5.11 Soils

This section describes the potential effects of the construction and operation of the proposed Almond 2 Power Plant (A2PP) on soil resources and is organized as follows: Section 5.11.1 describes the existing environment that could be affected, including soil types and their use (such as agriculture); Section 5.11.2 identifies potential environmental effects, if any, from project development; Section 5.11.3 discusses cumulative effects; Section 5.11.4 presents mitigation measures; Section 5.11.5 presents the laws, ordinances, regulations, and standards (LORS) applicable to soils and their use; Section 5.11.6 provides agency contacts for all involved agencies; Section 5.11.7 describes permits required for the project; and Section 5.11.8 provides the references used to develop this section.

5.11.1 Affected Environment

The proposed A2PP project site is located in Stanislaus County, approximately 2 miles southwest of the Ceres city center and approximately 5 miles south of the Modesto city center. The project site is located immediately north of the existing TID Almond Power Plant. The existing plant is in Ceres; however, the plant has a Modesto mailing address. The majority of the linear features fall outside the city of Ceres boundary, in unincorporated areas of Stanislaus County.

The proposed A2PP is on land zoned for industrial use. It is bordered on the south by the existing TID Almond Power Plant, on the west by the WinCo Foods distribution center, on the north by a chemical supply facility, and on the east by a modular building distributor and drilling equipment storage facility.

Surrounding land uses include industrial, municipal, residential, and agricultural uses. The Ceres Fire Department is located approximately 0.3 mile north of the proposed project site. The Stanislaus County offices (housing USDA, Farm Bureau, Department of Environmental Resources, County Parks and Recreation and others) are approximately 0.5 mile from the project site, at the corner of W. Service Rd and Crows Landing Road. The Ceres Wastewater Treatment Plant is located approximately 0.75 mile east of the proposed plant, along Morgan Road. A small golf course is located to the south-southeast of the proposed plant, along Crows Landing Road. A newer residential development is located 0.5 mile northeast of the project location off of E. Service Road. Strawberry Fields Park and Sinclear Elementary School are located within this development, approximately 1 mile northeast of the project site. Additional rural homes exist along Crows Landing Road and E. Grayson Road.

There are no current agricultural lands within the proposed A2PP project site. The proposed linear features will primarily run along existing corridors and rights of way, including roadways, rail lines, and existing transmission lines. Only portions of each of the two new transmission line routes will be constructed on land that is currently in agriculture. Agricultural lands surrounding the project site include several fields of nut trees, including one field of almond trees directly south of the existing Almond Power Plant. Several graded border alfalfa or grass fields are also located within the vicinity of the proposed A2PP, including two larger fields within 0.3 mile to the southwest and southeast.

The A2PP laydown area will be located to the immediate north of the proposed project site and will be approximately 1.85 acres in size. Process water and wastewater connections will be located in the existing Almond Power Plant. Natural gas will be provided via one of two routes:[1] an approximately 9.1-mile-long gas pipeline that runs south along Crows Landing Road (Alternate A), or an approximately 11.1-mile-long gas pipeline that runs south along Carpenter Road (Alternate B). Two new transmission lines have been proposed: an approximately 0.9-mile-long 115 kV transmission line (Corridor 1), and an approximately 1.2-mile-long, 115-kV transmission line (Corridor 2) (see Figure 1.1-3). The transmission lines will tie into the proposed Grayson Substation[2] located east of the intersection of Crows Landing Road and Grayson Road. Additionally, the existing Almond Power Plant/Crows Landing Substation single-circuit 69-kV sub-transmission line will be reconductored to allow for increased power transmission (approx 2.9 miles long).

A description of the soils in the proposed project area was developed using the online and published Soil Survey of Eastern Stanislaus Area, California (USDA-Natural Resources Conservation Service [USDA-NRCS], 2008; 1964), and online Soil Survey of Stanislaus County, Western Part, California (no published survey available) (USDA-NRCS, 2008). Descriptions of the soil mapping units were developed from the soil survey and the online soil series descriptions (Soil Survey Staff, 2008).

Soil map units for the project area are identified in Figure 5.11-1A. Soil map unit characteristics for the area potentially affected by project construction are summarized in Table 5.11-1.

TABLE 5.11-1
Soil Mapping Unit Descriptions and Characteristics

Map Unit	Description

[1]Pacific Gas & Electric Company (PG&E) is currently examining the relative strengths of the two alignments. In order to allow the AFC to proceed, the two possible alternatives are presented in this AFC with same level of detail to allow complete evaluation of both alternatives. TID anticipates that PG&E will select a preferred route in late spring or early summer 2009. At that time, the route not selected will provide information for the California Energy Commission's Alternatives analysis.

[2] The proposed Grayson Substation is a component of the TID Hughson-Grayson 115-kV Transmission Line and Substation Project. In addition to the substation, the Hughson-Grayson project consists of an approximately 10-mile-long, 115-kV transmission line; a 0.5-mile-long, 69-kV transmission line from the existing TID Almond Power Plant; and a second 69-kV transmission line that extends 0.8 mile east from the proposed substation. An environmental impact report for the Hughson-Grayson project (State Clearinghouse Number 2009012075) is currently being prepared. The Notice of Preparation was issued on January 26, 2009, and reissued February 10, 2009. The Draft Environmental Impact Report is anticipated to be issued in July 2009.

