8.9 Agriculture and Soils

8.9.1 Introduction

The Eastshore Energy Center (Eastshore) will be a nominal 115.5-megawatt (MW) intermediate/peaking load facility operating up to 4,000 hours per year using natural gas-fired reciprocating engine technology. The Eastshore facility will be located at 25101 Clawiter Road in the City of Hayward, Alameda County, California, on a 6.22 acre parcel owned by Eastshore Energy, LLC, the project owner. Major features of the Eastshore project include the following:

- Demolition of the existing site building, foundations and paved surface,
- Grading of site and installation of new foundations, piping and utility connections,
- Fourteen (14) nominal 8.4 MW (gross) Wartsila model 20V34SG natural gas-fired reciprocating engine – generator sets,
- Fourteen (14) state-of-the-art air pollution control systems representing Best Available Control Technology (BACT), one system per each of the 14 engines, consisting of a selective catalytic reduction (SCR) unit for oxides of nitrogen (NOx) control and an oxidation catalyst unit for carbon monoxide (CO) and precursor organic compounds (POC) control,
- Fourteen (14) approximately 70-foot tall stacks, each with a separate continuous emissions monitoring system (CEMS),
- Acoustically-engineered main building enclosing all 14 engines,
- Closed loop cooling system consisting of multiple fan-cooled radiator assemblies outside of the main engine building,
- Two 10,000 gallon (each) aqueous (19% by weight) ammonia storage tanks and handling system serving the SCR units,
- One raw water storage tank, approximately 35,000 gallons,
- One nominal 225–kW diesel-fired emergency black start generator,
- One (1) either electric or 7.15 MMBtu/hr natural gas-fired heater (BAAQMD exempt), used for heating of the natural gas fuel to the reciprocating engines,
- Miscellaneous ancillary equipment,
- Pre-existing onsite water and wastewater service interconnections,
- Onsite 115 kV switchyard including switchgear and step-up voltage transformers,
- Approximately 1.1-mile 115 kV single-circuit transmission line interconnecting to PG&E's Eastshore Substation,
- Approximately 200-foot offsite natural gas line connection to PG&E Line 153,

- Chain-link security fencing enclosing the facility with a secured entrance on Clawiter Road, and
- 4.65-acre temporary construction laydown and parking area located immediately across Clawiter Road from the Eastshore site.

This subsection describes the potential environmental effects on agriculture and soils from the construction and operation of the project. Potential impacts are assessed for the Eastshore project site, the associated construction laydown area, the natural gas supply pipeline, and proposed electric transmission line.

Subsection 8.9.2 presents the laws, ordinances, regulations, and standards (LORS) applicable to agriculture and soils. Subsection 8.9.3 describes the existing environment that could be affected, including agricultural use and soil types. Subsection 8.9.4 identifies potential environmental effects, if any, from project development, and Subsection 8.9.5 presents mitigation measures. Subsection 8.9.6 describes the required permits and provides agency contacts. Subsection 8.9.7 provides the references used to develop this subsection.

8.9.2 Applicable Laws, Ordinances, Regulations, and Standards

Federal, state, county, and local LORS applicable to agriculture and soils are discussed below and summarized in Table 8.9-1.

8.9.2.1 Federal

8.9.2.1.1 Federal Water Pollution Control Act of 1972 and the Clean Water Act of 1977. The Federal Water Pollution Control Act of 1972, commonly referred to as the Clean Water Act (CWA) following amendment in 1977, establishes requirements for discharge of stormwater or wastewater from any point source that would affect the beneficial uses of waters of the United States. The State Water Resources Control Board (SWRCB) adopted one statewide National Pollution Discharge Elimination System (NPDES) General Permit that would apply to storm water discharges associated with construction, industrial, and municipal activities. The Regional Water Quality Control Board (RWQCB) is the administering agency for the NPDES permit program; however, the U.S. Environmental Protection Agency (USEPA) may retain jurisdiction at its discretion. The CWA's primary effect on agriculture and soils within the project area consist of control of soil erosion and sedimentation during construction, including the preparation and execution of erosion and sedimentation control plans and measures for any soil disturbance during construction.

8.9.2.1.2 USDA Engineering Standards. The U.S. Department of Agriculture, Natural Resources Conservation Service (NRCS), National Engineering Handbook, 1983, Sections 2 and 3 provide standards for soil conservation during planning, design, and construction activities. The project would need to conform to these standards during grading and construction to limit soil erosion.

TABLE 8.9-1
Laws, Ordinances, Regulations, and Standards for Agricultural and Soil Resources

LORS	Purpose	Regulating Agency	Applicability (AFC Section Explaining Conformance)
Federal			
Federal Water Pollution Control Act of 1972; Clean Water Act of 1977 (including 1987 amendments).	Regulates stormwater discharge from construction and industrial activities	RWQCB – San Francisco Bay Region 2 under State Water Resources Control Board. USEPA may retain jurisdiction at its discretion.	Subsections 8.9.2.1 and 8.9.4.2.
Natural Resources Conservation Service (1983), *National Engineering Handbook*, Sections 2 and 3.	Standards for soil conservation	Natural Resources Conservation Commission	Subsections 8.9.2.1 and 8.9.5.
State			
Porter-Cologne Water Quality Control Act of 1972; Cal. Water Code 13260-13269: 23 CCR Chapter 9.	Regulates stormwater discharge	CEC and the San Francisco Bay Region under State Water Resources Control Board	Subsections 8.9.2.2 and 8.9.4.2.
Local			
City of Hayward Municipal Code	Encroachment and construction permit	Public Works Division	Subsections 8.9.2.3 and 8.9.6
Burlington Northern Santa Fe Railroad (BNSF) Utility Specifications	Temporary occupancy and utility encroachment on BNSF right-of-way	Staubach Global Services, Permits Department	Subsections 8.9.2.3 and 8.9.6

8.9.2.2 State

8.9.2.2.1 California Porter-Cologne Water Quality Control Act. The Porter-Cologne Water Quality Control Act of 1972 is the state equivalent of the federal CWA, and its effect on Eastshore would be similar. The California Water Code requires protection of water quality by appropriate design, sizing, and construction of erosion and sediment controls. The discharge of soil into surface waters resulting from land disturbance may require filing a report of waste discharge (see Water Code Section 13260a). The RWQCB, which controls surface water discharges, may become involved indirectly if soil erosion threatens water quality.

