systems
NFPA 72A, Standard for the Installation, Maintenance and Use of Local Protective Signaling Systems for Guard's Tour, Fire Alarm and Supervisory Service	Requirements for the installation, maintenance and use of local protective signaling systems
NFPA 72E, Standard on Automatic Fire Detection	Requirements for automatic fire detection
NFPA 72F, Standard for the Installation, Maintenance and Use of Emergency Voice/Alarm of Communication Systems	Requirements for the installation, maintenance, and use of emergency and alarm communications systems
NFPA 72H, Guide for Testing Procedures for Local, Auxiliary, Remote Station and Proprietary Protective Signaling Systems	Testing procedures for the types signaling systems anticipated to be used at the facility
NFPA 75, Standard for the Protection of Electronic Computer/Data Processing Equipment	Requirements for fire protection systems used to protect computer systems
NFPA 78, Lightning Protection Code	Lightning protection requirements
NFPA 80, Standard for Fire Doors and Windows	Requirements for fire doors and windows

Table 8.16-7. (continued.)

LORS	Applicability
NFPA 90A, Standard for the Installation of Air Conditioning and Ventilating Systems	Requirements for the installation of air conditioning and ventilating systems
NFPA 101, Code for Safety to Life from Fire in Buildings and Structures	Requirements for the design of means of exiting the facility
NFPA 291, Recommended Practice for Fire Flow Testing and Marking of Hydrants	Guidelines for the testing and marking of fire hydrants
NFPA 850, Recommended Practice for Fire Protection for Fossil Fuel Steam Electric Generating Plants	Requirements for fire protection in fossil fuel steam electric generating plants
NFPA 1961, Standard for Fire Hose	Specifications for fire hoses
NFPA 1962, Standard for the Care, Maintenance, and Use of Fire Hose Including Connections and Nozzles	Requirements for the care, maintenance, and use of fire hose
NFPA 1963, Standard for Screw Threads and Gaskets for Fire Hose Connections	Specifications for fire hose connections
American National Standards Institute/American Society for Mechanical Engineers (ANSI/ASME), Boiler and Pressure Vessel Code	Specifications and requirements for pressure vessels
ANSI, B31.2, Fuel Gas Piping	Specifications and requirements for fuel gas piping

8.16.5 Permit Requirements and Permit Schedule

Table 8.16-8 provides a list of applicable permits related to the protection of worker health and safety for REP certification. This table lists the activities covered for each permit and application requirements to obtain the permit. Permits listed in Table 8.16-8 are supplied on an as needed basis by the nearest Cal-OSHA office. An annual excavation permit or single event permit for excavations requires submittal of health and safety program and procedures to Cal-OSHA for review and issuance of the permit. The permit application should be planned at least two weeks before the first scheduled excavation. Subsequent excavations should be planned to provide at least five days notice to Cal-OSHA prior to excavation activities. Permits for scaffolds and cranes should be scheduled at least five days before planned activity. Permits for the operations of unfired or fired pressure vessels should be scheduled with the Cal-OSHA Pressure Vessel Unit at the time it is anticipated to place the vessel in operation.

8.16.6 Agency Contacts

Agency contacts regarding worker health and safety at the REP are shown in Table 8.16-9.

Table 8.16-8. Health and safety permits.

Permit	Issuing Agency	Application Requirements	Applicability
Trenching and Excavation Permit	Cal-OSHA district or field office	Required for personnel entry into trenches and excavations 5 feet or more in depth	Submit completed permit application to any Cal-OSHA office. Review of written health and safety program or safe work procedures may be required. Submit at least 5 days prior to scheduled excavation.
Construction Demolition	Cal-OSHA district or field office.	Construction or demolition of buildings, structures or falsework 3 feet or higher	Submit completed permit application to any Cal-OSHA office. Review of written health and safety program or safe work procedures may be required.
Scaffolding	Cal-OSHA district or field office	Scaffolding 36 feet or higher, erection or dismantling	Submit completed permit application to any Cal-OSHA office. Review of written health and safety program or safe work procedures may be required.
Erection of a fixed tower crane	Cal-OSHA district or field office	Erection, climbing and dismantling of fixed tower cranes	Submit completed permit application to any Cal-OSHA office. Review of written health and safety program or safe work procedures may be required.
Pressure vessel, unfired or fired	Cal-OSHA Pressure Vessel Unit	Pressure vessels covered by the Unfired and the Fired Pressure Vessel Safety Orders require a permit to operate	Arrange for application and inspection with the nearest Cal-OSHA Pressure Vessel Unit.

Table 8.16-9. Agency contacts.

Agency	Contact	Title	Telephone and Address
Cal-OSHA District Office Consultation Service	Various – availability varies by day	Area Manager or available staff	(916) 263-0704 2424 Arden Way, Ste. 410 Sacramento, CA 95825
Pressure Vessel Unit District Office, Division of Occupational Safety and Health	Don Cook	Senior Principal Engineer	(510) 622-3066 fax: (510) 622-3077 Elihu Harris State Building 1515 Clay Street, Suite 901 Oakland, CA 94621
Roseville Fire Department	Ken Wagner	Fire Chief	(916) 774-5800 401 Oak Street, #402 Roseville, CA 95678

8.16.7 References

Wagner, K. 2003. Personal communication between Aileen Giovanello (Tetra Tech FW, Inc.) and Ken Wagner (Fire Chief, Roseville Fire Department), July 21, 2003.

9.0 ALTERNATIVES

The following sections discuss alternatives to the Power Roseville Energy Park (REP) as proposed in this AFC. These include the "no project" alternative, power plant site alternatives, linear facility route alternatives, technology alternatives, water supply alternatives, and waste water disposal alternatives. These alternatives are discussed in relation to the environmental, public policy, and business considerations involved in developing the project. The main objective of the REP is to produce economical, reliable, and environmentally sound electrical energy and ancillary services within Roseville Electric's service area.

The Energy Facilities Siting Regulations (Title 20, California Code of Regulations, Appendix B) guidelines titled *Information Requirements for an Application* require:

> *A discussion of the range of reasonable alternatives to the project, including the no project alternative... which would feasibly attain most of the basic objectives of the project but would avoid or substantially lessen any of the significant effects of the project, and an evaluation of the comparative merits of the alternatives.*

The regulations also require:

> *A discussion of the applicant's site selection criteria, any alternative sites considered for the project, and the reasons why the applicant chose the proposed site.*

9.1 PROJECT OBJECTIVES

The basic objectives of the REP project are discussed throughout this application (also see Section 1.3). Some of the key project objectives include the following:

- To improve the quality and reliability of electric service in Roseville by locating the plant within RE's service area, directly connected to the Roseville Electric distribution grid
- To provide rate stability and reasonable cost to ratepayers by decreasing the City's dependence on short-term and long-term external power contracts
- To gain better control over operational issues that may stem from transmission facilities in the Sacramento Valley region that experience congestion during peak periods.
- To locate generation in or near load centers so as to increase overall grid reliability
- To minimize environmental impacts from the power plant site itself as well as from the gas, water and transmission lines

The REP will provide reasonably priced power to the City's ratepayers to help meet the City's demand for electricity and to help replace nuclear and fossil fuel generation resources retired due to age or cost of producing power. It will enhance the reliability of the state's electrical system by providing baseload power generation near the centers of electrical demand.