TABLE 5.11-1
Soil Mapping Unit Descriptions and Characteristics

Map Unit	Description
DeA	Delhi loamy sand, 0 to 3 percent slopes Portions of the proposed natural gas pipeline (Alternate B) cross this soil unit. Parent material: Wind modified sandy alluvium derived from granite Typical profile: Loamy sand throughout Shrink-swell capacity: Low Depth and drainage: Very deep; somewhat excessively drained Permeability: High to very high Runoff: Negligible Farmland class: Prime farmland if irrigated Storie index: 66 (Grade 2), Good Capability class: 3s irrigated, 4e nonirrigated Taxonomic class: Mixed, thermic, Typic Xeropsamments
DgA	**Delhi loamy sand, silty substratum, 0 to 3 percent slopes** Portions of the proposed PG&E gas pipeline (Alternate B) cross this soil unit. Parent material: Wind modified sandy alluvium derived from granite Typical profile: Loamy sand over stratified very fine sand to silt loam Shrink-swell capacity: Low Depth and drainage: Very deep; somewhat excessively drained Permeability: High Runoff: Negligible Farmland class: Prime farmland if irrigated Storie index: 66 (Grade 2), Good Capability class: 3s irrigated, 4e nonirrigated Taxonomic class: Mixed, thermic, Typic Xeropsamments
DrA	**Dinuba sandy loam, 0 to 1 percent slopes** Portions of the proposed PG&E gas pipeline (both Alternates A and B) and the transmission lines cross this soil unit. Parent material: Developed from moderately coarse textured dominantly granitic alluvium Typical profile: Sandy loam over stratified silts and very fine sands Shrink-swell capacity: Low Depth and drainage: Very deep; naturally moderately well drained but due to pumping may be better drained or, where over-irrigated, imperfectly drained. Permeability: Moderate to moderately rapid in A horizon and less permeable below Runoff: Medium Farmland class: Prime farmland if irrigated Storie index: 82 (Grade 1), Excellent Capability class: 2w irrigated, 4s nonirrigated Taxonomic class: Coarse-loamy, mixed, active, thermic Typic Haploxeralfs

TABLE 5.11-1
Soil Mapping Unit Descriptions and Characteristics

Map Unit	Description	
DwA	**Dinuba sandy loam, slightly saline-alkali, 0 to 1 percent slopes**	
	A portion of the proposed PG&E gas pipeline (both Alternates A and B) crosses this soil unit.	
	Parent material:	Developed from moderately coarse textured dominantly granitic alluvium
	Typical profile:	Sandy loam over stratified silts and very fine sands
	Shrink-swell capacity:	Low
	Depth and drainage:	Very deep; naturally moderately well drained but due to pumping may be better drained or, where over-irrigated, imperfectly drained.
	Permeability:	Moderate to moderately rapid in A horizon and less permeable below
	Runoff:	Medium
	Farmland class:	Prime farmland if irrigated
	Storie index:	67 (Grade 2); Good
	Capability class:	2w irrigated, 4s nonirrigated
	Taxonomic class:	Coarse-loamy, mixed, active, thermic Typic Haploxeralfs
FsA	**Fresno fine sandy loam, strongly saline-alkali, 0 to 1 percent slopes**	
	A portion of the proposed PG&E gas pipeline (Alternate A) crosses this soil unit.	
	Parent material:	Developed in alluvium derived from granite
	Typical profile:	Fine sandy loam over sandy clay loam, silt loam, and stratified sandy loam to loam. Strongly cemented silica hardpan present in subsoil (typically about 24 inches).
	Shrink-swell capacity:	Low
	Depth and drainage:	Moderately deep over duripan; moderately well drained
	Permeability:	Very slow; small pools of water commonly persist during wet winters
	Runoff:	Very high
	Farmland class:	Not a Prime or Important Farmland
	Storie index:	8 (Grade 6), Nonagricultural
	Capability class:	6s
	Taxonomic class:	Fine-loamy, mixed, superactive, thermic Natric Durixeralfs
FtA	**Fresno sandy loam, slightly saline-alkali, 0 to 1 percent slopes**	
	A portion of the proposed PG&E gas pipeline (both Alternates A and B) crosses this soil unit.	
	Parent material:	Developed in alluvium derived from granite
	Typical profile:	Fine sandy loam over sandy clay loam, silt loam, and stratified sandy loam to loam. Strongly cemented silica hardpan present in subsoil (typically about 24 inches).
	Shrink-swell capacity:	Low
	Depth and drainage:	Moderately deep over duripan; moderately well drained
	Permeability:	Very slow; small pools of water commonly persist during wet winters
	Runoff:	Very high
	Farmland class:	Not a Prime or Important Farmland
	Storie index:	20 (Grade 4), Poor
	Capability class:	3s irrigated, 6s nonirrigated
	Taxonomic class:	Fine-loamy, mixed, superactive, thermic Natric Durixeralfs