8.9.2.3 Local

Within the City of Hayward, the proposed project would require a construction permit for the Eastshore site and an encroachment permit for linear features that would cross any public rights-of-way. The Public Works Division is responsible for reviewing plans and for inspecting construction projects while in progress. City fees are required for new utilities within public rights-of-way as well as for connection to the sanitary sewer.

Because the entire project including linears will occur within the incorporated areas of the City of Hayward, there are no LORS from Alameda County that pertain to the Eastshore project (Sawrey-Kubicek, 2006, personal communication).

The Union Pacific (UP) railroad would also require an Encroachment Permit for any utility crossing or running parallel within their right-of-way. This permit is required for either aboveground or belowground utilities. If the required utility borehole is greater than 20 inches in diameter and between 5.5 and 10 feet below the base of the rail, UP requires the Applicant to perform a site-specific geotechnical study at their own expense. A Temporary Occupancy Permit is required to complete the geotechnical study

8.9.3 Environmental Setting

The proposed Eastshore project is located within an urban area of the City of Hayward. The Eastshore project area is currently zoned as (I) industrial (City of Hayward, 2006) and dominated by industrial/commercial land uses. The proposed Eastshore project will be constructed on 6.22 acres located at 25101 Clawiter Road (just west of the intersection of Clawiter Road and the UP railroad) in the City of Hayward. In addition to the grading at the main plant site, equipment and material laydown during construction and construction parking will be located on a 4.65-acre parcel portion of Berkeley Farms just southeast from the project site across Clawiter Road. An overhead electrical power line connection to the PG&E Eastshore Substation is also proposed which is located approximately 0.83-mile south-southeast from the Eastshore site.

The main plant site is currently occupied by a large (102,000 square foot) industrial building that was used for metal stamping operations from 1998 until the facility closed in 2005. Prior to that time, the site had been used from the early 1960s to 1998 for the manufacture of epoxy-coated concrete tubes. Before the site's development in the early 1960s, the site was a mixture of agricultural and unused land with no residential structures (TRC, 2005). The existing building covers the majority of the subject site, with the remainder covered with paved parking and roadway access or landscaped areas along the eastern and southern boundaries.

The construction laydown area is located on the northern portion of the Berkeley Farms property. This portion of the property is currently cleared but it is unpaved and undeveloped. The portions immediately adjacent to the southern boundary of the laydown area are currently used for temporary storage of truck trailers associated with Berkeley Farms operations.

Based on review of aerial photographs and documentation from a nearby project (Calpine/Bechtel, 2001), there are no commercial agricultural land uses within the proposed Eastshore project area (includes areas within a 1-mile buffer of all facilities). There are no important farmlands (as defined for the Farmland Mapping and Monitoring Program) mapped within the same area (CDC, 2004). The proposed gas and electrical corridors will follow existing roadway or railroad rights-of-way through urban areas. The potable water supply and sanitary sewer pipeline connection already exist on the Eastshore site.

Soil survey mapping units characterizing the types and distribution of soils within the project area, as shown on Figure 8.9-1, are taken from: *Soil Survey of Alameda County, California, Western Part* (NRCS, 1981). The electronic shape files for these mapping units were downloaded from the NRCS website. Detailed soil descriptions were developed from the soil survey publication (NRCS, 1981) and from Official Series Descriptions on the NRCS website.

It should be noted that, because of the densely developed, urban nature of the Eastshore site and vicinity, there is a high probability that actual soil conditions could vary significantly

from those described. This condition could occur because of historic grading (mixing) of locally occurring soils or from imported fill brought in where native soil bearing properties were not sufficient to support building foundations or other facilities.

Data for the affected environment are summarized and presented below:

- Soil types for the project site, laydown area, and along the project gas supply pipeline and electrical transmission alignments are identified in Figure 8.9-1.
- Table 8.9-2 summarizes the characteristics of each of the individual soil mapping units identified on Figure 8.9-1 in the project vicinity including the site boundaries and the project's linear facilities. The table summarizes depth, texture, drainage, permeability, erosion hazard rating, land capability classification, and landscape planting considerations.

TABLE 8.9-2
Soil Mapping Unit Descriptions and Characteristics

Map Unit	Description
107	**Clear Lake clay; 0 to 2 percent slopes, drained:** This soil comprised almost all of the Eastshore property except for the southeastern corner. The soils of this mapping unit are formed in alluvium in basins. They occur between 10 and 200 feet of elevation. The Land Capability Classification for non-irrigated soils is IIIs-5 indicating that the soil has severe limitations restricting the choice of plants or requires special conservation practices due to droughty conditions caused by very fine textured layers. The Capability Class is IIs-5 when irrigated indicating that this soil has moderate limitations restricting the choice of plants or requires moderate conservation practices due to droughty conditions caused by very fine textured layers. The following properties are associated with this soil mapping unit: Very deep and poorly drained soil Clay surface underlain by a calcareous clay and silty clay substratum Permeability is slow Surface runoff is slow Erosion hazard is negligible Highest shrink/swell potential is high Landscape plantings require slow watering (such as drip irrigation) to encourage deep rooting and may also benefit from additions of organic matter, sulfur and iron and aluminum chelates. Listed as a Prime Farmland soil Taxonomic Class: Fine, montmorillonitic, thermic Typic Pelloxererts