9.2 THE "NO PROJECT" ALTERNATIVE

If the Applicant were to not build the REP (the "no project" alternative), it would not be possible to meet the project objectives. The "no project" alternative would forego all of the benefits associated with the REP project. In addition, the "no project" alternative would result in more energy production from existing power plants than would otherwise occur, and these currently include older, less efficient, and

less environmentally sound generating units. Most importantly, Roseville Electric, as a municipal utility, would fail to meet the existing and expected electrical load requirements of its ratepayers in the City of Roseville under the no project alternative. This would have major negative economic consequences for the City's commercial and residential rate-payers and for the City's economy as a whole, since the City would be required to contract for power at greater expense from outside entities in order to meet the expected growth in demand as well as to replace the existing contractual supply.

In summary, the "no project" alternative would not serve the growing needs of Roseville's and California's businesses and residents for economical, reliable, and environmentally sound generation resources.

9.3 POWER PLANT SITE ALTERNATIVES

For comparison purposes, and to meet the requirements of CEQA and Title 20, alternative sites were chosen that could feasibly attain most of the project's basic objectives. The alternative sites are shown in Figure 9.3-1.

The key siting criteria in considering these alternatives and the proposal REP site included the following factors:

- Location more than 1,000 feet from the nearest residential uses or other sensitive receptor
- Location near the centers of demand for maximum efficiency and system benefit
- Land zoned for industrial use or heavy industry
- Access to tertiary treated waste water from the Dry Creek or Pleasant Grove Waste Water Treatment Plant for cooling water
- Location near electrical transmission facilities
- Location near reliable natural gas supply
- A parcel or adjoining parcels of sufficient size for a power plant and construction laydown areas
- Site control (lease or ownership) feasible
- Minimize construction impacts to existing residences and businesses
- Feasible mitigation of potential environmental impacts

9.3.1 Proposed Roseville Energy Park Site

The proposed site for the REP on Phillip Road in Roseville, California meets all of the project's objectives and, in addition, would have no significant, unmitigated, environmental impacts. The site is a 40-acre area located in Roseville, California immediately north of the City's Pleasant Grove Waste Water Treatment Plant (PGWWTP).

This site was chosen, among other things, because it is:

- Located adjacent to a source of reclaimed waste water sufficient for plant cooling (the PGWWTP) such that a lengthy pipeline would not be necessary, thus reducing environmental effects
- Located near transmission facilities, the new 60 kV transmission line that will serve West Roseville, making it unnecessary to construct new transmission facilities, thus reducing environmental effects

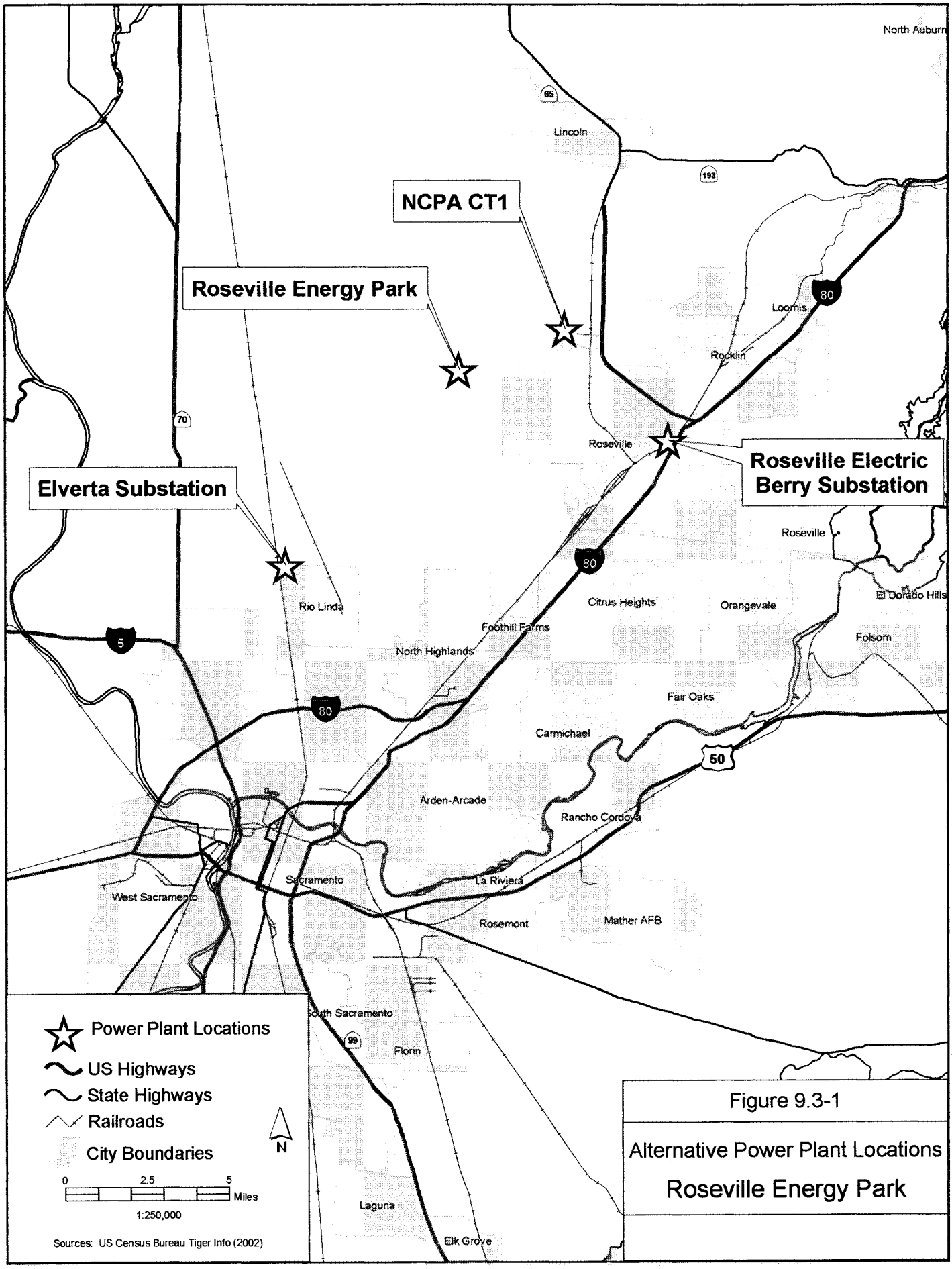

Figure 9.3-1

Alternative Power Plant Locations

Roseville Energy Park

- Zoned Public/Quasi-Public, which includes power generation as a permitted use
- Located 1.2 miles from the nearest residential area and 3 miles from sensitive receptors and, in combination with the West Roseville Specific Plan Area build-out, is located more than 1,000 feet from the nearest residential use or sensitive receptor
- Located where construction impacts to existing residences and businesses will be minimal
- The project site is owned by the City of Roseville and includes ample area for site construction, laydown, and staging

9.3.2 Alternative Site A: Roseville Electric Berry Substation

Alternative site A is located within a 25-acre parcel adjacent to Berry Road and Galleria Boulevard. The site is currently owned by the City of Roseville and is adjacent to RE's Berry Substation. Transmission lines are available from the Berry substation immediately to the south of the site. The site is currently vacant. Residential and commercial and industrial uses surround the site.