TABLE 5.11-1
Soil Mapping Unit Descriptions and Characteristics

Map Unit	Description
FuA	**Fresno sandy loam, moderately saline-alkali, 0 to 1 percent slopes:**
	A portion of the proposed PG&E gas pipeline (both Alternates A and B) crosses this soil unit.
	Parent material: Developed in alluvium derived from granite
	Typical profile: Fine sandy loam over sandy clay loam, silt loam, and stratified sandy loam to loam. Strongly cemented silica hardpan present in subsoil (typically about 24 inches).
	Shrink-swell capacity: Low
	Depth and drainage: Moderately deep over duripan; moderately well drained
	Permeability: Very slow; small pools of water commonly persist during wet winters
	Runoff: Very high
	Farmland class: Not a Prime or Important Farmland
	Storie index: 14 (Grade 5), Very poor
	Capability class: 4s irrigated, 6s nonirrigated
	Taxonomic class: Fine-loamy, mixed, superactive, thermic Natric Durixeralfs
FwA	**Fresno-Dinuba sandy loams, strongly saline alkali, 0 to 1 percent slopes:**
	A portion of the proposed PG&E gas pipeline (Alternate A) crosses this soil unit.
	Parent material: Developed in alluvium derived from granite
	Typical profile: Sandy loam over sandy clay loam, silt loam, and stratified sandy loam to loam. Strongly cemented silica hardpan present in subsoil (typically about 24 inches).
	Shrink-swell capacity: Low
	Depth and drainage: Moderately deep over duripan; moderately well drained
	Permeability: Moderate to moderately rapid in A horizon and less permeable below
	Runoff: Medium
	Farmland class: Not a Prime or Important Farmland
	Storie index: 6/18 (Grade 6/Grade 5), Nonagricultural/Very poor
	Capability class: 3s irrigated, 4s/6s non-irrigated
	Taxonomic class: Coarse-loamy, mixed, active, thermic Typic Haploxeralfs; Coarse-loamy, mixed, active, thermic Typic Haploxeralfs
HdA	**Hanford sandy loam, 0 to 3 percent slopes:**
	A portion of the proposed A2PP project site and portions of the proposed PG&E gas pipeline (Both Alternates A and B) and the transmission lines fall within this soil unit.
	Parent material: Formed in moderately coarse textured alluvium dominantly from granite
	Typical profile: Fine sandy loam throughout
	Shrink-swell capacity: Low
	Depth and drainage: Very deep; well drained
	Permeability: Moderately rapid
	Runoff: Negligible to low
	Farmland class: Prime farmland if irrigated
	Storie index: 92 (Grade 1), Excellent
	Capability class: 4c
	Taxonomic class: Coarse-loamy, mixed, superactive, nonacid, thermic Typic Xerorthents

TABLE 5.11-1
Soil Mapping Unit Descriptions and Characteristics

Map Unit	Description
HdpA	**Hanford sandy loam, moderately deep over silt, 0 to 1 percent slopes:** A portion of the proposed A2PP project site and portions of the proposed PG&E gas pipeline (both Alternates A and B) and the transmission lines fall within this soil unit. Parent material: Formed in alluvium derived from igneous rock Typical profile: Sandy loam over silt loam Shrink-swell capacity: Low Depth and drainage: Very deep; well drained Permeability: Moderately rapid Runoff: Negligible to low Farmland class: Prime farmland if irrigated Storie index: 93 (Grade 1), Excellent Capability class: 2s irrigated, 4s nonirrigated Taxonomic class: Coarse-loamy, mixed, superactive, nonacid, thermic Typic Xerorthents
HdsA	**Hanford sandy loam, deep over silt, 0 to 1 percent slopes** A portion of the proposed reconductored 69-kV sub-transmission route crosses this soil unit. Parent material: Formed in alluvium derived from igneous rock Typical profile: Sandy loam over silt loam Shrink-swell capacity: Low Depth and drainage: Very deep; well drained Permeability: Moderately rapid Runoff: Negligible to low Farmland class: Prime farmland if irrigated Storie index: 93 (Grade 1), Excellent Capability class: 1 irrigated, 4c nonirrigated Taxonomic class: Coarse-loamy, mixed, superactive, nonacid, thermic Typic Xerorthents
HfA	**Hilmar loamy sand, 0 to 1 percent slopes:** A portion of the proposed PG&E gas pipeline (both Alternates A and B) crosses this soil unit. Parent material: Formed in wind modified sandy alluvium derived from granite over silty alluvium derived from granite Typical profile: Loamy sand over sand, sandy loam, and stratified very fine sandy loam to silt loam Shrink-swell capacity: Low Depth and drainage: Very deep; imperfectly to poorly drained; ponding can occur during periods of heavy irrigation Permeability: Rapidly permeable surface and upper subsoil (23+ inches thick) over slowly permeable subsoil Runoff: Slow Farmland class: Farmland of statewide importance Storie index: 57 (Grade 3), Fair Capability class: 3w irrigated, 4s nonirrigated Taxonomic class: Sandy over loamy, mixed, active, calcareous, thermic, Aeric Halaquepts

TABLE 5.11-1
Soil Mapping Unit Descriptions and Characteristics

Map Unit	Description	
HkbA	**Hilmar loamy sand, slightly saline-alkali, 0 to 1 percent slopes:**	
	A portion of the proposed PG&E gas pipeline (Alternate A) crosses this soil unit.	
	Parent material:	Formed in wind modified sandy alluvium derived from granite over silty alluvium derived from granite
	Typical profile:	Loamy sand over sand, sandy loam, and stratified very fine sandy loam to silt loam
	Shrink-swell capacity:	Low
	Depth and drainage:	Very deep; imperfectly to poorly drained; ponding can occur during periods of heavy irrigation
	Permeability:	Rapidly permeable surface and upper subsoil (23+ inches thick) over slowly permeable subsoil
	Runoff:	Slow
	Farmland class:	Not a Prime or Important Farmland
	Storie index:	45 (Grade 3), Fair
	Capability class:	3w irrigated, 4s nonirrigated
	Taxonomic class:	Sandy over loamy, mixed, active, calcareous, thermic, Aeric Halaquepts
TrA	**Traver sandy loam, moderately saline-alkali, 0 to 1 percent slopes:**	
	A portion of the proposed PG&E gas pipeline (Alternate A) crosses this soil unit.	
	Parent material:	Formed on alluvial fans and flood plains composed of alluvium derived from granitic sources
	Typical profile:	Sandy loam throughout
	Shrink-swell capacity:	Low
	Depth and drainage:	Very deep; moderately well to somewhat poorly drained
	Permeability:	Moderate to slow
	Runoff:	Slow
	Farmland class:	Farmland of statewide importance
	Storie index:	42 (Grade 3), Fair
	Capability class:	3s irrigated, 6s nonirrigated
	Taxonomic class:	Coarse-loamy, mixed, superactive, thermic Natric Haploxeralfs
TuA	**Tujunga loamy sand, 0 to 3 percent slopes:**	
	A portion of the proposed PG&E gas pipeline (both Alternates A and B) and the reconductored transmission line cross this soil unit.	
	Parent material:	Formed in alluvium weathered mostly from granitic sources
	Typical profile:	Loamy sand throughout
	Shrink-swell capacity:	Low
	Depth and drainage:	Very deep; somewhat excessively drained
	Permeability:	Rapid
	Runoff:	Negligible or very low runoff
	Farmland class:	Prime farmland if irrigated
	Storie index:	62 (Grade 2), Good
	Capability class:	3e irrigated, 6e nonirrigated
	Taxonomic class:	Mixed, thermic, Typic Xeropsamments