TABLE 8.9-2
Soil Mapping Unit Descriptions and Characteristics

Map Unit	Description
111	**Danville silty clay loam, 0 to 2 percent slopes:** This soil mapping unit comprised the southeastern corner of the Eastshore project site and the entire laydown area, as well as the transmission line. It is also found at the Eastshore substation. The soils of this mapping unit are formed in alluvium that derived from sedimentary rocks on low terraces and alluvial fans. They occur between 10 and 200 feet of elevation. The Land Capability Classification for non-irrigated soils is IIIs-3 indicating that this soil has severe limitations restricting the choice of plants or requires special conservation practices due to droughty conditions caused by very slow permeability of clayey subsoil. The Capability Class is IIs-3 when irrigated indicating that this soil has moderate limitations restricting the choice of plants or requires moderate conservation practices due to droughty conditions caused by very slow permeability of clayey subsoil. The following properties are associated with this soil mapping unit: Very deep and well drained soil Silty clay loam surface, subsoil and substratum Permeability is slow Surface runoff is slow Erosion hazard is negligible Highest shrink/swell potential is high Landscape plantings require slow watering (such as drip irrigation) to encourage deep rooting and may also benefit from additions of organic matter to improve water intake, aeration and tilth. Listed as a Prime Farmland soil Taxonomic Class: Fine, montmorillonitic, thermic Pachic Argixerolls
143	**Sycamore silt loam, 0 to 2 percent slopes, drained:** This soil is found along a short segment of the electrical transmission line south of Breakwater Avenue (State Highway 92). The soils of this mapping unit are formed in alluvium that derived from sedimentary rocks on flood plains. They occur between 10 and 50 feet of elevation. The Land Capability Classification for non-irrigated soils is IIIc-1 indicating that this soil has severe limitations restricting the choice of plants or requires special conservation practices because of dry climatic conditions. The Capability Class is I when irrigated indicating that the soil has few limitation that restrict their use. The following properties are associated with this soil mapping unit: Very deep and poorly drained soil Silt loam surface, subsoil and substratum Permeability is moderate Surface runoff is slow Erosion hazard is slight Highest shrink/swell potential is moderate Landscape plantings may benefit from additions of nitrogen as well as organic matter to improve water intake and tilth. Listed as a Prime Farmland soil Taxonomic Class: Fine-silty, mixed, nonacid, thermic Aeric Haplaquepts

TABLE 8.9-2
Soil Mapping Unit Descriptions and Characteristics

Map Unit	Description
154	**Willows clay, 0 to 2 percent slopes, drained:** This soil is found along short segments of the southern end of the electrical transmission line and at the Eastshore substation. The soils of this mapping unit are formed in alluvium that derived mainly from sedimentary rocks on basin rims. They occur between 10 and 200 feet of elevation. The Land Capability Classification for non-irrigated soils is IIIs-5 indicating that this soil has severe limitations restricting the choice of plants or requires special conservation practices due to droughty conditions caused by very fine textured layers. The Capability Class is IIs-5 when irrigated indicating that this soil has moderate limitations restricting the choice of plants or requires moderate conservation practices due to droughty conditions caused by very fine textured layers. The following properties are associated with this soil mapping unit: Very deep and poorly drained soil Clay surface with calcareous clay subsoil and substratum Permeability is very slow Surface runoff is slow Erosion hazard is negligible Highest shrink/swell potential is high Landscape plantings require slow watering (such as drip irrigation) to encourage deep rooting and may also benefit from additions of organic matter to improve water intake, aeration and tilth. Additions of sulfur and iron and aluminum chelates may also benefit plant growth. Listed as a Prime Farmland soil Taxonomic Class: Fine, montmorillonitic, thermic Typic Pelloxererts

Notes:

Soil characteristics are based on soil mapping descriptions provided in the published soil survey (NRCS, 1981) and in the NRCS Official Series Descriptions provided on the NRCS website.

Soil descriptions are limited to those soil units that would be directly affected by the Eastshore project. Other soil mapping units that are within the project area buffer shown on Figure 8.9-1, but would not be directly impacted by Eastshore facilities include: **[106]** Botella loam, 0 to 2 percent slopes; **[138]** Reyes clay, ponded; **[139]** Reyes clay, drained; and **[162]** Water. Among these soils, the **[106]** Botella loam, 0 to 2 percent slopes is listed as a Prime Farmland Soil.

8.9.3.1 Soil Types, Agricultural Use, and Important Farmlands in the Proposed Eastshore Project Area

The types of land use surrounding the proposed site are presented and discussed in Section 8.4, Land Use. A review of project-specific and web-based aerial photographs and documentation from a nearby project (Calpine/Bechtel, 2001) confirmed that the site and immediately surrounding land uses are not used for agricultural production or to support livestock.

The soils mapped around the Eastshore project site and surrounding areas (soil mapping units [107] and [111]) are indicated to be of the soil capability subclass IIIs-3 and 5 (without irrigation) indicating that these soils have severe limitations for choice of plants or management (or both) due to droughty conditions caused by very fine layers or clayey subsoil.

All four of the mapped soil units described in Table 8.9-2 are listed as prime farmland soils. However, none of the actual soil mapping units in the project area are considered as prime farmlands because those lands have been developed for urban (industrial, commercial, or residential) uses.

The Farmland Mapping and Monitoring Program (FMMP) of the California Department of Conservation (CDC) provide statistics on conversion of farmland to non-agricultural uses for Alameda County where the Eastshore site is located (CDC, 2006). In the year 2004, Alameda County had approximately 9,268 acres of Important Farmlands (including Prime Farmland, Farmland of Statewide and Local Importance and Unique Farmlands) and an additional 244,975 acres of grazing land. In the period from 2002 to 2004, Important Farmlands had shown a net decrease of 649 acres (6.5 percent of 2002 amount) within the county.

The "Important Farmlands" mapping by the FMMP (see Figure 8.9-2) shows that the project site and surrounding areas to be designated as "Urban and Built-Up Land" with limited areas of "Other Land"(mostly associated with tidal marsh areas) in the southwest and southern portions of the project area.

The drainage class information provided in Table 8.9-2 shows that three of the four soil mapping units that would be directly affected by the Eastshore facilities are poorly drained. Only the **[111]** Danville silty clay loam was indicated to be well drained. The presence of poorly drained soils would normally indicate potential conditions favorable for jurisdictional wetlands to occur. However, the developed urban nature of the areas where poorly drained soils had been mapped indicates that it is likely that those soils have been either drained or filled.

8.9.3.2 Soil Loss and Erosion

The factors that have the largest effect on soil loss include steep slopes, lack of vegetation, and erodible soils composed of large proportions of fine sands. The soils found in the Eastshore site, laydown area, and along the linear features are nearly level (all within a 0 to 2 percent slope class). While the Eastshore site soils do not have vegetative cover, they are currently paved or otherwise covered by existing facilities. In general, the soil types at the Eastshore site and along the linear features, as indicated by the NRCS mapping (1981), have surface soil conditions that are very fine grained (silty clay loam, clay loam, or clay). The risk of erosion for the mapped soils is considered to be only negligible to slight. The potential for erosion is further mitigated by the fact that the proposed areas where construction activities will occur is surrounded by other developed properties and buildings that will limit locally significant ground-level winds that could lead to excessive wind erosion.

