5.11 Soils

5.11.1 Introduction

On August 16, 2001, GWF Energy LLC filed an Application for Certification (AFC) with the California Energy Commission (CEC) for the Tracy Peaker Project (TPP). The CEC found the AFC data adequate on October 17, 2001. The CEC released a staff assessment on December 28, 2001, and a supplemental staff assessment on February 1, 2002. The CEC published its Presiding Member's Proposed Decision on May 31, 2002, with the project receiving its Final Decision on July 17, 2002. These documents are incorporated by reference into this AFC and are presented in electronic form in Appendix 1A.

This section describes the potential effects of the construction and operation of the GWF Tracy Combined Cycle Power Plant (GWF Tracy) on soil resources, and is organized as follows: Section 5.11.2 presents the laws, ordinances, regulations, and standards (LORS) applicable to soils and their use; Section 5.11.3 describes the existing environment that could be affected, including soil types and their use (such as agriculture); Section 5.11.4 identifies potential environmental effects, if any, from project development; Section 5.11.5 discusses cumulative effects; Section 5.11.6 presents mitigation measures; Section 5.11.7 provides agency contacts for all involved agencies; Section 5.11.8 describes permits required for the project; and Section 5.11.9 provides the references used to develop this section.

5.11.2 Laws, Ordinances, Regulations, and Standards

Federal, state, and local LORS applicable to soils are summarized in Table 5.11-1 and discussed below.

TABLE 5.11-1
Laws, Ordinances, Regulations, and Standards for Soils

LORS	Requirements/Applicability	Administering Agency	AFC Section Explaining Conformance
Federal			
Federal Water Pollution Control Act of 1972: Clean Water Act (CWA) of 1977 (including 1987 amendments)	Regulates stormwater discharge from construction and industrial activities	Regional Water Quality Control Board (RWQCB) Central Valley Region 5 under State Water Resources Control Board (SWRCB). U.S. Environmental Protection Agency (EPA) may retain jurisdiction at its discretion.	5.11.2.1.1
Natural Resources Conservation Service (NRCS) (1983), National Engineering Handbook, Sections 2 and 3	Standards for soil conservation	Natural Resources Conservation Service	5.11.2.1.2

TABLE 5.11-1
Laws, Ordinances, Regulations, and Standards for Soils

LORS	Requirements/Applicability	Administering Agency	AFC Section Explaining Conformance
State			
Porter-Cologne Water Quality Control Act of 1972; Cal. Water Code 13260-13269: 23 CCR Chapter 9	Regulates stormwater discharge	CEC and Central Valley Region (5S) under SWRCB	5.11.2.2.1
Local			
San Joaquin County General Plan 2010, Section II – Community Development & Section IV – Resources	Regulates transmission lines; Puts limits on development of agricultural soils	San Joaquin County Community Development Department	5.11.2.3
Title 9 – Development Title of San Joaquin County	Provides requirements for alteration of land within county	San Joaquin County Community Development Department	5.11.2.3
Improvement Standards for San Joaquin County	Provides design standards for improvements within County	San Joaquin County Department of Public Works	5.11.2.3
San Joaquin County Standard Specifications and Special Provisions	Provides the County's minimum requirements for excavation safety, dust control, earthwork, and erosion and pollution control, and more.	San Joaquin County Department of Public Works	5.11.2.3

5.11.2.1 Federal LORS

5.11.2.1.1 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 CWA following an amendment in 1977, establishes requirements for discharges of stormwater or wastewater from any point source that would affect the beneficial uses of waters of the United States. The CWA effectively prohibits discharges of stormwater from construction sites unless the discharge is in compliance with a National Pollutant Discharge Elimination System (NPDES) permit. SWRCB is the permitting authority in California and has adopted a statewide general permit for stormwater discharges associated with construction activity (General Construction Permit; SWRCB, 1999) that applies to projects resulting in one or more acres of soil disturbance. GWF Tracy will result in disturbance of more than one acre of soil; therefore, the project will require the preparation of a stormwater management plan. The requirements are described in greater detail in Section 5.15, Water Resources.

The CWA's primary effect on 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.

5.11.2.1.2 U.S. Department of Agriculture Engineering Standards

Sections 2 and 3 of the USDA-NRCS National Engineering Handbook (1983) provide standards for soil conservation during planning, design, and construction activities. GWF Tracy will need to conform to these standards during grading and construction to limit soil erosion.

5.11.2.2 State LORS

5.11.2.2.1 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 GWF Tracy 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 Central Valley RWQCB, which controls surface water discharges in the project area, may become involved indirectly if soil erosion threatens water quality.