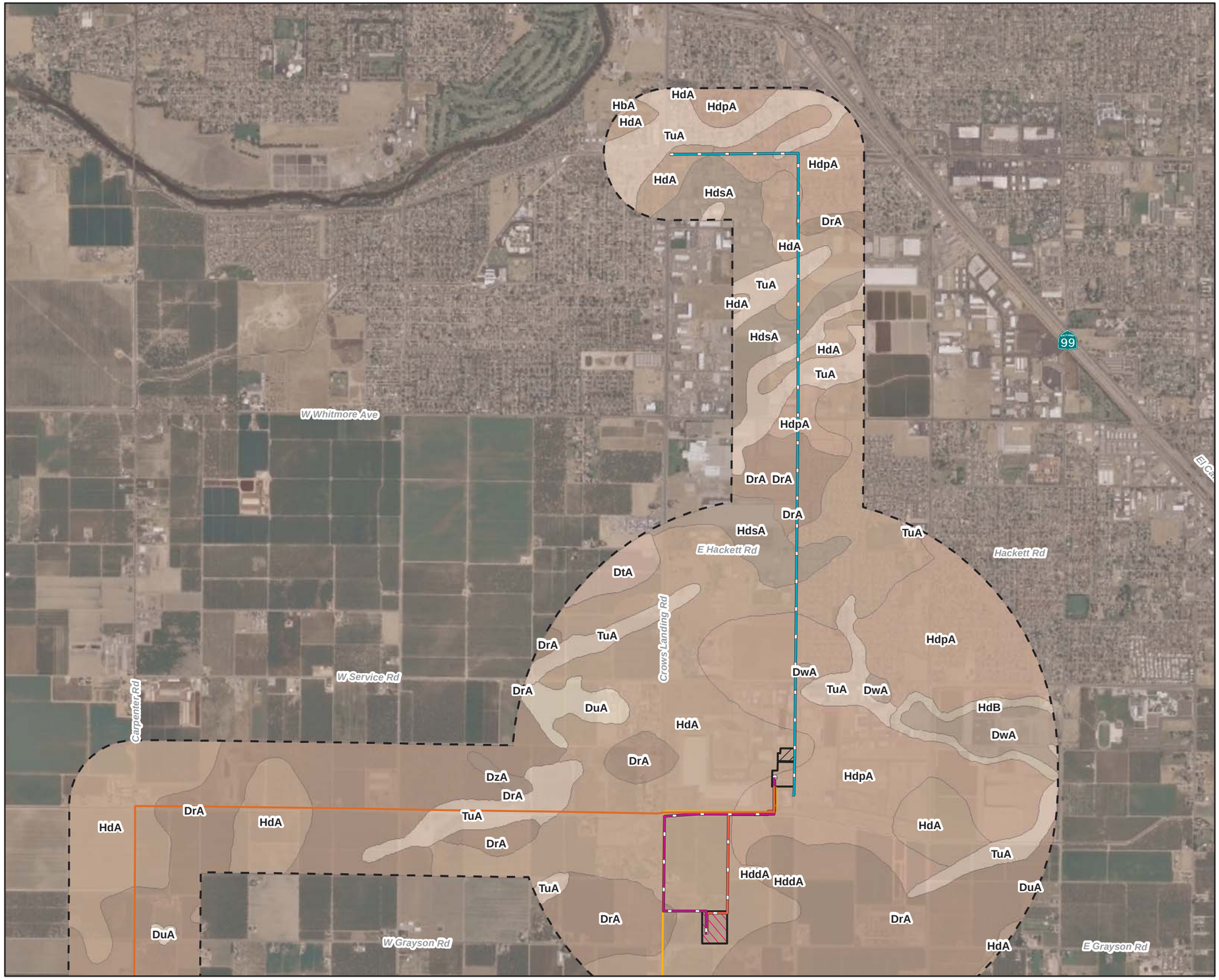
TABLE 5.11-1
Soil Mapping Unit Descriptions and Characteristics