9.3.3 Alternative Site B: Elverta Substation

Alternative site B is located on 90 acres in Elverta in northwestern Sacramento County. The site is west of the junction of U Street and Marysville Boulevard, just south of the Western Area Power Administration's Elverta Substation. The site is currently used for grazing. A rural residential area is located east and south of the site. Agricultural uses are to the west.

9.3.4 Alternative Site C: NCPA CT-1

Alternative site C is located just north of the Roseville City limits in Placer County. The site is just north of the existing Northern California Power Authority Combustion Turbine facility NCPA CT-1 in an open area between newer housing developments to the west and an industrial area to the east. A housing development is under construction immediately south of the site.

9.4 COMPARATIVE EVALUATION OF ALTERNATIVE SITES

In the discussion that follows, the sites are compared in terms of each of the 16 topic areas required in the AFC, as well as in terms of project development constraints. The most useful topics for comparison are as follows:

- **Project Development Constraints**—Are there site characteristics that would prohibit or seriously constrain development, such as significant contamination problems, or lack of fuel, transmission capacity, or water?
- **Land Use Compatibility**—Is the parcel zoned appropriately for industrial use and compatible with local land use policies? What is the distance to the nearest residential area? What is the distance to sensitive receptors?
- **Routing and Length of Linear Facilities**–Can linear facilities be routed to the site along existing transmission lines, pipelines, and roads? Will linear facilities be significantly shorter for a given site?
- **Water Supply**—Is a supply of recycled water readily available such that it is not necessary to use potable water for all or part of the cooling water?
- **Visual Resources**—Are there significant differences between the sites in their potential for impact on valuable or protected viewsheds?

- **Biological Resources**—Would there be significant impacts to wetlands or threatened or endangered species such that mitigation of these effects would be unduly expensive or constrain the supply of available mitigation resources?
- **Contamination**—Is there significant contamination on site, such that cleanup expense would be high or such that cleanup would cause significant schedule delay?
- **Noise**—Is the site sufficiently near to a sensitive receptor area such that it would be difficult to mitigate potential noise impacts below the level of significance?
- **Use of Previously Disturbed Areas**—Has the site been previously disturbed? Does the site minimize the need for clearing vegetation and otherwise present low potential for impact on biological and cultural resources?
- **Other Environmental Categories**—Are there significant differences between the sites in their potential for impact in other environmental categories?

Table 9.4-1 compares the alternatives sites in terms of their basic site characteristics.

Table 9.4-1. Characteristics of the alternative sites.

Site or Alternative	Roseville Energy Park	Berry Substation	Elverta Substation	NCPA CT-1
Acreage available	40 acres	25	90	74
Current use	Construction	None	Grazing	Grazing
Previously disturbed?	Yes	Yes	No	No
Construction laydown area	Yes	No	Yes	Yes
Distance to nearest sensitive receptor	3 miles	0.65 miles	1 mile	1.3 miles
Distance to nearest residence	1,115 feet	500 feet	700 feet	550 feet
Transmission line	Adjacent	Adjacent	1000 feet	650 feet
Direct access to RE grid	Yes	Yes	No	No
Recycled water available?	Yes	Yes	No	Yes
Water supply pipeline	50 feet	3.2 miles	-	4.7 miles
Natural gas pipeline	6 miles	3.4 miles	20 miles	500 feet
Zoning	Public/Quasi Public	Public/Quasi Public	Intensive Industrial	Farm
Agricultural conversion	No	No	No	Yes
Contamination	Not identified	Not identified	Not identified	Not identified

There is no precise mathematical weighting system established for considering potential impacts in alternatives analyses. Some of the criteria used to compare the alternatives are more or less important to consider than others. For example, an impact that could affect public health and safety or could result in significant environmental impacts is obviously of greater concern than a purely aesthetic issue associated with an advisory design guideline. It is important in comparing alternatives to focus on the key siting advantages and the potential adverse environmental effects of a particular site. Comparing each of the

environmental disciplines and giving each discipline equal weight would provide a misleading analysis because effects in one area are not necessarily equivalent in importance to effects in another area.

For example, though the sites may differ in terms of available local road and street capacities and the current levels of traffic congestion, the number of workers during the operational phase of the project is low and would be unlikely to have a significant effect on local traffic. The sites may differ widely in the amount of traffic congestion they would cause during construction, but this is a temporary impact and should not be a strong consideration in site selection, as long as measures to mitigate this impact are feasible. The sites would not differ significantly in terms of geological hazards, though close proximity to a major fault would call for more rigorous and expensive seismic engineering. Hazardous materials handling and worker health and safety issues would be the same or nearly the same for most sites. Though the risk of a release of hazardous materials during transport might be seen as more or less likely depending on location (roadway hazards, in particular), the record of safe transport and handling of such materials is clear. Further, the sites considered here are all in or near urban areas that are served by good transportation networks and are close to the sources of supply.

Similarly, project effects on paleontological and cultural resources are not often consequential in comparing alternatives. Once an initial screening for effects on highly significant sites is completed, the probabilities of encountering hidden paleontological or cultural resources during construction are difficult to calculate or compare.

9.4.1 Project Development Constraints

As indicated in the introductory descriptions of each of the alternative sites, the basic needs of power plant siting for land, access to electrical transmission, gas supply, and cooling water, are met at each of the alternative sites. There are, however, some differences between the sites.

For example, the proposed REP project site would involve construction of a pipeline (approximately 6 miles) to supply natural gas. The other three sites would also require construction of a natural gas pipeline, with the Elverta site requiring the longest distance. All four of the sites have close access to electrical transmission lines on-site. However, only the REP and Berry Street sites allow direct access to RE's distribution grid, a primary project objective. While the REP site has access to reclaimed water adjacent to the site, the NCPA CT-1 and Berry Street sites require recycled water supply pipeline construction. The Elverta site has no economical source of recycled water and would rely on potable water sources.

In terms of constructability, the REP site is the most favorable, followed by Rio Linda/Elverta. There is also open space near the NCPA CT-1 site that could serve for construction laydown. The Berry Street site, by contrast, is very constrained, and there is little area nearby for construction laydown, staging, and worker parking.

9.4.2 Air Quality

The quantity of emissions from project operation would be the same at any of the sites. The REP, NCPA CT-1, and Berry Street substation would be under the jurisdiction of the Placer County Air Pollution District while the Elverta Substation site would be under the jurisdiction of the Sacramento Metropolitan Air Quality District. Each of the sites has similar contributions to airsheds and would, therefore, be subject to similar review, emission reduction crediting, and permitting requirements. Each site is located in relatively flat terrain that will help to promote dispersion of emissions. Small differences between the

sites in distance from the nearest residences should not make a significant difference in air quality impacts at these residences. Mitigation would bring any potential impacts to a level below significance for any of the alternatives.