5.11.2.3 Local LORS

Applicable San Joaquin County regulations include the General Plan 2010 (San Joaquin County, 1992), the Development Title (LexisNexis Municipal Codes, 1995), the Improvement Standards (San Joaquin County Department of Public Works, 1997), as well as the Standard Specifications and Special Provisions document (San Joaquin County Department of Public Works, 2008).

Sections of the General Plan that may be relevant to this project include Resources (Section IV), and Community Development (Section II). Policies regarding soil conservation are found in the Agricultural Lands Section of the Resources portion of the plan. Policies regarding transmission lines are found in the Utilities Section of the Community Development portion of the plan.

The Development Title for San Joaquin County describes the requirements for land alteration within the county. Several of the Development Title divisions that may apply to this project include Division 6 (Agricultural Zones), Division 14 (Grading and Excavation Regulations), and Division 15 (Natural Resources Regulations). Division 18 (Williamson Act Regulations) do not apply because the property is already developed for nonagricultural uses and any offsite impacts (such as a laydown area) would be temporary.

The County Improvement Standards document describes design standards for roads, storm drains, water systems, sewer systems, and fire access that would apply to construction on the site.

The San Joaquin County Standard Specifications and Special Provisions document provides the County's minimum requirements for excavation safety, dust control, earthwork, watering, erosion control and pollution control.

5.11.3 Environmental Setting

GWF Tracy is located in San Joaquin County, approximately 4.1 miles southwest of Tracy, California and about 20 miles southwest of Stockton, California. The project site is located on an approximately 16.38-acre site (the site of the existing TPP) within a 40-acre parcel

owned by GWF Energy, LLC. This site is within the "sphere of influence" of the City of Tracy, but is outside of the actual city boundaries.

The GWF Tracy site is bounded by the Delta-Mendota Canal to the southwest, agricultural property to the south and east, and the Union Pacific Railroad to the north. Immediately north of the railroad are the Owens-Brockway glass container manufacturing plant and the Nutting-Rice warehouse. The Tracy biomass power plant is located approximately 0.6 mile to the northwest.

Surrounding land uses include industrial directly north of GWF Tracy and agriculture to the west, east, and south. The nearest residential properties are located approximately 0.80 mile southeast of the site (along South Lammers Road), and approximately 0.95 mile northeast of the site, north of West Schulte Road.

GWF Tracy will be constructed within the property of the existing TPP. Natural gas for the project will be delivered by connecting to the existing natural gas pipeline (no offsite natural gas pipeline construction will be required). The Byron Bethany Irrigation District (BBID) will continue to supply the project with industrial process water and nonpotable domestic water from the Delta-Mendota Canal. Water will be provided to the project by connecting to an existing onsite water pipeline. Drinking water for the facility will be provided by a local bottled water vendor. The plant will be a near-zero wastewater discharge facility; small quantities of industrial wastewater from the plant will be stored onsite and periodically transported from the plant via licensed waste haulers for offsite recycling or disposal. The existing electrical transmission system will be modified, requiring a new interconnecting transmission line from transmission lines adjacent to the project site (along the southeastern property line). Two termination structures will be required to interconnect the project to the transmission line adjacent to the project fence line to the southeast.

A description of the soils in the proposed project area was developed using the online Soil Survey of San Joaquin County, California (NRCS, 2008a). Descriptions of the soil mapping units were developed from the soil survey and the online soil series descriptions (NRCS, 2008b; Soil Survey Staff, 2008).

Soil map units for the project area are identified in Figure 5.11-1. Soil map unit characteristics for the area potentially affected by project construction are summarized in Table 5.11-2. The project area includes the proposed GWF Tracy site, the relocated stormwater retention basin, the relocated equipment storage area, and the area of the additional two termination structures adjacent to the project fence line. The table summarizes depth, texture, drainage, permeability, water runoff, and items related to revegetation potential. Actual soil conditions in the project area could differ from what is described in the generalized soil descriptions because the site has already been graded for the development of the existing TPP.

5.11.3.1 Agricultural Use

Based on a review of aerial photography, it appears that much of the land immediately surrounding GWF Tracy is used for agricultural production. Most of this land looks to be in row crops with the exception of a small orchard to the southwest.