Map Unit	Description	
WaA	**Waukena fine sandy loam, slightly saline-alkali, 0 to 1 percent slopes:**	
	A portion of the proposed PG&E gas pipeline (Alternate A) crosses this soil unit.	
	Parent material:	Formed in mixed, moderately fine textured, sedimentary alluvium
	Typical profile:	Fine sandy loam over sandy clay loam and stratified fine sandy loam and clay loam
	Shrink-swell capacity:	Low
	Depth and drainage:	Very deep; moderately well to somewhat poorly drained
	Permeability:	Slow to very slow permeability
	Runoff:	Slow
	Farmland class:	Farmland of statewide importance
	Storie index:	67 (Grade 2), Good
	Capability class:	3s irrigated, 6e nonirrigated
	Taxonomic class:	Fine-loamy, mixed, superactive, thermic, Typic Natrixeralfs
WbA	**Waukena fine sandy loam, moderately saline-alkali, 0 to 1 percent slopes**	
	Portions of the proposed PG&E gas pipeline (Alternate B) cross this soil unit.	
	Parent material:	Alluvium derived from granite
	Typical profile:	Fine sandy loam over sandy loam
	Shrink-swell capacity:	Low
	Depth and drainage:	Very deep; moderately well drained
	Permeability:	Moderately high
	Runoff:	High
	Farmland class:	Not a Prime or Important Farmland
	Storie index:	39 (Grade 4), Poor
	Capability class:	4s irrigated, 6s nonirrigated
	Taxonomic class:	Fine, serpentinitic, superactive, mesic, Pachic Ultic Argixerolls
WdA	**Waukena sandy loam, slightly saline-alkali, 0 to 1 percent slopes**	
	Portions of the proposed PG&E gas pipeline (Alternate B) cross this soil unit.	
	Parent material:	Alluvium derived from granite
	Typical profile:	Sandy loam throughout
	Shrink-swell capacity:	Low
	Depth and drainage:	Very deep; moderately well drained
	Permeability:	Moderately high
	Runoff:	High
	Farmland class:	Farmland of statewide importance
	Storie index:	64 (Grade 2), Good
	Capability class:	3s irrigated, 6s nonirrigated
	Taxonomic class:	Fine, serpentinitic, superactive, mesic, Pachic Ultic Argixerolls

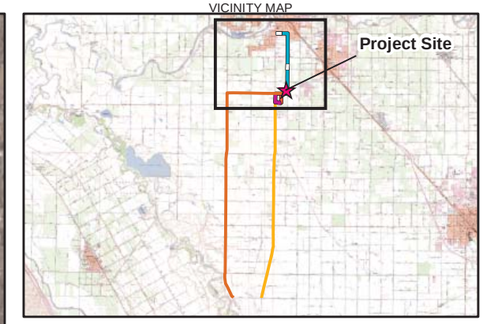
TABLE 5.11-1
Soil Mapping Unit Descriptions and Characteristics

Map Unit	Description
Soil characteristics are based on soil mapping descriptions provided in the online soil survey (USDA-NRCS, 2008); in the published soil survey (NRCS, 1964); and in the online Official Series Descriptions (OSDs) (http://www2.ftw.nrcs.usda.gov/osd/dat) (Soil Survey Staff, 2008).	
Soil descriptions provided above are limited to those soil units that could be directly affected by the proposed A2PP project. Other soil mapping units, which are well outside of the project area but are shown on Figures 5.11-1A, B, C, and D, are listed below:	
Within the "Soil Survey of Eastern Stanislaus Area": **CeA** - Columbia loam, 0 to 1 percent slopes, **CsB** - Columbia soils, channeled, 0 to 8 percent slopes, **DtA** - Dinuba sandy loam, deep, 0 to 1 percent slopes; **DuA** - Dinuba sandy loam, poorly drained variant, 0 to 1 percent slopes; **DzA** - Dinuba sandy loam, very poorly drained variant, slightly saline-alkali, 0 to 1 percent slopes; **FrA** - Fresno fine sandy loam, moderately saline-alkali, 0 to 1 percent slopes; **HbA -** Hanford fine sandy loam, 0 to 3 percent slopes; **HdB** - Hanford sandy loam, 3 to 8 percent slopes; **HddA** - Handford sandy loam, poorly drained variant, 0 to 1 percent slopes; and **WeA** - Waukena sandy loam, moderately saline-alkali, 0 to 1 percent slopes. Within the "Stanislaus County, Western Part" soil survey: **153** - Columbia fine sandy loam, channeled, partially drained, 0 to 2 percent slopes, frequently flooded; **159 -** Columbia complex, 0 to 2 percent slopes, frequently flooded; and **W** - Water.	

The project area includes the proposed A2PP project site and linear features (i.e., overhead transmission lines and underground gas). Table 5.11-1 summarizes soil map unit depth, texture, drainage, permeability, water runoff, and items related to revegetation potential. It is very likely that actual soil conditions at the project site and along linear features could differ from what is described in the generalized soil descriptions because of the potential for natural soil variation and the potential for previous local grading and importation of fill into this industrialized area (additional information to this effect is presented below).



VICINITY MAP



LEGEND

- Natural Gas Pipeline (Alternate A)
- Natural Gas Pipeline (Alternate B)
- 115-kV Circuit 1 Line (Corridor 1)
- 115-kV Circuit 2 Line (Corridor 2)
- Reconductored 69kV Sub-Transmission Line
- Laydown Area
- Project Site
- Proposed Grayson Substation
- Buffer