Best management practices (BMPs) will be used to minimize erosion at the site during construction. These measures typically include mulching, physical stabilization, dust suppression, berms, ditches, and sediment barriers. Water erosion will be mitigated through the use of sediment barriers and wind erosion potential will be reduced significantly by keeping soil moist or by covering soil piles with mulch or other wind protection barriers. These temporary measures will be removed from the site after the completion of construction and the site will be paved or completely covered. The final state of the site during operations will be completely paved or otherwise covered so soil erosion loss at that point would be negligible.

8.9.3.2.1 Water Erosion. Despite the low potential for soil erosion in the Eastshore project area, an estimate of erosion by water is provided in Table 8.9-3. This estimate of soil loss by water erosion was developed using the Revised Universal Soil Loss Equation (RUSLE2) program using the following assumptions:

- The 6.22-acre Eastshore site is currently being cleared of structures. If necessary, the site will be graded at the beginning of construction to ensure proper drainage. To be conservative, it was assumed that active soil grading on the plant site would occur over a 2-month period. It was assumed that the soil for the site would be disturbed for an additional 16-month construction period. No significant grading is expected for the laydown area. However, it is assumed that a 1-month period of disturbance to the laydown area (for clearing and minor grading) would occur after which time the laydown area would be covered with a protective layer of gravel to permit year-round use.
- The natural gas supply pipeline will be installed using jack and bore techniques to establish an approximately 200-foot underground pipeline beneath Clawiter Road and the BNSF rail corridor. Both working ends of the horizontal bore are currently paved. Soil cuttings from the borehole will be collected and disposed of properly after completion of the gas pipeline. For this reason, soil loss was not estimated for the gas pipeline linear.
- For the overhead transmission line, overhead towers would be used to connect the Eastshore to the PG&E Eastshore substation. The length of the connection would be about 7,800 feet. It is estimated that as many as 12 new poles would be installed, proportionally distributed along the length of the chosen alternative and that the disturbed foot print for each tower would be 4 feet by 4 feet. The transmission line would have an estimated total disturbed impact area of 0.0044 acre.
- Estimates of soil loss (in tons) were made for the affected impact area associated with each mapped soil type (NRCS, 1981).
- RUSLE2 rainfall erosivity conditions were estimated for the Eastshore site coordinates using site-specific rainfall estimates from on-line National Weather Service data (NOAA Atlas 2) at http://hdss.nws.noaa.gov/cgi-bin/hdsc/na2.perl?qlat=33.9978 $qlon=-118.2221 & Submit=submit.
- Assumes a 100-foot slope length. Estimated soil unit slope is the midpoint of the minimum and maximum of the unit slope class (i.e., slope of 1 percent).

TABLE 8.9-3
Estimate of Soil Loss by Water Erosion Using Revised Universal Soil Loss Equation (RUSLE2)

			Estimates Using Revised Universal Soil Loss Equation[a]		
Feature (acreage)	**Activity**	**Duration (months)**	**Soil Loss (tons) without BMPs**	**Soil Loss (tons) with BMPs**	**Soil Loss (tons/yr) No Project**
Site (5.91 of 6.22 acres disturbed)	Grading	2	1.898	0.025	0.112
	Construction	16	7.004	0.200	--
Laydown Area (2.38 of 4.65 acres disturbed)	Grading	1	0.515	0.007	0.057
Transmission Line (0.0044 acres)	Grading/excavation	0.1	0.00009	0.0000012	0.00010
Total Project Soil Loss Estimates	**All activities listed above**	**24**	**9.417**	**0.232**	**0.169**

Notes:

[a] Soil losses (tons/acre/year) are estimated using RUSLE2 software available online http://fargo.nserl.purdue.edu/rusle2_dataweb/RUSLE2_index.htm.

The soil characteristics were estimated using generalized RUSLE2 soil profiles corresponding to the mapped soil unit.

Soil loss (R-factors) were estimated using 2-year, 6-hour point precipitation frequency amount for the nearest National Weather Service station to the Eastshore site online at http://hdsc.nws.noaa.gov/hdsc/pfds/sa/sca_pfds.html.

Estimates of actual soil losses use the RUSLE2 soil loss times the duration and the affected area. The No Project Alternative estimate does not have a specific duration so loss is given as tons/year.

Project Assumptions:

- About 95% of the entire Eastshore site (5.91 of 6.22 acres) will be disturbed.
- About 51% of the laydown area (2.38 of 4.65 acres) will require minimum grading (estimated at 1 month) before the area is covered with gravel to permit year-round use.
- The overhead transmission line will have 12 towers and each tower will have a 4-foot x 4-foot footprint. It is assumed that the disturbance at each pole is 3 days.

RUSLE2 Assumptions:

100-ft slope length. Estimated soil unit slope is the midpoint of the minimum and maximum of the unit slope class.

Construction soil losses assume the following inputs: Management - Bare ground; Contouring - None, rows up and down hill; Diversion/terracing - None; Strips and Barriers - None.

Grading soil losses assume the following inputs: Management - Bare ground/rough surface; Contouring - None, rows up and down hill; Diversion/terracing - None; Strips and Barriers - None.

Construction with BMP soil losses assume the following inputs: Management - Silt fence; Contouring - Perfect, no row grade; Diversion/terracing - None; Strips and Barriers - 2 fences, 1 at end of RUSLE slope.

No Project soil losses assume the following inputs: Management - Dense grass, not harvested; Contouring - None, rows up and down hill; Diversion/terracing - None; Strips and Barriers - None.

Soil losses are estimated using the following RUSLE2 conditions:

- **Construction** soil losses were approximated using Management as "bare ground, smooth surface;" Contouring: None, rows up and down hill; Diversion/terracing: None; and Strips and Barriers: None.

- **Active grading** soil losses were approximated using Management as "bare ground, rough surface" soil conditions; Contouring: None, rows up and down hill; Diversion/terracing: None; and Strips and Barriers: None.
- **Construction** soil losses **with implementation of construction BMPs** was approximated using Management as "Silt fence;" Contouring: Perfect, no row grade; Diversion/terracing: None; and Strips and Barriers: 2 fences, one at end of RUSLE2 slope.
- A **"No Project"** soil loss estimate was also approximated using Management as "Dense grass – not harvested;" Contouring: None, rows up and down hill; Diversion /terracing: None; and Strips and Barriers: None.