5.11.3.2 Soil Types

Table 5.11-2 describes the properties of the soil mapping units that are found in the vicinity of the GWF Tracy site. As indicated, the soil mapping units in the project area are nearly level soils formed on old terraces from sandstone and shale. These soils are moderately well to well drained. Due to the developed nature of the site, it is possible that soil conditions could vary from those mapped. The previous development of the TPP likely entailed significant mixing during the grading of soils beneath the foundations and roadways. These soils would have to be suitable for compaction to support structures and roadways, so they are expected to consist of a mixture with a wide range of coarse-textures particles (from silt to gravel sizes). They would not be expected to contain unsuitable materials, such as organic debris or expansive clays. It is likely that the development of the GWF Tracy site involved the addition of non-native soils because of the potential expansive behavior of the native soils.

TABLE 5.11-2
Soil Mapping Unit Descriptions and Characteristics

Map Unit	Description	
118	Capay clay, 0 to 2 percent slopes	
	This soil unit covers the edges of the property:	
	Formation:	In moderately fine and fine textured alluvium derived from sandstone and shale or other mixed rock sources
	Typical profile:	Clay texture throughout
	Shrink-swell capacity:	High (Linear Extensibility >6)
	Depth and drainage:	Very deep (>60 inches) and moderately well drained
	Permeability:	Slow to very slow
	Runoff:	Negligible to high
	Erosion hazard:	Slight to high
	Capability class:	2s (irrigated), 4s (non-irrigated)
	Taxonomic class:	Fine, smectitic, thermic Typic Haploxererts
252	Stomar clay loam, 0 to 2 percent slopes	
	This soil unit covers the middle portion of the property:	
	Formation:	In material weathered from sandstone and shale
	Typical profile:	Clay loam over clay loam and clay
	Shrink-swell capacity:	High (Linear Extensibility >6)
	Depth and drainage:	Very deep (>60 inches) and well drained
	Permeability:	Slow
	Runoff:	Negligible to high
	Erosion hazard:	Slight to high
	Capability class:	2s (irrigated), 4s (non-irrigated)
	Taxonomic class:	Fine, smectitic, thermic Mollic Haploxeralfs

Soil characteristics listed above are based on soil mapping descriptions provided in the online soil survey (http://websoilsurvey.nrcs.usda.gov).

Soil descriptions provided above are limited to those soil units that could be directly affected by the GWF Tracy Project. Other soil mapping units, which are outside of the project footprint but are shown on Figure 5.11-1, include the following: 113 – Calla clay loam, 2 to 8% slopes; 114 – Calla-Carbona complex; 116 – Calla-Pleito complex; 118 – Capay clay, 0 to 2% slopes; 119 – Capay clay, 2 to 5% slopes; 123 – Carbona clay loam; and 281 – Zacharias clay loam.

As shown on Figure 5.11-1, 29.9 percent of the site lies within soil mapping unit 118 – Capay clay (0 to 2 percent slopes) and the remaining 70.1 percent of the site lies within soil mapping unit 252 – Stomar clay loam (0 to 2 percent slopes).

5.11.3.3 Potential for 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 GWF Tracy area are nearly level, especially in the previously developed area of the TPP. Much of the site currently consists of structures and graveled areas; however, it does appear that some portions of the property are unpaved and sparsely vegetated.

In general, soils at the proposed site are very fine in texture, ranging from clay loam to clay (NRCS, 2008a,b). The erosion potential of these soils will vary based on the wetness of the soil, soil compaction, sizes of soil particles, and other site-specific properties. The soils at the site are expected to have relatively high water erosion potential and a moderate wind erosion potential for the following reasons:

- There are nearly level conditions at the site and laydown areas; however, the soils are expected to have slow to very slow permeability (and consequently, high runoff).
- The clay surface materials of the Capay soil are not expected to be readily transported by wind. The clay loam surface materials of the Stomar soil may be more readily transported by wind. It is expected that the laydown areas will be covered (by gravel or paving) immediately after grading to prevent subsequent wind erosion losses.

It should be noted that, given the potential for expansive native soils at the site, existing TPP structures may be founded upon imported soils of construction fill. These soils, if exposed, could be subject to higher rates of water and wind erosion.

5.11.3.4 Other Significant Soil Characteristics

A significant soil characteristic concerning the proposed GWF Tracy site is the potential for soils with a high shrink-swell potential. Both of the soil map units within the project area are classified as having smectitic mineralogy with a high shrink-swell potential. The official series description for the Capay series (Soil Survey Staff, 2008) lists slickensides and cracking as soil features; these features are typical of expansive soils exhibiting shrinking and swelling behavior. The presence of expansive clays in the soil may affect the suitability of the soil as a bearing surface for foundations and pipelines because expansive clays have the potential to heave or collapse with changing moisture content.