Soil Type

- 153, Columbia fine sandy loam, channeled, partially drained, 0 to 2 percent slopes
- 159, Columbia complex, 0 to 2 percent slopes
- CeA, Columbia loam, 0 to 1 percent slopes
- CsB, Columbia soils, channeled, 0 to 8 percent slopes
- DeA, Delhi loamy sand, 0 to 3 percent slopes
- DgA, Delhi loamy sand, silty substratum, 0 to 3 percent slopes
- DrA, Dinuba sandy loam, 0 to 1 percent slopes
- DtA, Dinuba sandy loam, deep, 0 to 1 percent slopes
- DuA, Dinuba sandy loam, poorly drained variant, 0 to 1 percent slopes
- DwA, Dinuba sandy loam, slightly saline-alkali, 0 to 1 percent slopes
- DzA, Dinuba sandy loam, very poorly drained variant, slightly saline- alkali
- FrA, Fresno fine sandy loam, moderately saline-alkali, 0 to 1 percent slopes
- FsA, Fresno fine sandy loam, strongly saline-alkali, 0 to 1 percent slopes
- FtA, Fresno sandy loam, slightly saline-alkali, 0 to 1 percent slopes
- FuA, Fresno sandy loam, moderately saline-alkali, 0 to 1 percent slopes
- FwA, Fresno-Dinuba sandy loams, strongly saline alkali, 0 to 1 percent slopes
- HbA, Hanford fine sandy loam, 0 to 3 percent slopes
- HdA, Hanford sandy loam, 0 to 3 percent slopes
- HdB, Hanford sandy loam, 3 to 8 percent slopes
- HddA, Hanford sandy loam, poorly drained variant, 0 to 1 percent slopes
- HdpA, Hanford sandy loam, moderately deep over silt, 0 to 1 percent slopes
- HdsA, Hanford sandy loam, deep over silt, 0 to 1 percent slopes
- HfA, Hilmar loamy sand, 0 to 1 percent
- HkbA, Hilmar loamy sand, slightly saline-alkali, 0 to 1 percent slopes
- TrA, Traver sandy loam, moderately saline-alkali, 0 to 1 percent slopes
- TuA, Tujunga loamy sand, 0 to 3 percent slopes
- W, Water
- WaA, Waukena fine sandy loam, slightly saline-alkali, 0 to 1 percent slopes
- WbA, Waukena fine sandy loam, moderately saline-alkali, 0 to 1 percent slopes
- WdA, Waukena sandy loam, slightly saline-alkali, 0 to 1 percent slopes
- WeA, Waukena sandy loam, moderately saline-alkali, 0 to1 percent slopes

Notes:
1. 1 mile around Project Site, 1/4 mile around NG Pipeline and Transmisson Line.
2. Source: U.S. Department of Agriculture, Natural Resources Conservation Service, Soil Survey Geographic (SSURGO) database for Stanislaus County, California.
3. The Grayson Substation is being developed as a separate Project

This map was compiled from various scale source data and maps and is intended for use as only an approximate representation of actual locations.