The estimated soil loss by water erosion is 9.42 tons for the project cycle without the use of construction BMPs, which, when applied, reduce the soil loss estimate to 0.232 tons over the same period. It should be recognized that the estimate of accelerated soil loss by water is conservative because of the 'worst-case' assumptions noted above. The full implementation of construction BMPs is expected to reduce soil erosion losses to near negligible levels.

8.9.3.2.2 Wind Erosion. The potential for wind erosion of surface soils (i.e., fugitive dust emissions) for the Eastshore project was estimated by calculating the total suspended particulates that could be emitted from active grading activities, unpaved road traffic, and wind erosion of exposed soil. The total site area and estimated grading duration were multiplied by emission factors to estimate the particulate matter less than 10 microns in equivalent diameter (PM_{10}) or total suspended particulate matter (TSP) emitted from the site. Fugitive dust from site grading was calculated using the default PM_{10} emission factor used in the South Coast Air Quality Management District (SCAQMD), Level 2 Analysis Procedure (MRI, 1996) and AP-42, Chapter 11.9 Western Surface Coal Mining, Final Section Supplement E (USEPA, 1995, 1998). The conversion of total suspended particulate emissions from PM_{10} emissions used the factor provided in the Bay Area Air Quality Management District CEQA Guidelines (BAAQMD, 1999).

Mitigation measures, such as watering exposed surfaces, are used to reduce PM_{10} emissions during construction activities. The PM_{10} reduction efficiencies are taken from the SCAQMD *CEQA Handbook* (1993) and were used to estimate the effectiveness of the mitigation measures. Table 8.9-4 summarizes the mitigation measures and PM_{10} efficiencies applied to the emission calculations.

TABLE 8.9-4
Mitigation Measures for Fugitive Dust Emissions

Mitigation Measure	PM_{10} Emission Reduction Efficiency	Efficiency Applied
Water active sites at least three times daily	45 to 85%	65%
Enclose, cover, water twice daily, or apply non-toxic soil binders, according to manufacturer's specifications, to exposed piles (i.e., gravel, sand, dirt) with 5 percent or greater silt content	30 to 74%	50%

Source: SCAQMD CEQA Handbook, Table 11-4. (1993)

Table 8.9-5 summarizes the mitigated TSP predicted to be emitted from the site from grading and the wind erosion of exposed soil. Without mitigation, the maximum predicted erosion of material from the site with implementation of mitigation measures is estimated at 3.28 tons over the course of the project construction cycle. This estimate is reduced to approximately 1.53 tons by implementing basic mitigation measures. These estimates are extremely conservative because they assume soil will be exposed for the entire 18-month construction period. It is expected that actual wind erosion would be much lower because of the developed urban nature of the project area. Existing buildings surrounding the construction areas would be expected to significantly reduce erosive winds at ground level.

TABLE 8.9-5
Estimate of PM10 Emitted from Grading and Wind Erosion

Emission Source	Area	Duration (months)	Unmitigated PM_{10} (tons)	Mitigated PM_{10} (tons)
Grading Dust:				
Project Site	5.91 of 6.22 acres	2	0.242	0.085
Laydown Area	2.38 of 4.65 acres	1	0.049	0.399
Wind Blown Dust:				
Project Site	5.91 of 6.22 acres	16	2.994	1.048
Estimated Total			**3.285**	**1.531**

Assumptions:

Assumes that about 95% of the project site (5.91 of 6.22 acres) will be disturbed and that the grading will be completed within a 2-month period.

Assumes that about 51% of the laydown area (2.38 of 4.65 acres) will be disturbed and that the grading will be completed within a 1-month period.

Assumes bare soil at the project site is exposed for 16 months after grading during construction phase.

The overhead transmission lines will have 12 new poles along the proposed route with a total estimated impact area of 0.0044 acre. However, because these will be installed within previously developed urban areas using construction BMPs, no estimate of soil loss by wind erosion is given.

Data Sources:

[a] PM_{10} Emission Factor Source: MRI, SCAQMD Project No. 95940, Level 2 Analysis Procedure, December 1996.

[b] PM_{10} to TSP Conversion Source: BAAQMD CEQA Guidelines, December 1999.

[c] TSP Emission Factor Source: AP-42 (USEPA, 1995), Chapter 11.9 Western Surface Coal Mining, Table 11.9-4, (revised October 1998).

SCAQMD CEQA Handbook (1993) Table 11-4 for mitigation efficiency rates (as summarized in Table 8.9-4)

8.9.3.3 Other Significant Soil Characteristics

A significant soil characteristic concerning the proposed project is the potential for soils with a high shrink/swell potential. These soils occur throughout the project area except for a small portion of the transmission line route. High shrink/swell potential is associated with the Clear Lake clay, Danville silty clay loam, and Willows clay soils. The Sycamore silt loam is indicated to have a moderate shrink/swell potential. Expansive clays have the potential to

be unsuitable for use as bearing surfaces for foundations of structures and poles due to their potential to heave or collapse with changing moisture content.

The potential for shallow water conditions is also expected at the Eastshore site and along the southern portions of the transmission line route. These areas are mapped as poorly drained soils (Clear Lake clay, Sycamore silt loam, and Willows clay soils). It is expected that actual water levels may be lower if the units are drained. In addition, there is a strong potential for these developed urban areas to have an undetermined amount of fill over the native poorly-drained soils. Undeveloped areas without fill have the potential to support jurisdictional wetlands.

A Phase I investigation of the Eastshore site did not indicate that any releases of hazardous materials or petroleum related liquids had occurred at the property (TRC, 2005). However, because the site history included activities where these compounds were used on the property, there is a potential that undiscovered contamination could exist.

8.9.4 Potential Environmental Consequences

The following subsections describe the potential environmental effects on agricultural production and soils during the construction and operation phases of the project.