It is likely that soils at the GWF Tracy site have been modified to account for the high shrink-swell potential soils. The development of the TPP likely required significant mixing of local soils and the import of construction fill soils to support the foundations, pipelines, and roadways. These imported soils would have to be suitable for compaction to support structures and roadways, so they are expected to consist of a mixture with a wide range of coarse-textures particles (from silt to gravel sizes). They would not be expected to contain unsuitable materials such as organic debris or expansive clays. An onsite geotechnical soil evaluation will be required for foundation design to determine construction needs with respect to expansive soils. If expansive soil materials are found onsite, the San Joaquin County Community Development Department, Building Inspection Division requires that

footings for building foundations be located at least 18 inches below the ground surface in undisturbed soil.

5.11.4 Environmental Analysis

The following sections describe the potential environmental effects on soils during the construction and operation phases of GWF Tracy.

5.11.4.1 Significance Criteria

The potential for impacts to soils resources and their uses (such as agriculture) were evaluated with respect to the criteria described in the Appendix G checklist of the California Environmental Quality Act (CEQA). An impact is considered potentially significant if it would:

- Involve other changes in the existing environment which, because of their location or nature, could result in conversion of farmland to nonagricultural use
- Impact jurisdictional wetlands
- Result in substantial soil erosion
- Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property

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

5.11.4.2 Farmland Conversions

GWF Tracy is located adjacent to farmland in an area generally zoned for agricultural use. According to the AFC prepared for the TPP (GWF, 2001), the property was under a Williamson Act contract before construction of the TPP. This document stated that the contract would have expired three months before the construction of the existing power plant. Because the TPP has already been developed on site, all of the restrictions of the Williamson Act have been lifted from this property. GWF Tracy construction will occur on the same property as the existing TPP. The laydown areas will be located on the adjacent property, also owned by GWF Energy LLC, in areas that will be restored to their original condition after completion of construction. GWF Tracy will require the placement of two transmission termination structures and the relocation of the stormwater retention basin and an equipment storage area. These modifications will result in the permanent conversion of an additional 3.28 acres of agricultural land to a nonagricultural use. See Land Use Sections 5.6.7.3 and 5.6.9 for a detailed discussion of farmland conversion and proposed mitigation.

5.11.4.3 Jurisdictional Wetlands

Based on the mapped soil units, which are moderately well to well drained, and the previously developed nature of the project site, it is expected that wetlands are not present within the proposed GWF Tracy footprint. Therefore, the proposed the GWF Tracy should not impact jurisdictional wetlands or waters of the United States.

5.11.4.4 Soil Erosion During Construction

Construction impacts on soil resources can include increased soil erosion and soil compaction. Soil erosion causes the loss of topsoil and can increase the sediment load in surface receiving waters downstream of the construction site. The magnitude, extent, and duration of construction-related impacts depend on the erodibility of the soil, the proximity of the construction activity to the receiving water, and the construction methods, duration, and season.

Because conditions that could reasonably be expected to lead to moderate soil erosion are present at the GWF Tracy site, construction best management practices (BMPs) will be required. In accordance with the CEC requirements, a sediment and erosion control plan will be developed and implemented to reduce the impact of runoff from the construction site. Mandatory site inspections will be required to ensure that the BMPs described in the erosion and sediment control plan are properly implemented and effective. Based on the site conditions and BMP requirements, impacts from soil erosion are expected to be less than significant.

Due to the potential for soil erosion in the GWF Tracy area, estimates of erosion by water and wind are provided in the following sections.

5.11.4.4.1 Water Erosion

An estimate of soil loss during construction by water erosion is found in Table 5.11-3. This estimate was developed using the Revised Universal Soil Loss Equation (RUSLE2) program using the following assumptions:

- The area to be disturbed is a total of 16.38 acres. Active soil grading is expected to occur within a 3.85-acre area over an estimated 2-month period, after which the soil would be exposed for an additional 18-month construction period. It is assumed that up to one tenth of the soils onsite could be exposed at any point during the construction period since the currently covered areas would only be exposed where required by construction. The laydown area is expected to be graded within 1 month, after which, it would be covered with gravel or other material to permit wet season use.
- Estimates of soil loss (in tons) were made for the site-specific soil mapping unit characteristics that were available within the RUSLE2 database.
- RUSLE2 rainfall erosivity conditions were estimated for the National Weather Service station closest to the GWF Tracy site. Rainfall estimates were obtained from the online National Weather Service Hydrometerological Design Studies Center (NOAA Atlas 2) at http://www.nws.noaa.gov/ohd/hdsc/noaaatlas2.htm.
- A 100-foot slope length was assumed for all soil units. The median of each soil unit slope class was used for the RUSLE2 calculations. For this project, an average slope of 1 percent (i.e., mid-point of the 0 to 2 percent slope class) was assumed for both the Stomar and the Capay soil units.