N

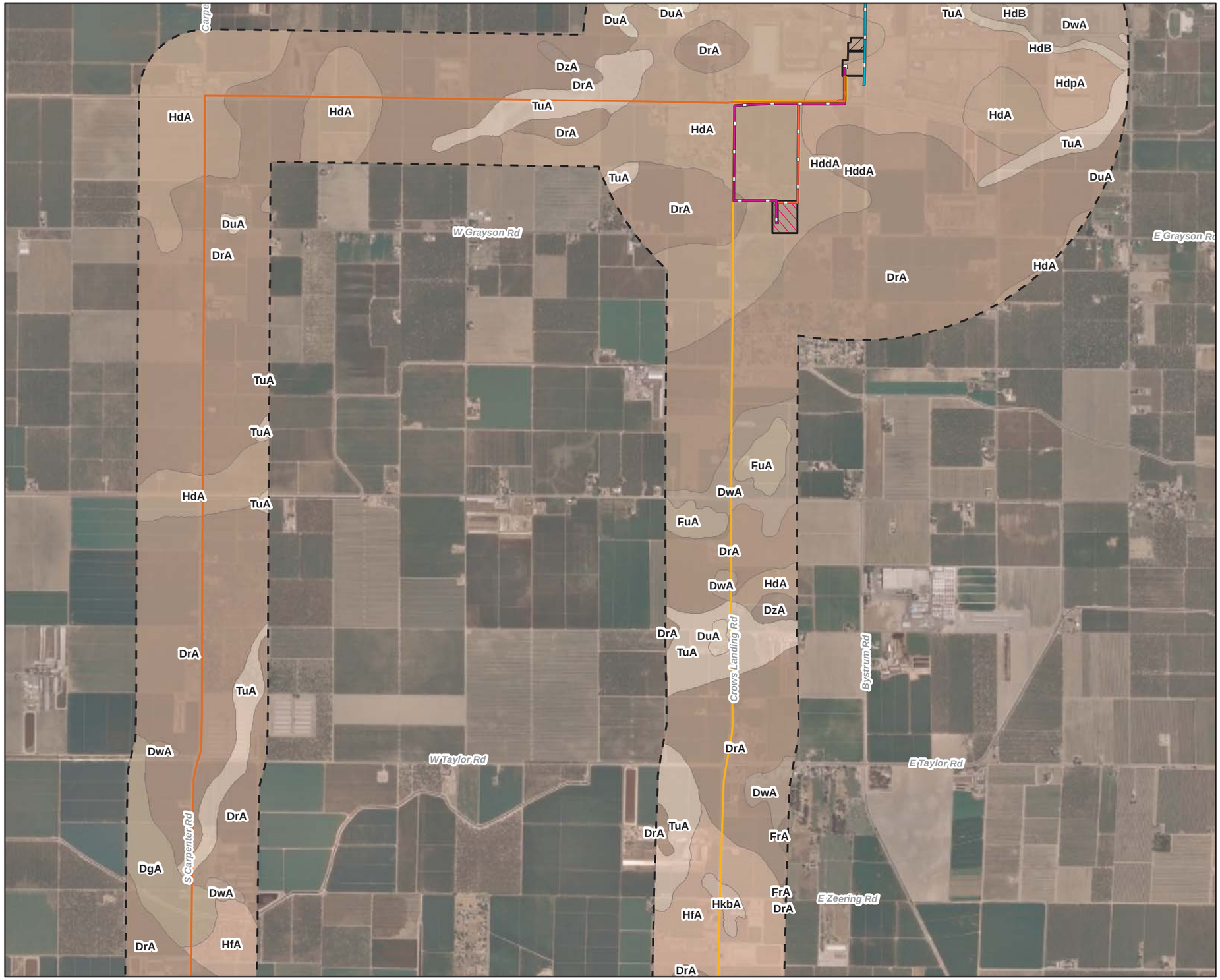
0 1,000 2,000
Feet

FIGURE 5.11-1A
SOIL CLASSIFICATION OF SITE

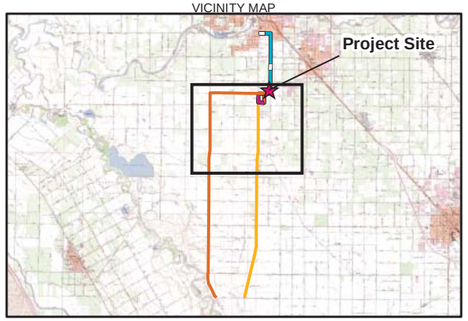
ALMOND 2 POWER PLANT
CERES, CALIFORNIA

CH2MHILL

SAC\\ZION\SACGIS\PROJ\TURLOCKIRRIGATIONDIS\383194\MAPFILES\APP_SOILS.MXD MHASKELL 4/21/2009 13:21:26



VICINITY MAP



LEGEND

- Natural Gas Pipeline (Alternate A)
- Natural Gas Pipeline (Alternate B)
- 115-kV Circuit 1 Line (Corridor 1)
- 115-kV Circuit 2 Line (Corridor 2)
- Reconductored 69kV Sub-Transmission Line
- Laydown Area
- Project Site
- Proposed Grayson Substation
- Buffer

Soil Type

- 153, Columbia fine sandy loam, channeled, partially drained, 0 to 2 percent slopes
- 159, Columbia complex, 0 to 2 percent slopes
- CeA, Columbia loam, 0 to 1 percent slopes
- CsB, Columbia soils, channeled, 0 to 8 percent slopes
- DeA, Delhi loamy sand, 0 to 3 percent slopes
- DgA, Delhi loamy sand, silty substratum, 0 to 3 percent slopes
- DrA, Dinuba sandy loam, 0 to 1 percent slopes
- DtA, Dinuba sandy loam, deep, 0 to 1 percent slopes
- DuA, Dinuba sandy loam, poorly drained variant, 0 to 1 percent slopes
- DwA, Dinuba sandy loam, slightly saline-alkali, 0 to 1 percent slopes
- DzA, Dinuba sandy loam, very poorly drained variant, slightly saline- alkali
- FrA, Fresno fine sandy loam, moderately saline-alkali, 0 to 1 percent slopes
- FsA, Fresno fine sandy loam, strongly saline-alkali, 0 to 1 percent slopes
- FtA, Fresno sandy loam, slightly saline-alkali, 0 to 1 percent slopes
- FuA, Fresno sandy loam, moderately saline-alkali, 0 to 1 percent slopes
- FwA, Fresno-Dinuba sandy loams, strongly saline alkali, 0 to 1 percent slopes
- HbA, Hanford fine sandy loam, 0 to 3 percent slopes
- HdA, Hanford sandy loam, 0 to 3 percent slopes
- HdB, Hanford sandy loam, 3 to 8 percent slopes
- HddA, Hanford sandy loam, poorly drained variant, 0 to 1 percent slopes
- HdpA, Hanford sandy loam, moderately deep over silt, 0 to 1 percent slopes
- HdsA, Hanford sandy loam, deep over silt, 0 to 1 percent slopes
- HfA, Hilmar loamy sand, 0 to 1 percent
- HkbA, Hilmar loamy sand, slightly saline-alkali, 0 to 1 percent slopes
- TrA, Traver sandy loam, moderately saline-alkali, 0 to 1 percent slopes
- TuA, Tujunga loamy sand, 0 to 3 percent slopes
- W, Water
- WaA, Waukena fine sandy loam, slightly saline-alkali, 0 to 1 percent slopes
- WbA, Waukena fine sandy loam, moderately saline-alkali, 0 to 1 percent slopes
- WdA, Waukena sandy loam, slightly saline-alkali, 0 to 1 percent slopes
- WeA, Waukena sandy loam, moderately saline-alkali, 0 to1 percent slopes

Notes:
1. 1 mile around Project Site, 1/4 mile around NG Pipeline and Transmisson Line.
2. Source: U.S. Department of Agriculture, Natural Resources Conservation Service, Soil Survey Geographic (SSURGO) database for Stanislaus County, California.
3. The Grayson Substation is being developed as a separate Project

This map was compiled from various scale source data and maps and is intended for use as only an approximate representation of actual locations.