The potential for impacts to agricultural and soils resources were evaluated with respect to the criteria described in the Appendix G checklist of CEQA. An impact is considered potentially significant if it would:

- Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps for the Farmland Mapping and Monitoring Program by the California Resources Agency to non-agricultural use
- Conflict with existing zoning for agricultural use or a Williamson Act contract
- Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland to non-agricultural use
- Impact jurisdictional wetlands
- Result in substantial soil erosion

The following subsections describe the anticipated environmental impacts on agricultural production and soils during plant construction and operation.

8.9.4.1 Impacts on Agricultural Soils or Wetland Soils

As previously indicated, the Eastshore site and associated linear features are located within an urban area of the City of Hayward. This area is already developed for industrial, commercial, and residential land uses and there are no agricultural uses near the Eastshore site or associated features. While the mapped soils in these areas are considered to be suited for commercial crop production when irrigated, the urban developed nature of this area precludes any future use of these areas for agricultural purposes. For this reason, the proposed Eastshore project will not have any direct impact on agricultural soils or important farmlands. The project will not affect any properties currently under a Williamson Act contract or conflict with existing zoning for agricultural use.

Based on the urban developed nature of the Eastshore project area, it is not expected that the project will affect wetland soils.

8.9.4.2 Construction

Construction activities can potentially impact soil resources by increasing soil erosion and soil compaction. The effect of soil erosion would be that soil lost during or after construction could increase the sediment load in surface receiving waters downstream of the construction site. The magnitude, extent, and duration of this construction-related impact depends on the erodibility of the soil (discussed above), the proximity of the construction activity to receiving waters, and the construction methods, duration, and season.

There is very little potential for erosion associated with the soil types at the Eastshore and surrounding areas. By requiring the use of BMPs during construction, the impacts from soil erosion are expected to be less than significant. Typical BMPs are outlined in Section 8.9.5.

Construction of the proposed project would result in soil compaction during the construction of structure foundations, water and gas pipelines, and paved roadway and parking areas. Soil compaction would also result from vehicle traffic along temporary access roads. Soil compaction increases soil density by reducing soil pore space. This, in turn, reduces the ability of the soil to absorb precipitation and transmit gases for respiration of soil microfauna. Soil compaction can result in increased runoff, erosion, and sedimentation. The incorporation of BMPs during project construction will result in less than significant impacts from soil compaction during construction.

Since the site and project linears will be constructed in currently developed areas that will be repaved or otherwise protected after construction, the overall anticipated effects of construction are considered to be less than significant with mitigation incorporated. Because of the historical uses of the Eastshore site for manufacturing (TRC, 2005), it is recommended that construction planning include a contingency for handling of contaminated soils should they be discovered during site construction.

8.9.4.3 Operation

Operation of the Eastshore project would not result in impacts to the soil from erosion or compaction. Routine vehicle traffic during plant operation will be limited to existing roads, all of which will be paved, and standard operational activities should not involve the disruption of soil. Therefore, impacts to soil from project operations would be less than significant.

8.9.4.4 Effects of Generating Facility Emissions on Soil-Vegetation Systems

There is a concern in some areas that emissions from the generating facility, principally nitrogen (as oxide of nitrogen emissions) from the combustors or particulate matter from the cooling towers, would have an adverse effect on soil-vegetation systems in the project vicinity. This is principally a concern where environments that are highly sensitive to nutrients or salts, such as serpentine habitats, are downwind of the project.

In this case, the dominant land use around the project is urban and there are no serpentine habitats in the immediate project area. The addition of small amounts of nitrogen to the industrial and commercial areas would be a less than significant impact because of the

paucity of vegetation in these areas. Within the more vegetated residential areas, the addition of small amounts of nitrogen would be insignificant within the context of fertilizers, herbicides, and pesticides typically used by homeowners.

8.9.4.5 Cumulative Effects

As previously described, the effects on soil erosion, sedimentation, and compaction associated with the Eastshore project are not considered to be significant. Therefore, the cumulative impacts of the proposed Eastshore project would be negligible.

8.9.5 Mitigation Measures

Erosion control measures would be required during construction to help maintain water quality, protect property from erosion damage, and prevent accelerated soil erosion or dust generation that destroys soil productivity and soil capacity. Temporary erosion control measures could be installed before construction begins, would be maintained and evaluated during construction, and would be removed from the site after the completion of construction.

8.9.5.1 Temporary Erosion Control Measures

Temporary erosion control measures would be implemented before construction begins, and would be evaluated and maintained during construction. These measures typically include revegetation, mulching, physical stabilization, dust suppression, berms, ditches, and sediment barriers.

For the transmission line, temporary erosion control might include asphalt patching around poles until permanent paving can be completed. If required on non-paved areas disturbed by the power line construction, revegetation would be accomplished using locally prevalent, fast-growing plant species compatible with adjacent existing plant species.

During construction of the project and the related linear facilities, dust erosion control measures would be implemented to minimize the wind-blown erosion of soil from the site. Water would be sprayed on the soil in construction areas to control dust and during revegetation.

Sediment barriers, such as straw bales, sand bags, or silt fences, slow runoff and trap sediment. Sediment barriers are generally placed below disturbed areas, at the base of exposed slopes, and along streets and property lines below the disturbed area. Sediment barriers are often placed around sensitive areas, such as wetlands, creeks, or storm drains to prevent contamination by sediment-laden water.

The Eastshore site is relatively level; therefore, it is not considered necessary to place barriers around the property boundary. However, some barriers would be placed in locations where offsite drainage could occur to prevent sediment from leaving the site. If used, straw bales would be properly installed (staked and keyed), then removed or used as mulch after construction. Runoff detention basins, drainage diversions, and other large-scale sediment traps are not considered necessary due to the level topography and surrounding paved areas. Any soil stockpiles would be stabilized and covered if left onsite for long periods of time, including placement of sediment barriers around the base of the stockpile.

8.9.5.2 Permanent Erosion Control Measures

Permanent erosion control measures on the site will include graveling, paving and drainage systems.

A Drainage, Erosion and Sedimentation Control Plan (DESCP) will be developed in conjunction with California Energy Commission (CEC) staff to set performance standards and monitor the effectiveness of soil loss mitigation measures. This plan will address the timing and methods for monitoring plant establishment, as well as reporting and response requirements.

8.9.6 Permits and Agency Contacts

Permits required for the project, the responsible agencies, and proposed schedule are shown in Table 8.9-6.