TABLE 5.11-3
Estimate of Soil Loss by Water Erosion Using Revised Universal Soil Loss Equation (RUSLE2)

			Estimates Using Revised Universal Soil Loss Equation[a]		
Feature (acreage)[b]	**Activity**	**Duration (months)**	**Soil Loss (tons) without BMPs**	**Soil Loss (tons) with BMPs**	**Soil Loss (tons/yr) No Project**
Site (16.38 acres estimated)	Grading	2	3.0	0.01	0.006
	Construction	18	2.4	0.07	---
Laydown Area (12.3 acres estimated)	Grading	1	7.8	0.0	0.244
(0 acres exposed; paved or graveled)	Construction	19	0.0	0.0	---
Stormwater Basin (3.28 acres estimated)	Grading	1	0.01	0.000152	0.000021
	Construction	0	0.00	0.0	---
Transmission Termination Structures (0.0004 acre for pole footprint)	Grading	0.25	0.0000115	0.0000002	0.000001
	Construction	0.50	0.0000109	0.0000003	---
Project Soil Loss Estimates	All activities listed above	20	**13.20**	**0.07**	**0.25**

Notes:

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

- The soil characteristics were estimated using RUSLE2 soil profiles corresponding to the mapped soil unit.
- Soil loss (R-factors) was estimated using 2-year, 6-hour point precipitation frequency amount for the nearest National Weather Service station to the project site (http://www.nws.noaa.gov/ohd/hdsc/noaaatlas2.htm).
- 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.

[b] The transmission termination structure was assumed to have a 4-foot by 4-foot excavation footprint.

Other Project Assumptions as follows:

- It is assumed that 100% of the GWF Tracy site and laydown area will be exposed during grading, and approximately 10 of the site will be bare soil during construction.
- It is assumed that grading the site will take 2 months and construction will take 18 months.
- It is assumed that grading for laydown area (currently bare soil) will take 1 month and the area will be covered (graveled or paved) immediately thereafter.
- It is assumed that soil loss will be negligible from the laydown areas once it is covered.
- The overhead transmission line will have two termination structures outside of project footprint in unpaved area. The termination structures will have a combined 4-foot by 4-foot footprint.
- It is assumed that the grading/excavation for the pole will be completed within 1 week and the entire installation will be completed within 2 weeks.
- It is assumed that once excavated, the stormwater pond construction is essentially complete so no additional soil losses are estimated.

TABLE 5.11-3
Estimate of Soil Loss by Water Erosion Using Revised Universal Soil Loss Equation (RUSLE2)

			Estimates Using Revised Universal Soil Loss Equation[a]		
Feature (acreage)[b]	**Activity**	**Duration (months)**	**Soil Loss (tons) without BMPs**	**Soil Loss (tons) with BMPs**	**Soil Loss (tons/yr) No Project**

– The water, sewer, and gas lines will be completed on site, so no additional soil losses are estimated for them.

RUSLE2 Assumptions as follows:

100-foot 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 – two fences, one 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" soil conditions; 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" soil conditions; Contouring: Perfect, no row grade; Diversion/terracing: None; and Strips and Barriers: two fences, one at end of RUSLE2 slope.

A **"No Project"** soil loss estimate was also approximated using Management as "Dense grass – not harvested" soil conditions; Contouring: None, rows up and down hill; Diversion /terracing: None; and Strips and Barriers: None.

With the implementation of appropriate BMPs required under the NPDES permit, the total estimated project soil loss is estimated to be 0.09 tons (see Table 5.11-3), an amount that does not constitute a significant impact. It should also be recognized that these estimates of accelerated soil loss by water are very conservative (i.e., tend to overestimate soil losses) because they assume only a single BMP (i.e., silt fencing), whereas a Stormwater Pollution Prevention Plan (SWPPP) will require multiple soil erosion control measures.

5.11.4.5 Wind Erosion

The potential for wind erosion of surface material was estimated by calculating the total suspended particulates that would be emitted as a result of grading and the wind erosion of exposed soil. The total site area and grading duration were multiplied by emission factors to estimate the total suspended particulates (TSP) that would be emitted from the site. Fugitive dust from site grading was calculated using the default particulate matter less than 10 microns in equivalent diameter (PM_{10}) emission factor used in URBEMIS2002 (Jones and Stokes, 2003) and the ratio of fugitive TSP to PM_{10} published by the Bay Area Air Quality Management District (BAAQMD, 2005). Fugitive dust resulting from the wind erosion of exposed soil was calculated using the emission factor in AP-42 (EPA, 1995; also in Table 11.9-4 in BAAQMD, 2005).