9.4.3 Biological Resources

The REP site currently contains foraging habitat for raptors including Swainson's hawk and the burrowing owl, and some jurisdictional wetlands and swales that may be habitat for protected species such as the fairy shrimp. The Elverta site faces these same biological resources issues. The Berry Street site may provide limited habitat for the burrowing owl. The NCPA CT-1 site also contains habitat for the burrowing owl and other foraging raptors and may contain wetlands.

9.4.4 Cultural Resources

There would be few significant differences in cultural resources among the REP, NCPA CT-1, Elverta Substation, and Berry Street Substation alternatives, based on current information. Known archaeological sites would not be directly affected (buried sites are possible in any location). There would be a greater possibility of encountering buried archaeological deposits with the alternatives (Elverta and Berry Street Substation) that would involve longer underground linear appurtenances (such as water and gas lines).

9.4.5 Geological Resources and Hazards

There would be no significant differences between the sites in terms of geological resources and hazards. There are no geological resources located at or near any of the sites. The REP, NCPA CT-1, and Berry Street Substation are located within 10 miles of the Foothills Fault system considered a class C low-slip rate fault. The Elverta Substation site is located 15 miles from that fault zones. Seismic hazards and potential adverse foundation conditions will be minimized by conformance with the recommended seismic design criteria of the California Building Code (CBC [1998]) Seismic Zone 3 requirements. In addition, the facility arrangement is such that no major structures or equipment are within the projected trace of any active or potentially active faults.

9.4.6 Hazardous Materials Handling

There would be no significant difference between the site locations in terms of hazardous materials handling. The uses of hazardous materials would be the same for any of the sites. Though there might be differences in the distances that trucks carrying hazardous materials would travel to deliver the materials, these differences would be minor and would not necessarily be consequential, given the effective mitigation measures available and the excellent safety record for transport of these materials.

9.4.7 Land Use

Three of the four sites are currently zoned for industrial use. The REP site, which lies within the City of Roseville, is zoned Public/Quasi-Public. Under the City Zoning Ordinance, electrical generation is a conditionally permitted use in the Public/Quasi-Public district. The site is buffered on the south by the PGWWTP and, under the West Roseville Specific Plan (WRSP) will be buffered on the west by an industrial district and to the east by an active recreation area (regional soccer facility). Other surrounding uses are agricultural, though there are three rural residences somewhat near the power plant site.

The Berry Street Substation site is also zoned Public/Quasi-Public. There is an established residential area 500 feet to the west. The Roseville Galleria regional shopping mall lies to the north and motels and other commercial development occur to the east across Interstate 80.

The Elverta Substation site is zoned Intensive Industrial and is surrounded by the Elverta Substation to the north, agricultural land to the east, and rural residential areas to the south and east.

Though the NCPA CT-1 site is zoned Farm, electrical power plants can be approved with a conditional use permit in the Placer County Farm zone. The site is surrounded by grazing land to the north and immediately west. Further west is a new residential area. To the east is a tributary of Pleasant Grove Creek with a large industrial and commercial area beyond. There are several units of new housing south and west of the NCPA CT-1 plant in the Woodcreek East Project. Individual segments (villages) of this project are located 550, 700, and 900 feet from the power plant site, respectively.

9.4.8 Noise

The REP would meet the County noise standards for residential districts adjacent to an industrial district and all three nearby rural residences, each of which is located within County jurisdiction.

The Berry Substation is only 500 feet from an existing residential neighborhood. However, there is substantial background noise here from Interstate 80. With appropriate shielding and sound walls, the Berry Substation site should be able to meet community noise standards in City's zoning ordinance, though this may occur at considerable expense.

The Elverta Substation is 700 feet from the nearest residence. Previous analysis for that location indicates that with appropriate shielding and sound walls, the site should be able to meet community noise standards in each City's zoning ordinance (Foster Wheeler Environmental Corporation 2001).

The NCPA CT-1 site is approximately 550 feet from a residential housing development. The juxtaposition of the existing combustion turbine generating facility with the proposed facility could pose a problem for power plant construction and operation at this site. By using appropriate baffling and enhancing existing sound walls, the project could meet standards for industrial zoning at the property line though at considerable expense. Meeting the noise standards in the City's zoning ordinance, however, for residential uses could be very difficult.

9.4.9 Paleontology

There would be no significant differences between the project sites in terms of potential effects on paleontological resources. None of the sites is located at a known paleontological find location, although Pleistocene fossils have been found in the alluvial deposits of the Roseville and Sacramento Valley. The probability of encountering significant fossils is approximately the same at all sites.

9.4.10 Public Health

The project would not be likely to cause significant adverse long-term health impacts (either cancer or non-cancer) from exposure to toxic emissions, regardless of the site chosen.

9.4.11 Socioeconomics

Three of the four sites are located in Placer County while the Elverta site is located in the Sacramento County. The number of workers, construction costs, payroll, and property tax revenues would be nearly the same for the project at each of the sites. The majority of the workers would come from the City of Roseville or Sacramento depending on the site. Most workers would commute daily or weekly to the plant site. Some may move temporarily to the local area during construction, causing site-specific impacts to schools, utilities, and emergency services. These impacts would be temporary. Disproportionate impacts to minority and low income populations would be unlikely since minority

populations are not concentrated in an area or areas that are also high potential impact areas. The project is not likely to cause significant adverse public health impacts to areas that are disproportionately minority or low income.

9.4.12 Soils and Agriculture

There would not be significant differences between the alternative sites in terms of their potential effects on soils and agriculture. None of the sites would result in the loss of prime and unique farmlands or farmlands, though the NCPA CT-1 site would involve conversion of existing agricultural land.

9.4.13 Traffic and Transportation

Though there are differences between the project sites in terms of the amounts of current traffic congestion in their immediate areas, three of the sites are located in an urban area with relatively congested local traffic and near access to major freeways that are also relatively congested. The number of employees working at a given time during project operation (approximately 25) will not significantly impact local traffic conditions at any of the sites. The peak number of employees during construction (206) will have much more impact, but the impact will be temporary, and can be mitigated by providing off-site parking and busing for workers during peak periods. The effect on construction-phase traffic, therefore, should not figure as a major consideration in evaluating or comparing the sites. The REP and Elverta Substation sites are more rural than the other two.

9.4.14 Visual Resources

The REP site is located in an undeveloped area with only one substantial structure in the vicinity; the PGWWTP, which is immediately south of the REP site. Viewsheds from the project site include open plains to the east, the PGWWTP to the south, and plains and woodland to the north and east. There are three rural residences within one half-mile of the REP. Though the visual impact to these viewers is high, the local viewshed quality is low to moderate and the number of affected viewers in this location is low. Other views from traveled or developed areas are distant.

The Berry Street Substation is located in a developed urban and industrial viewshed with residential areas located nearby. The project is located prominently on a hilltop, however, and would be very visible to a large number of viewers traveling several major transportation corridors, including Interstate 80, State Route 65, and Galleria Boulevard. These viewers would see the project from fairly long approach distances along the transportation corridors. This visibility could pose an adverse impact that might be difficult or very expensive to mitigate.