TABLE 8.9-6
Permits and Agency Contacts for Eastshore Soils

Permit or Approval	Schedule	Agency Contact	Applicability
Project Linears and Proposed Transmission Line			
Erosion and Sediment Control Plan	Prior to construction	California Energy Commission 1516 Ninth Street, MS-2000 Sacramento, CA 95814	Regulation of drainage and erosion associated with site and linear facilities during construction
Issuance of construction and encroachment permits	Minimum of 30 days prior to construction	Stan Morris City of Hayward Public Works Department 777 B Street Hayward, CA 94541 (510) 583-4140	Site grading, and excavation at site or along linears within public rights-of-way
Construction Activity, Stormwater and NPDES Permit	Prior to construction	Janet O'Hara San Francisco Bay RWQCB 1515 Clay Street, Suite 1400 Oakland, CA 94612 (510) 622-2300	Regulation of stormwater discharge from site and linear facilities during construction

8.9.6.1 Site and Linears

A construction and an encroachment permit will be obtained from the City of Hayward before construction begins at the Eastshore site or along the linear features. Once the project is licensed and begins final design, grading and construction plans for the proposed project would be first approved by a Certified Building Official (CBO) as required by the CEC Compliance group. Plans approved by the CBO are then submitted to the City of Hayward Public Works Department.

8.9.7 References

Bay Area Air Quality Management District (BAAQMD). 1999. *BAAQMD CEQA Guidelines, Assessing the Air Quality Impacts of Projects and Plans*. December.

California Department of Conservation (CDC). 2006. Farmland Mapping and Monitoring Program Statistics web page at http://www.consrv.ca.gov/dlrp/FMMP/fmmp_stats.htm.

Calpine/Bechtel Joint Development. 2001. Application for Certification for the Russell City Energy Center, Hayward, California. May.

Hayward, City of. 2006. Zoning Map. Last revised: June 12.

Midwest Research Institute (MRI). 1996. South Coast Air Quality Management District (SCAQMD) Project No. 95040, Level 2 Analysis Procedure. March.

National Resource Conservation Service (NRCS) (formerly the Soil Conservation Service [SCS] of the U.S. Department of Agriculture). 1981. *Soil Survey of Alameda County, California, Western Part.* Produced in cooperation with the University of California Agricultural Experiment Station. March.

_____. 1983. *National Engineering Handbook*.

National Weather Service data (NOAA Atlas 2) at http://hdss.nws.noaa.gov/cgi-bin/hdsc/na2.perl?qlat=33.9978 $qlon=-118.2221 & Submit=submit. Accessed June 30, 2006.

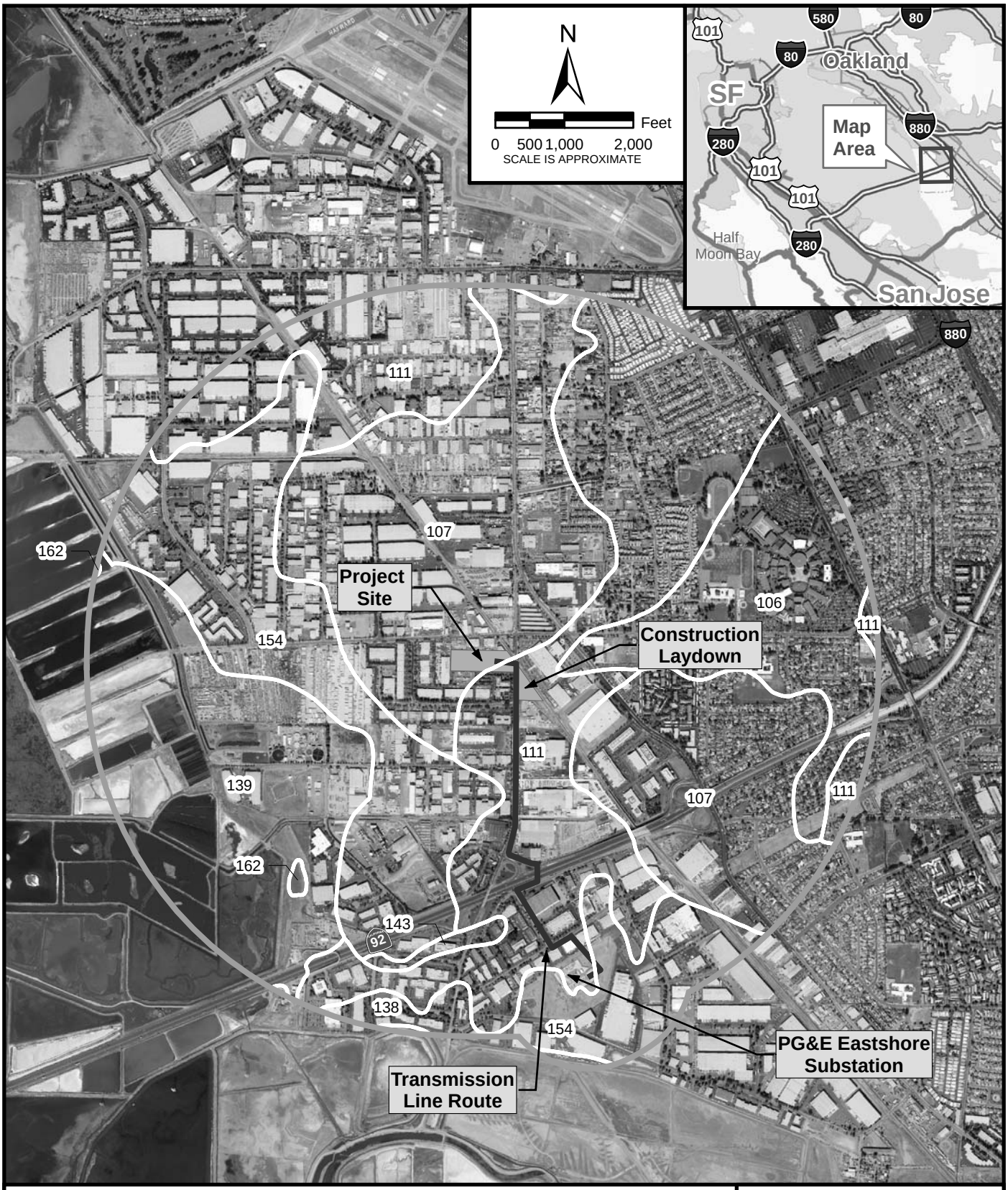
Sawrey-Kubicek, Phil. 2006. Personal communication with Alameda County Planning Department on June 30.