Table 5.11-4 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 is estimated at 1.713 tons over the course of the project construction cycle. This estimate is reduced to 0.625 tons by implementing basic mitigation measures such as water application (see Section 5.11.6, Mitigation Measures). These estimates are conservative because they make use of emission rates for a generalized soil rather than for specific soil properties.

TABLE 5.11-4
Estimate of Total Suspended Particulates Emitted from Grading and Wind Erosion

Emission Source	Acreage	Duration (months)	Unmitigated TSP (tons)	Mitigated TSP (tons)
Grading Dust:				
Project Site	16.38	2	0.563	0.197
Laydown Area	12.3	1	0.135	0.074
Stormwater Basin	3.28	1	0.05638	0.01973
Transmission Termination Structures	0.0004	0.25	0.000002	0.0000006
Wind Blown Dust:				
Project Site	16.38	18	0.770	0.269
Laydown Area	12.3	1	0.000	0.000
Stormwater Basin	3.28	1	0.002	0.001
Transmission Termination Structures	0.0004	1	0.000006	0.000002
Estimated Total			1.526	0.561

Notes:
All linear feature impacts noted above are for portions outside of the project area footprint.

Project Assumptions:
Grading for project site will be completed in a 2-month period and construction will extend an additional 18 months.
Grading for laydown will be completed in a 1-month period and the site will be covered (graveled or paved) immediately.
Excavation of transmission termination structure holes will take 1 week followed by a 2-week construction period.
The transmission structures will have a 4-foot by 4-foot area for a total impact permanent area of 0.0004 acre.
Approximately 1/10th of the project site will have bare soil exposure during the length of the construction period.
Water, sewer, and gas line connections will all be on site.

Data Sources:
[a] PM_{10} Emission Factor Source: Midwest Research Institute, South Coast Air Quality Management District (SCAQMD) Project No. 95040, Level 2 Analysis Procedure, March 1996
[b] PM_{10} to TSP Conversion Factor Source: Bay Area Air Quality Management District CEQA Guidelines, Assessing the Air Quality Impacts of Projects, December 1999.
SCAQMD CEQA Handbook (1993) Table 11-4 for mitigation efficiency rates (as summarized in Table 8.9-4)

5.11.4.5.1 Compaction During Construction and Operation

Construction of GWF Tracy would result in soil compaction during the construction of foundations and paved roadway and parking areas. Soil compaction would also result from vehicle traffic along temporary access roads and in the equipment staging (laydown) area. 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.

Prior to use as the construction laydown areas, minimal grading is expected since the GWF Tracy site and proposed laydown areas are already developed and relatively flat. After minor grading, runoff from the site and laydown area will either occur as overland flow or percolate to groundwater. However, the laydown areas will be graveled (or otherwise covered) to allow for wet season use and further minimize soil erosion potential. Heavy equipment stored on site will be placed on dunnage to protect it from ground moisture. Once construction is completed, the gravel will likely be removed from the laydown area or may be incorporated into the site paving.

Construction activities resulting in additional soil compaction would be limited to those areas where new GWF Tracy facilities are needed. Compaction beneath the laydown area can be mitigated by removing and stockpiling topsoil for later reuse and by deep ripping the subsoil after removing the material and gravel covering. Given the limited area over which permanent compaction would occur, it is considered that this impact would be less than significant.

Operation of GWF Tracy would not result in impacts to the soil from erosion or compaction. Routine vehicle traffic during plant operation will be limited to roadways adapted from existing roads or constructed as part of GWF Tracy. Standard operational activities should not involve the disruption of soil. Therefore, impacts to soil from project operations would be less than significant.

5.11.4.6 Effects of Emissions on Soil-Vegetation Systems

There is a concern in some areas that emissions from a generating facility, principally nitrogen oxides (NO_x) from combustion, 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.

The existing combustion turbines at the existing TPP are equipped with dry low-NO_x combustor systems and selective catalytic reduction (SCR) to control the NO_x emissions exiting each combustion turbine generator/SCR. Additional post-combustion NO_x control will be provided via a new SCR contained within each new heat recovery steam generator. An oxidation catalyst system will also be incorporated into the emissions control system to control carbon monoxide and volatile organic compound emissions leaving the plant.