The Elverta site is located in a mixed agricultural and rural residential area. There are residences to the east and southeast from which the project would be visible. The project is somewhat consistent with the electrical substation, transmission lines, and large radio transmission tower located nearby. Views to the south would be blocked by auto wrecking yards.

The NCPA CT-1 site is located on undeveloped agricultural land, with extensive residential development to the south and west and industrial development further east. The site is located on a knoll somewhat elevated from the areas to the south and east and a project located here could be visible from a significant distance to the south and east. The site is immediately adjacent to the NCPA CT-1 power plant, which would have a similar appearance.

9.4.15 Water Resources

Three of the four sites would be able to use tertiary treated recycled water for power plant cooling (REP, Berry Street Substation, NCPA CT-1) and therefore these three would not differ significantly in their use of water resources. This is consistent with the State Water Resources Control Board's Policy 75-58 indicating that water for power plant cooling should avoid using fresh inland waters if other waters (such as treated waste water) are available. An economical recycled water supply is not available to the Elverta Substation site and a project here would rely upon potable water for power plant cooling. Recycled water is available at short distance (without several miles of pipeline) only at the REP site.

9.4.16 Waste Management

The management of wastes would differ between the project site and the three alternatives, though these differences would not necessarily lead to a site preference. All four sites are currently vacant and no demolition would be necessary with the associated waste generation.

9.4.17 Summary and Comparison

Returning to our original site selection criteria as described in Section 9.3, it is clear that power plant siting is feasible at most of these alternative sites. A summary of environmental and project development constraints is presented in Table 9-2.

- **Location more than 1000 feet from the nearest residential receptor**—Only the REP site meets this standard (nearest is 1,115 feet). Each of the other sites, however, is located relatively near residential areas with many residents, while there are only three residences within one half-mile of the REP.
- **Location near the centers of electrical demand**—All of the sites are in or near highly urbanized areas with residential and industrial demand for power. The REP site and Berry Street Substation are also located within the City of Roseville and thus meet the project objective of directly connecting to the Roseville Electric grid. The NCPA CT-1 lies just outside of the City of Roseville. The Rio Linda/Elverta Site is several miles away.
- **Land zoned for industrial heavy industrial use**—All of the sites are zoned industrial or Public/Quasi-Public except for the NCPA CT-1 site, which is zoned Farm.
- **Location near a sufficient source of cooling water, preferably treated waste water**—The REP is adjacent to the PGWWTP, which will provide recycled water for cooling. The Berry Street and NCPA sites would require construction of recycled water pipelines to serve them. Recycled water is not economically available at the Elverta site, which would use potable water for cooling.
- **Location near electrical transmission facilities**—Each of the sites is adjacent to a substation or transmission line; however, only the REP and Berry Street sites offer direct connection to RE's distribution grid. Sufficient capacity is assumed at the three substation sites (REP, Berry Street, Elverta). Without a System Impact Study, it is unclear whether or not additional conductors or transmission lines would be necessary to export power from the NCPA site.
- **Location near ample natural gas supply**—Three of the sites are relatively near (six miles or less) a major natural gas pipeline for fuel gas supply. The NCPA CT-1 is very near PG&E line 123, but would need a pipeline of several miles in order to reach a practicable connecting point to this line to deliver the capacity needed for this project. The Elverta site would require a 20-mile-long natural gas pipeline, thus increasing costs and the potential for environmental impacts.

- **Parcel or adjoining parcels of sufficient size for a power plant**—There is sufficient land available at each parcel to develop a power plant. Berry Street, however, lacks sufficient space for construction laydown, staging, and worker parking areas.
- **Site control feasible**—The City of Roseville owns and controls the REP and Berry Street Sites. The others are privately owned, and site control may or may not be difficult to obtain.
- **Mitigation of potential impacts feasible**—Mitigation of potentially significant environmental impacts appears feasible at each of the sites. Mitigation for noise impacts could be prohibitively expensive, however, at Berry Street Substation and NCPA CT-1.

The Elverta site would require a very long natural gas pipeline, increasing the possibility of significant environmental effects. Water supply for this site could also be difficult to arrange. Development appears feasible at the other sites. Mitigation of visual impacts could be a constraint at Berry Street because of the prominent location on a hilltop and large number of viewers.

Table 9.4-2. Environmental and project development constraints of the REP and alternative sites.

Site or Alternative	Roseville Energy Park Site	Berry Substation	Elverta Substation	NCPA CT-1
Site control	Yes	Yes	No	No
Land Use and zoning	Permitted Use	Permitted Use	Permitted Use	Farm conversion
Sensitive noise receptors nearby	Few nearby receptors currently, buffers to future residential areas	Residences nearby	Residences nearby	Residences nearby
Visual Resources	Few viewer currently, buffers to future residential areas	Visible from transportation corridors	Existing substation, some residential viewers	Visible from residential areas
Wetlands	Yes	No	Yes	No
Protected species	Yes	Yes	Yes	Yes
Cultural Resources	No	No	No	No
Significant unmitigated impacts or costly mitigation?	No	Visibility, noise mitigation may be expensive	Water may not be available, long pipelines	Noise mitigation may be expensive

The REP site has interconnections with recycled water and electrical transmission lines on or very near the site; the site has few nearby residential or other sensitive receptors. Visual and noise impacts will not be significant. Biological resources impacts will be comparable to most other sites. In conclusion, the REP site is the most feasible site with the lowest potential environmental impact, in comparison with the other alternatives.

9.5 ALTERNATIVE PROJECT DESIGN FEATURES

The following section addresses alternatives to some of the REP design features, such as the locations of the natural gas supply pipeline, electrical transmission line, and water supply pipeline, and the radio broadcast tower relocation.

9.5.1 Alternative Natural Gas Supply Pipeline Routes

Natural gas fuel for the REP will be supplied by Pacific Gas and Electric (PG&E) pipeline from a major gas distribution line (Line 123) at Baseline Road near Country Club Road. These routes are also described in Chapter 5 and Figure 5.1-1.

9.5.1.1 Selection Criteria

In general, the alternative routes for the gas supply pipeline were selected based on engineering and construction feasibility, the expected delivery pressure of the natural gas supply, length of pipeline, cost, and the potential for environmental impacts. Engineering/construction feasibility is an assessment of whether the pipeline can be physically placed along a route. Length of pipeline is important because pressure drop, cost, and potential environmental impacts are usually functions of length. Environmental impacts must be either not significant or mitigatable to a level of insignificance.

No major differences between the routes evaluated were seen with regards to engineering and construction feasibility, the expected delivery pressure of the natural gas supply, length of pipeline, and cost to construct or operate. All routes included pipeline construction along city streets that involve temporary reduction or rerouting of traffic during pipeline construction and the potential for some temporary disruption of utility services.

All of the candidate routes follow City streets and all of them (except Route B1) also follow planned streets for the WRSP that are not yet in existence. Therefore, the routes will all cross open and undeveloped land in the WRSP area. The potential for environmental (biological, cultural, etc.) effects in these areas, however, has been taken into account in the WRSP Environmental Impact Statement and the developers of West Roseville (West Park and Fiddyment Ranch developments) have undertaken agency consultation, mitigation planning, and mitigation for environmental effects in these areas.