South Coast Air Quality Management District (SCAQMD). 1993. CEQA Handbook.

TRC. 2005. *Phase I Environmental Site Assessment, Former Trend Technologies Metal Finishing Facility, 25101 Clawiter Road, Hayward, California*. Prepared for Black Hills Energy, Inc., October 20.

U.S Environmental Protection Agency (USEPA). 1995. *Compilation of Air Pollutant Emission Factors AP-42*. Volume I: Stationary Point and Area Sources. Fifth Edition. January.

_____. 1998. Chapter 11 Mineral Products Industry, Section 11.9 Western Surface Coal Mining, Final Section, Supplement E. October.



LEGEND

- Site Location
- 1 mile buffer from Project Site Includes 1/4 mile buffer from outlying Transmission Lines
- Soil Map Unit Boundary
- Transmission Line Route

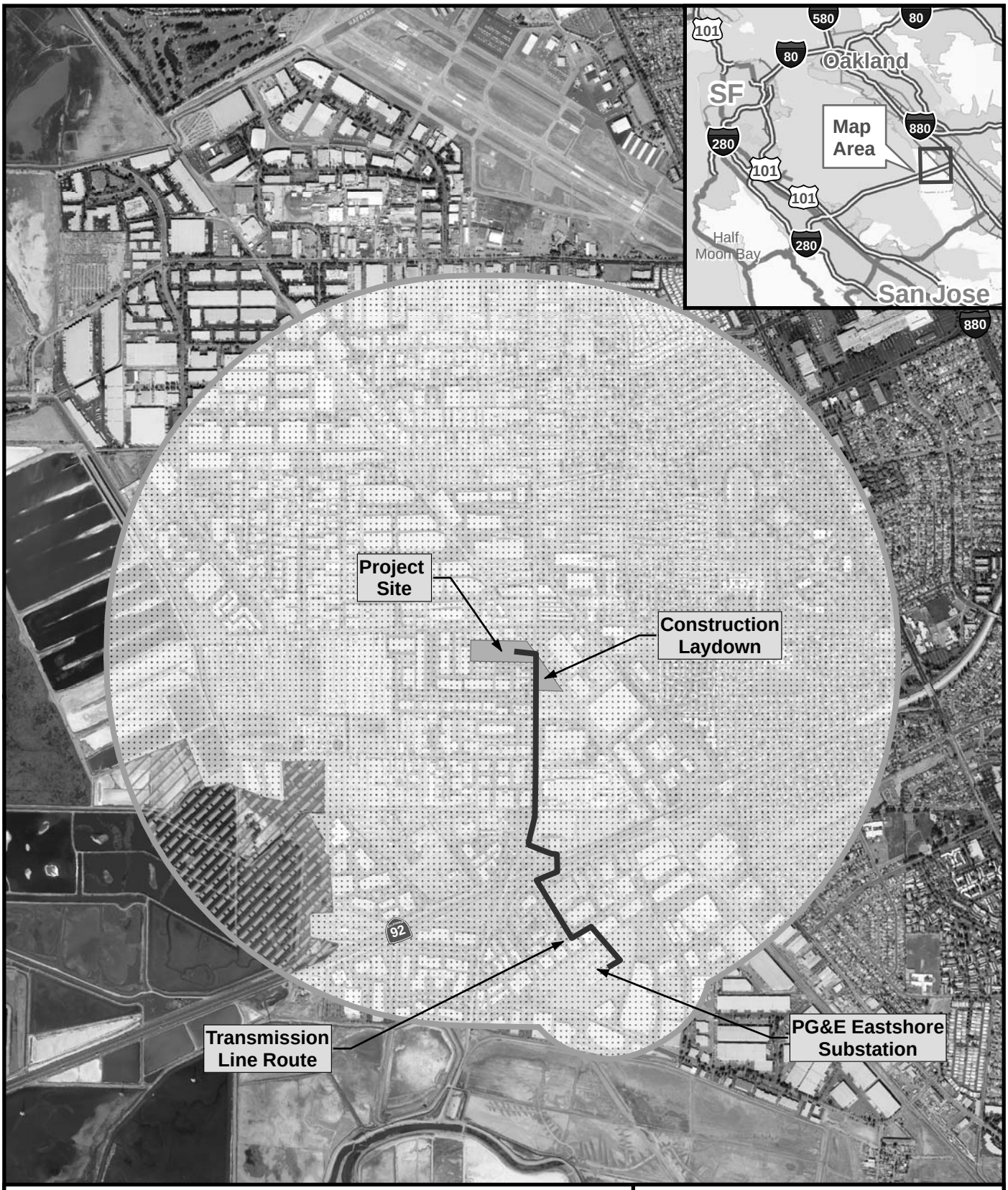
Soil Map Unit Key

106 Botella loam, o to 2 percent slopes
107 Clear Lake clay, 0 to 2 percent slopes, drained
111 Danville silty clay loam, 0 to 2 percent slopes
138 Reyes clay, ponded
139 Reyes clay, drained
143 Sycamore silt loam, drained
154 Willows clay, drained
162 Water

FIGURE 8.9-1
SOILS MAP
EASTSHORE ENERGY CENTER
HAYWARD, CALIFORNIA

CH2MHILL

BAO \\ZINFANDEL\GIS\PROJECTS\EASTSHORE\MAPFILES\FIG_8_9_1_SOILS.MXD FIG_8_9_1_SOILS.PDF 8/25/2006 11:44:42



LEGEND

1 mile buffer from Project Site Includes 1/4 mile buffer from outlying Transmission Lines

Transmission Line Route

Urban and Built-up Land

Other Land

1,000 500 0 1,000

Feet

SCALE IS APPROXIMATE

N

FIGURE 8.9-2
IMPORTANT FARMLANDS MAP
EASTSHORE ENERGY CENTER
HAYWARD, CALIFORNIA

CH2MHILL

BAO \\ZINFANDEL\GIS\PROJECTS\EASTSHORE\MAPFILES\FIG_8_9_2_FARMS.MXD FIG_8_9_2_FARMS.PDF 8/25/2006 11:33:19