These design additions, in addition to the lack of serpentine habitats in or surrounding the project area, suggest that the addition of depositional nitrogen would be very small. These nitrogen additions, considered with the high levels of fertilizers used on surrounding agricultural fields, would be considered to be a less-than-significant impact on soil-vegetation systems.

5.11.5 Cumulative Effects

A cumulative impact refers to a proposed project's incremental effect together with other closely related past, present, and reasonably foreseeable future projects whose impacts may compound or increase the incremental effect of the proposed project (Pub. Resources Code § 21083; Cal. Code Regs., tit. 14, §§ 15064(h), 15065(c), 15130, and 15355).

As previously described, GWF Tracy would have a minimal effect on agriculture because the proposed project would convert 3.28 acres of land used for agriculture to a nonagriculture use. The project's effects on soil erosion, sedimentation, and compaction would be negligible and are not considered to be significant, particularly with the application of onsite BMPs.

Nearby projects that could contribute to the cumulative impact of GWF Tracy are described in Section 5.6.8 and include the following:

- Mountain House residential, commercial and industrial development
- Pastor of St. Bernard's Church and school
- Costco Warehouse Distribution Facility
- Ellis and Cordes specific plans and Tracy Hills Development (residential, commercial, industrial development)
- Gateway Business Park
- Kimball High School Development

It is expected that the cumulative projects would employ good engineering practices and comply with all applicable federal, state, and local LORS. Therefore, the potential for cumulative impacts of GWF Tracy as combined with other projects on soil loss and erosion is not expected to be significant.

5.11.6 Mitigation Measures

BMPs will be used to minimize erosion at the project site during construction. These measures typically include mulching, physical stabilization, dust suppression, berms, ditches, and sediment barriers. The actual BMPs would be developed during final design and would be included in the appropriate SWPPP. A copy of the draft construction SWPPP is provided in Appendix 5.11A. 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 would be removed from the site after the completion of construction and the site will paved or completely covered with facilities or other type of groundcover (e.g., gravel or landscape).

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.

5.11.6.1 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. These measures would be removed from the site after the completion of construction.

During construction of GWF Tracy, dust erosion control measures would be implemented to minimize the wind-blown loss of soil from the site. Water of a quality equal to or better than existing surface runoff would be sprayed on the soil in construction areas to control dust prior to completion of permanent control measures.

Sediment barriers slow runoff and trap sediment. Sediment barriers include straw bales, sand bags, straw wattles, and silt levees. They 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 to prevent contamination by sediment-laden water near areas such as wetlands, creeks, or storm drains. The site will be constructed on relatively level ground; 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, sediment barriers 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 small site size, level topography and surrounding graveled areas. Any soil stockpiles, including sediment barriers around the base of the stockpiles, would be stabilized and covered.

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 5.11-5 summarizes the mitigation measures and PM_{10} reduction efficiencies.

TABLE 5.11-5
Mitigation Measures for Fugitive Dust Emissions

Mitigation Measure	PM_{10} Emission Reduction Efficiency (Percent)
Water active sites at least twice daily	34–68
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	30–74

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

5.11.6.2 Permanent Erosion Control Measures

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

5.11.6.3 Potential Soil Contamination Measures

A Phase 1 Environmental Site Assessment was conducted for the GWF Tracy Project site prior to the construction of the existing TPP. That assessment concluded that the site had historically only been used for production agriculture, and that contaminated soil materials would not be expected to be present on the property (Harding ESE, 2001). However, concerns regarding the potential for pesticide contamination were raised and soils samples were analyzed for the presence of pesticides during the TPP licensing proceeding. The results of this sampling indicated that no pesticides were found above regulatory action levels.

5.11.7 Agencies and Agency Contacts

Permits required for GWF Tracy along with agency contacts are shown in Table 5.11-6. A grading permit application and permit approval will be obtained from San Joaquin County before construction begins. Other permits will be obtained from the county if design plans warrant. As there will be no offsite discharges of process or stormwater, stormwater discharge, waste discharge, and NPDES permits will not need to be obtained from the Central Valley RWQCB before construction begins.

TABLE 5.11-6
Permits and Agency Contacts for Soils

Permit or Approval	Agency Contact	Applicability
Grading Permit Application & Permit	Tom Ushing, Senior Building Inspector San Joaquin County Community Development Department 1810 E. Hazelton Ave Stockton, CA 95205 (209) 468-9780	Grading of site surfaces
Construction Activity, Stormwater and NPDES Permit	Jim Marshall, Senior Engineer San Joaquin Delta Unit, Central Valley RWQCB 11020 Sun Center Drive #200 Rancho Cordova, CA 95670 (916) 464-4772	Regulation of stormwater discharge from site facilities during construction

5.11.8 Permits and Permit Schedule

It is expected that all the required permits for grading, and stormwater discharge can be secured as long as applications are provided to the appropriate agency a minimum of 6 months prior to construction.