9.5.1.2 Pipeline Routes

The natural gas pipeline route chosen for the project would begin at a new connection to PG&E natural gas main pipeline 123 at Baseline Road near Country Club Lane, approximately 6 miles from the project site. All four alternatives begin at this point. Alternative A heads west on Baseline Road, then turns north along Fiddyment Road to Blue Oaks Boulevard, where it follows the planned new alignment of Blue Oaks Boulevard west to the planned new alignment of Phillip Road. At this point, it turns south and follows the existing alignment of Phillip Road west to the project site.

Alternatives B and B1 follow the same route as Alternative A west along on Baseline Road and north on Fiddyment Road as far as Del Webb Boulevard. At this point, Alternative B turns onto the alignment of Bob Doyle Drive, a new street planned under the WRSP. Alternative B follows Bob Doyle west, then northwest, then north, to Phillip Road. From there, Alternative B follows Phillip Road west and north to the project site. A variant, Alternative B1, continues on Fiddyment Road to Phillip Road and then takes Phillip Road west, then north, then west again, to the project site. This variant would only be chosen if the West Roseville annexation were denied or delayed indefinitely, since the portion of Phillip Road between Fiddyment Road and the new Bob Doyle Drive will be abandoned under the WRSP.

Alternative C begins at PG&E Line 123 on Baseline Road. This route turns north on Country Club Drive, then west on Pleasant Grove Boulevard. This route would then continue west to follow the new extension of Pleasant Grove Boulevard as far as the new West Side Drive (a northward extension of Watt Avenue). The route would follow West Side Drive north to the new extension of Blue Oaks Boulevard. It would

turn east on Blue Oaks Boulevard to the new alignment of Phillip Road. It would then turn south on Phillip Road, following it south and then west to the project site.

9.5.2 Electrical Transmission System Alternatives

Roseville Electric plans to connect the REP directly to the new 60 kV transmission line that will be constructed to serve West Roseville at Phillip Road adjacent to the REP switchyard. In the event that the West Roseville annexation is denied or delayed indefinitely, RE will build a new 60 kV transmission line. This transmission line route would follow Phillip Road east, south, and east to Fiddyment Road, and Fiddyment Road south the RE Fiddyment Receiving Station.

9.5.3 Water Supply Alternatives

The PGWWTP will supply water for the proposed project as described in Section 7.0 through a pipeline on the REP site. Other sources of water might include potable water from the City of Roseville system. Well water would be another possible source of cooling water. Recycled water is clearly the better alternative, however, because it provides a beneficial use for treated waste water which might otherwise be wasted. Using potable water from either the City's system or on-site wells would involve consuming large quantities of scarce fresh water for power plant cooling that could be more beneficially used for other purposes.

9.5.4 Waste Water Disposal Alternatives

There will be no process waste water from the REP because all cooling water will be processed through a zero liquid discharge system. This alternative method eliminates the need for returning concentrated brine water to the PGWWTP, or disposing process waste water in the City's sanitary sewer system. It is the preferable alternative, since it does not absorb sanitary sewer system capacity.

9.6 TECHNOLOGY ALTERNATIVES

The configuration of the REP was selected from a wide array of technology alternatives. These include generation technology alternatives, fuel technology alternatives, combustion turbine alternatives, NO_x control alternatives, inlet air cooling alternatives, and heat rejection alternatives.

9.6.1 Generation Technology Alternatives

Selection of the power generation technology focused on those technologies that can utilize the natural gas readily available from the existing transmission system. The following provides a discussion of the suitability of such technologies for application to the REP.

9.6.1.1 Conventional Boiler and Steam Turbine

This technology burns fuel in the furnace of a conventional boiler to create steam. The steam is used to drive a steam turbine-generator, and the steam is then condensed and returned to the boiler. This is an outdated technology that is able to achieve thermal efficiencies up to approximately 36 percent when utilizing natural gas, although efficiencies are somewhat higher when utilizing oil or coal. Due to this low efficiency and large space requirement, the conventional boiler and steam turbine technology was eliminated from consideration.

9.6.1.2 Simple-Cycle Combustion Turbine

This technology uses a combustion turbine to drive a generator. Combustion turbines have relatively low capital cost, and aeroderivative units are able to achieve thermal efficiencies up to approximately

38 percent. Due to its quick startup capability and relatively low capital cost, this technology is used primarily in peaking application (less than 1,000 hours per year), where relatively low efficiency is not an overriding concern. Due to its relatively low efficiency, this technology tends to emit more air pollutants per kilowatt-hour generated than more efficient technologies. Due to less than optimal environmental performance and relatively low efficiency, the simple-cycle combustion turbine technology was eliminated from consideration.

9.6.1.3 Conventional Combined-Cycle

This technology integrates combustion turbines and steam turbines to achieve higher efficiencies. The combustion turbine's hot exhaust is passed through an HRSG to create steam used to drive a steam turbine-generator. This technology is able to achieve thermal efficiencies up to approximately 44 percent, considerably higher than most other alternatives. This high efficiency also results in relatively low air emissions per kilowatt-hour generated. For these reasons, the conventional combined-cycle is considered the benchmark against which all other base load and intermediate load technologies are compared. Due to its high efficiency and superior environmental performance, this technology was selected for the REP as well as for most other new base load and intermediate load power plants being developed in the United States.

9.6.1.4 Kalina Combined-Cycle

This technology is similar to the conventional combined-cycle, except a mixture of ammonia and water is used in place of pure water in the steam cycle. The Kalina cycle could potentially increase combined cycle thermal efficiencies by several percentage points. However, because this technology is still in the development phase and has not been commercially demonstrated, it was eliminated from consideration.

9.6.1.5 Advanced Combustion Turbine Engines

There are a number of efforts to enhance the thermal efficiency of combustion turbines by injecting steam, intercooling, and staged firing. These include the steam-injected gas turbine (STIG), the intercooled steam recuperated gas turbine (ISRGT), the chemically recuperated gas turbine (CRGT), and the humid air turbine (HAT) cycle. The STIG it less efficient than conventional combined-cycle technology, uses large amounts of de-ionized water and is only able to achieve thermal efficiencies up to approximately 40 percent. None of the remaining technologies, ISRGT, CRGT or HAT, is commercially available. Consequently, all of these technologies were eliminated from consideration.

9.6.2 Fuel Technology Alternatives

Technologies based on fuels other than natural gas were eliminated from consideration because they do not meet the project objective of utilizing natural gas available from the existing transmission system. Additional factors rendering alternative fuel technologies unsuitable for the proposed project are as follows:

- No geothermal or hydroelectric resources exist in Roseville County.
- Biomass fuels such as wood waste are not locally available in sufficient quantities to make them a practical alternative fuel and REP site space is limited.
- Solar and wind technologies are generally not dispatchable and are therefore not capable of producing ancillary services other than reactive power, and REP site space is limited.
- Coal and oil technologies emit more air pollutants than technologies utilizing natural gas.

- The availability of the natural gas resource provided by PG&E, as well as the environmental and operational advantages of natural gas technologies, make natural gas the logical choice for the proposed project.