5.11.9 References

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State Water Resources Control Board (SWRCB). 1999. Final Construction Permit (Online). Available at http://www.swrcb.ca.gov/stormwtr/docs/finalconstpermit.pdf (verified January 9, 2008).

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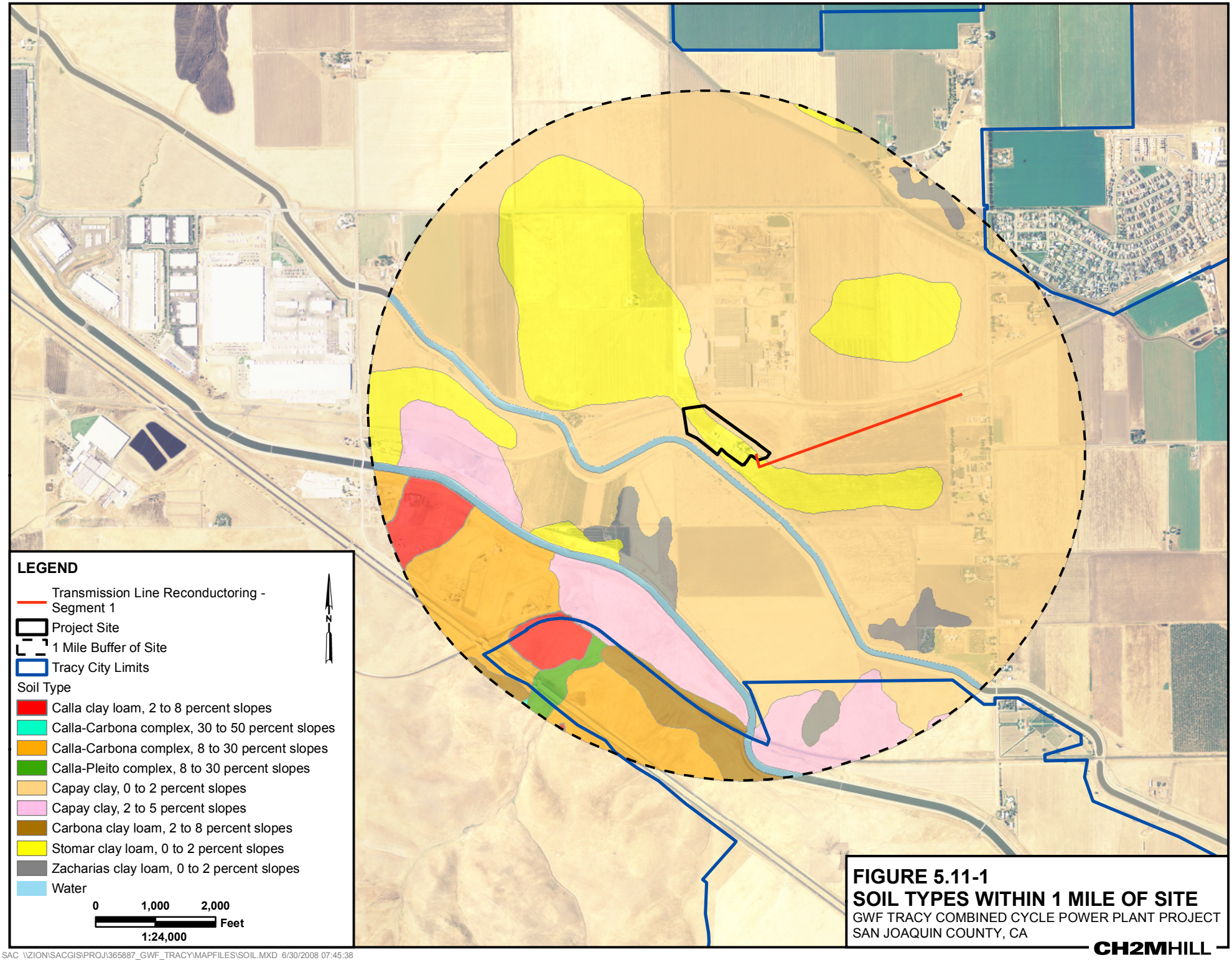

FIGURE 5.11-1
SOIL TYPES WITHIN 1 MILE OF SITE
GWF TRACY COMBINED CYCLE POWER PLANT PROJECT
SAN JOAQUIN COUNTY, CA

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