9.6.3 NO_x Control Alternatives

To minimize NO_x emissions from the REP, the CTGs will be equipped with water injection combustors and the HRSGs will be equipped with post-combustion selective catalytic reduction (SCR) using aqueous ammonia as the reducing agent. The following combustion turbine NO_x control alternatives were considered:

- Steam injection (capable of 25 to 42 ppm NO_x).
- Water injection (capable of 25 to 42 ppm NO_x).
- Dry low NO_x combustors (capable of 15 to 25 ppm NO_x).

Water injection was selected because it allows for lower acceptable NO_x emissions while being able to achieve an output turndown rate of 30 percent. This turndown is necessary to meet the variable RE load demand.

Two post-combustion NO_x control alternatives were considered:

- SCR.
- SCONOx

SCR is a proven technology and is used frequently in combined cycle applications. Ammonia is injected into the exhaust gas upstream of a catalyst. The ammonia reacts with NO_x in the presence of the catalyst to form nitrogen and water.

$SCONO_x$™ is a new technology and has been installed on a 25 MW combined cycle plant since December 1996. $SCONO_x$™ consists of an oxidation catalyst, which oxidizes CO to CO_2 and NO to NO_2. The NO_2 is adsorbed onto the catalyst, and the catalyst is periodically regenerated. Although a potentially promising technology, $SCONO_x$™ has not been commercially demonstrated on a large power plant. There are several technological and commercial issues remaining to be resolved prior to application of this new technology to the class of large combustion turbines selected for the proposed project.

The following reducing agent alternatives were considered for use with the SCR system:

- Anhydrous ammonia
- Aqueous ammonia
- Urea

Anhydrous ammonia is used in many combined cycle facilities for NO_x control, but is more hazardous than diluted forms of ammonia. Aqueous ammonia (a 27 percent ammonia, 73 percent water solution) is proposed for the REP because of its safety characteristics. Urea has not been commercially demonstrated for long-term use with SCR and was therefore eliminated from consideration.

9.6.4 Inlet Air Cooling Alternatives

Combustion turbine output and efficiency both increase as inlet air temperature decreases. Ambient air temperatures for the proposed project are sufficiently high for a large portion of the year to warrant some form of inlet air cooling. Two common forms of combustion turbine inlet air cooling are evaporative cooling and air chilling.

Evaporative cooling is capable of cooling to temperatures near the ambient wet-bulb temperature. Air chilling is capable of cooling to temperatures below the ambient wet-bulb temperature, and it is able to maintain a low temperature over a wide range of ambient conditions. Air chilling uses mechanical or absorption refrigeration to produce a cold fluid for cooling the inlet air. Air chilling has a greater capital and operating cost than evaporative cooling, however. Based on temperature profiles at the proposed site, evaporative cooling was selected for the REP to optimize output and efficiency versus capital cost.

9.6.5 Heat Rejection Alternatives

The REP will employ a surface condenser cooled by circulating water, with heat rejection provided by a mechanical draft, wet cooling tower. An air-cooled condenser was considered as an alternative. The wet cooling tower was found to be the most cost-effective heat rejection system and produces the highest plant efficiency.

The advantages of an air-cooled condenser include reductions in makeup water requirements, water vapor plumes, and cooling tower drift. Among the disadvantages of the air-cooled condenser are the land area requirements and high cost. Condenser performance is inversely related to the temperature of the cooling medium. The local climate in the project area is characterized by high dry-bulb temperatures and low wet-bulb temperatures (i.e., low relative humidity). Consequently, the performance of an air-cooled condenser (which is inversely related to dry-bulb temperature) is poor compared to the performance of a surface condenser cooled by circulating water (which is inversely related to wet-bulb temperature). The air-cooled condenser's relatively poor performance results in relatively high steam turbine backpressure, which negatively impacts steam turbine output and efficiency. This negative impact causes a decrease in overall plant output and efficiency. The air-cooled condenser also uses more auxiliary power due to the greater number and horsepower of its fans as compared to the wet cooling tower. As a result, net plant output and efficiency are further reduced. In addition, the capital cost and land requirements of an air-cooled condenser greatly exceeds the cost of a surface condenser, circulating water system, and wet coolings.

The air-cooled condenser's disadvantages of reduced plant output, reduced plant efficiency, and higher capital costs were found to outweigh the advantage of reduced water consumption.

9.7 REFERENCES

Foster Wheeler Environmental Corporation. 2001. Rio Linda/Elverta Power Project, Sacramento County, California Application for Certification. Submitted to the California Energy Commission. Prepared for FPL Energy Sacramento Power, LLC.

10. ENGINEERING

In accordance with CEC regulations, this section and its related appendices and Sections 2, 5, 6, and 7 present information concerning the design and engineering of the City of Roseville's Roseville Energy Park (REP). Section 10.1 describes the design of these project facilities with reference to Section 2, the Project Description. Section 10.2 discusses the reliability of the REP, and Section 10.3 presents the estimated thermal efficiency of the facility. Section 10.4 describes the LORS applicable to the REP engineering, and Section 10.5 identifies agencies that have jurisdiction, and provides the contact persons within those agencies. Section 10.6 contains references cited.

10.1 FACILITY DESIGN

Detailed descriptions of the REP are provided in Section 2.2. Design for safety is provided in Section 2.2.17, Facility Safety Design.

A geotechnical assessment of the property adjacent to the REP, the Pleasant Grove Waste Water Treatment Plant (PGWWTP), including soil borings, has been completed (España Geotechnical Consulting 1999). In addition, a geotechnical report was prepared for the Roseville Energy Facility project, located at the REP site (URS Corporation 2001). Copies of both Geotechnical Reports are included in Appendix 10G of this AFC.

Summary descriptions of the design criteria are included in: Appendix 10-A, Civil Engineering Design Criteria; Appendix 10-B, Structural Engineering Design Criteria; Appendix 10-C, Mechanical Engineering Design Criteria; Appendix 10-D, Electrical Engineering Design Criteria; Appendix 10-E, Control Engineering Design Criteria; and Appendix 10-F, Chemical Engineering Design Criteria.

Design and engineering information and data for the following systems are found in the following parts of the AFC:

- **Power Generation**—See Section 2.2.4 regarding the combustion turbine generator (CTG), heat recovery steam generator (HRSG), and steam turbine generator (STG). Also see Appendix 10-C and Sections 2.2.5 through 2.2.13, which describe the various plant auxiliaries.
- **Heat Dissipation**—See Section 2.2.8, Plant Cooling Systems, and Appendix 10-C.
- **Cooling Water Supply System**—See Section 2.2.7, Water Supply and Use, Section 2.2.8, Plant Cooling System, and Appendix 10-F.
- **Air Emissions Control Systems**—See Section 2.2.11, Emissions Control and Monitoring, and Section 8.1, Air Quality.
- **Waste Disposal Systems**—See Section 2.2.9 and 8.14, Waste Management.
- **Noise Abatement Systems**—See Section 8.7, Noise, and Appendix 10-C.
- **Switchyard/Transformer Systems**—See Section 2.2.5, Major Electrical Equipment and Systems; Section 2.2.13.2, Grounding; Section 2.2.5.1, AC Power Transmission; Section 2.2.14, Interconnection to Electrical Grid; Section 6, Electrical Transmission; and Appendix 10-D, Electrical Engineering Design Criteria.

10.2 RELIABILITY

This section discusses the availability of fuel, the expected service life of the plant, and the degree of reliability to be achieved by the REP.

10.2.1 Fuel Availability

The new dedicated gas supply pipeline to the REP will be connected to Pacific Gas & Electric's (PG&E) Line 123, about 6 miles southeast of the REP site. Line 123 is capable of delivering the required quantity of gas to the REP. It is conceivable that PG&E's transmission line or the new branch pipeline from the Line 123 to the REP could become temporarily inoperable if there is a breach in one of the lines or from other causes, resulting in fuel being unavailable at the REP. The REP facility has no backup fuel supply and would, therefore, have to be shut down until the situation was corrected.

10.2.2 Plant Availability

The REP will be a utility-owned, dispatchable facility. Due to the relatively high combined-cycle efficiency of the REP, it is anticipated that the facility will normally operate at a high average annual capacity consistent with electric power market conditions. The REP will be designed for an operating life of 30 years. Reliability and availability projections are based on this operating life. O&M procedures will be consistent with industry standard practices to maintain the useful life status of plant components.

The REP combined-cycle power block will consist of two natural gas-fired CTGs, two HRSGs with natural gas-fired duct burners, and one STG. The combined-cycle power block is projected to operate up to 91 percent of each year during each of the 30 years. The percentage of time that the combined-cycle power block is projected to operate 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 REP will be permitted to operate for a total of 8,247 hours each year, consisting of 3,914 hours at base load and 4.081 hours at peak load with HRSG duct firing, and 252 hours of startups and shutdowns, but will be dispatched based on economic need.

There are no known geologic hazards other than the possibility of a major earthquake (see Section 8.4, Geological Hazards and Resources).

The REP will be designed to ensure high reliability, including the redundancy of critical components (see Section 2.2.18.2, Redundancy of Critical Components).

Deterioration of output capacity and efficiency of the REP over time, called performance degradation, is expected to be on the order of 2 to 3 percent over a 3-year period. Cleaning, maintenance, or overhaul will recapture most of the loss. Over the expected 30-year life of the facility, the estimated total, nonrecovered loss in output and efficiency will be on the order of 1 to 2 percent.

10.3 EFFICIENCY

The maximum thermal efficiency that can be expected from the natural gas-fired combined-cycle plant is approximately 45 to 47 percent (higher heating value basis). This level of efficiency will be achieved by the REP when the facility is base-loaded. Other types of operations, particularly those at less than full gas turbine output, or when the HRSG duct burners are in use, will result in lower efficiencies. Potential operating scenarios for the plant vary from virtually continuous base-load operation during its early life to a very low facility capacity factor near the end of its operating life as new technologies become available.

The number of plant startup and shutdown cycles is expected to range between zero and over 207 per year per CTG.

The maximum annual generation from the facility, based on the expected permitted operating limits, estimated to be between 1,150 and 1,190 gigawatt hours (GWh).

10.4 LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

The LORS that are applicable to the design of the REP are referenced in Table 10.4-1 below. LORS applicable to the environmental areas of the AFC (sections 8.1 through 8.16) are contained within each of the environmental sections. The project will conform to all of these LORS.

Table 10.4-1. Applicable laws, ordinances, regulations, and standards.

LORS	Location in AFC for Facility Design Compliance	Conformance
Federal:		
Occupational Safety and Health Act (OSHA)—29CFR1910 and 29CFR126	Section 10	Meet Requirements
Environmental Protection Agency (EPA)—40CFR60, 40CFR75, 40CFR112, 40CFR302, 40CFR423, 40CFR50, 40CFR100, 40CFR260, 40CFR300, and 40CFR400	Section 8 & 10	Meet Requirements
Federal Aviation Administration (FAA)—Obstruction Marking and Lighting AC No. 70/74601H	Section 6 & 10	Meet Requirements
California:		
California Code of Regulations (CCR)— Title 8, Sections 450 and 750 and Title 24, 1995, Titles 14, 17, 19, 20, 22, 23, and 26.	Section 10	Meet Requirements
California Department of Transportation (Cal-DOT)—Standard Specifications	Section 10	Meet Requirements
California Occupational Safety and Health Administration (Cal-OSHA)—Regulations and Standards	Section 10	Meet Requirement
California Business and Professions Code—Sections 6704, 5730, and 6736	Section 10	Meet Requirements
California Vehicle Code—Section 35780	Section 10	Meet Requirements
California Labor Code—Section 6500	Section 10	Meet Requirements
Local:		
City of Roseville—Regulations and Ordinances	Section 10	Meet Requirements
Placer County—Regulations and Ordinances	Section 10	Meet Requirements
Industrial:		
Civil Engineering Design Criteria	Appendix 10-A	Meet Design Criteria
Structural Engineering Design Criteria	Appendix 10-B	Meet Design Criteria

Table 10.4-1. Applicable laws, ordinances, regulations, and standards.

LORS	Location in AFC for Facility Design Compliance	Conformance
Mechanical Engineering Design Criteria	Appendix 10-C	Meet Design Criteria
Control Engineering Design Criteria	Appendix 10-E	Meet Design Criteria
Chemical Engineering Design Criteria	Appendix 10-F	Meet Design Criteria
Geologic and Foundation Design Criteria	Appendix 10-G	Meet Design Criteria

The Appendices to Chapter 10 contain the discipline design criteria that will be used in design. Appendix 10-A and Appendix 10-B address the physical design criteria for the site-related features, structures, and foundations of the REP.

Appendices 10-C through 10-F provide the design criteria for the REP system and equipment, including the codes and standards that apply to the design, materials, fabrication and erection of the system and equipment.

Appendix 10-G, Geologic and Foundation Criteria, is provided as the project geotechnical report. This appendix contains the results of the subsurface investigation, laboratory testing program, and preliminary geotechnical assessment for the PGWWTP, which is located adjacent to the REP (Espana Geotechnical Consulting 1999) and for the Roseville Energy Facility project at the REP site (URS Corporation 2001).

10.5 INVOLVED AGENCIES, AGENCY CONTACTS

Building permits for the REP would be issued by the Roseville Department of Planning. A point of contact is provided in Table 10.4-2. A detailed schedule for submittal of all plans and specifications that require review by the Chief Building Official (CBO) will be prepared well in advance of the start of construction of the REP.

Table 10.4-2. Agency Contacts

Agency	Contact	Telephone
City of Roseville Department of Planning and Inspection	Patricia Dunn Community Development Director	(916) 774-5334

10.6 REFERENCES

España Geotechnical Consulting. 1999. Geotechnical Report for the Pleasant Grove Wastewater Treatment Plant, Roseville, California. Prepared for Carollo Engineers, Sacramento, CA. Prepared by España Geotechnical Consulting, Roseville, California.

URS Corporation. 2001. Geotechnical Engineering Study, Roseville Energy Facility, Roseville, California. Appendix L.1, Roseville Energy Facility Application for Certification. Prepared for Roseville Energy Facility, LLC, San Francisco, California. Prepared by URS Corporation, Oakland, California.