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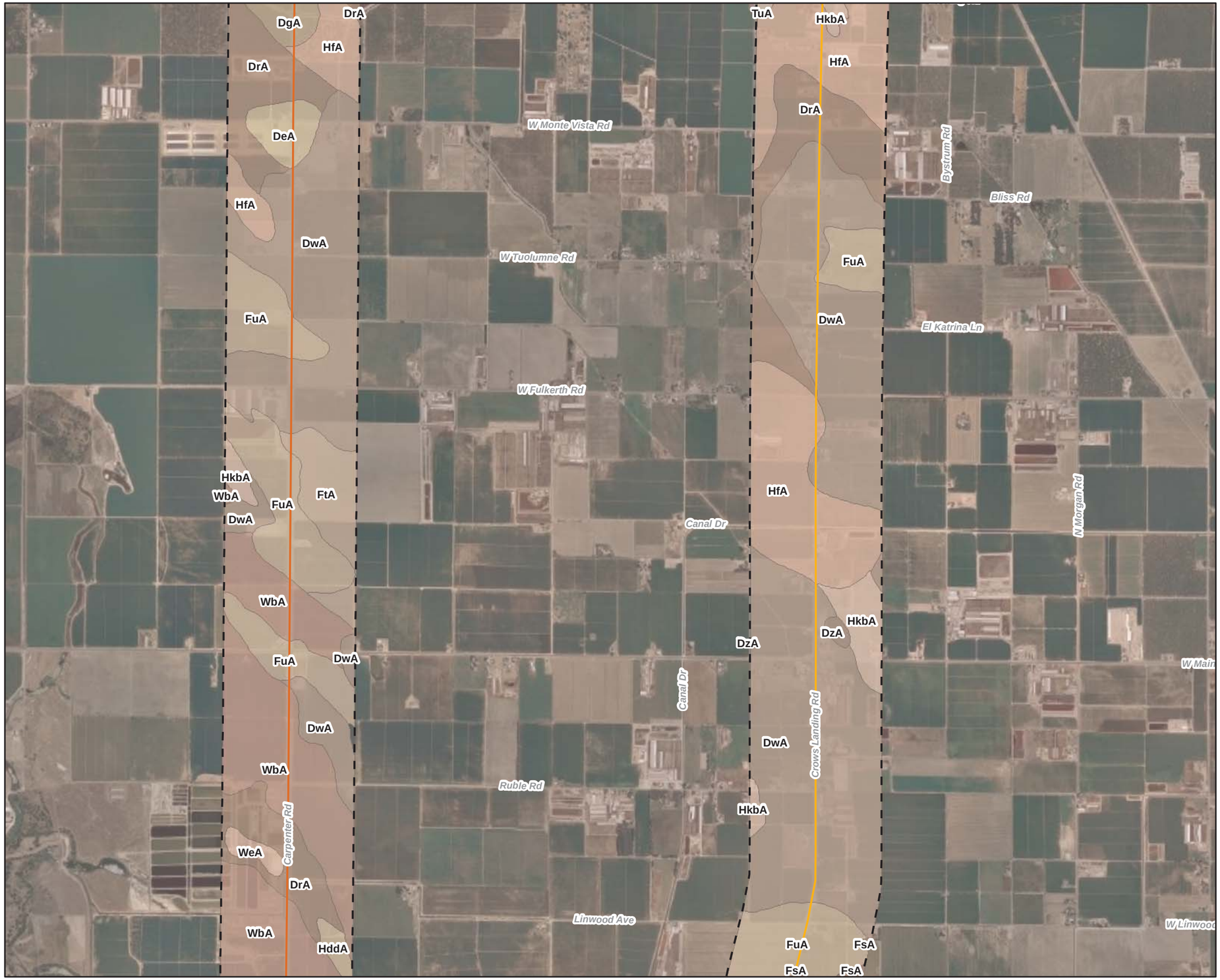
Feet

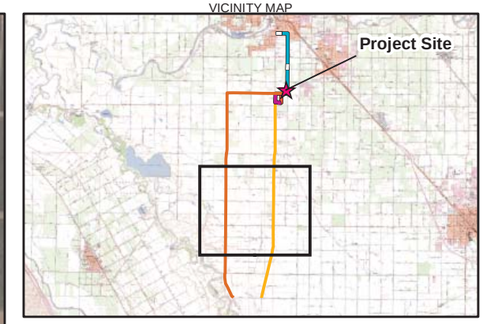
FIGURE 5.11-1B
SOIL CLASSIFICATION OF SITE

ALMOND 2 POWER PLANT
CERES, CALIFORNIA

CH2MHILL



VICINITY MAP



LEGEND

- Natural Gas Pipeline (Alternate A)
- Natural Gas Pipeline (Alternate B)
- 115-kV Circuit 1 Line (Corridor 1)
- 115-kV Circuit 2 Line (Corridor 2)
- Reconductored 69kV Sub-Transmission Line
- Laydown Area
- Project Site
- Proposed Grayson Substation
- Buffer

Soil Type

- 153, Columbia fine sandy loam, channeled, partially drained, 0 to 2 percent slopes
- 159, Columbia complex, 0 to 2 percent slopes
- CeA, Columbia loam, 0 to 1 percent slopes
- CsB, Columbia soils, channeled, 0 to 8 percent slopes
- DeA, Delhi loamy sand, 0 to 3 percent slopes
- DgA, Delhi loamy sand, silty substratum, 0 to 3 percent slopes
- DrA, Dinuba sandy loam, 0 to 1 percent slopes
- DtA, Dinuba sandy loam, deep, 0 to 1 percent slopes
- DuA, Dinuba sandy loam, poorly drained variant, 0 to 1 percent slopes
- DwA, Dinuba sandy loam, slightly saline-alkali, 0 to 1 percent slopes
- DzA, Dinuba sandy loam, very poorly drained variant, slightly saline- alkali
- FrA, Fresno fine sandy loam, moderately saline-alkali, 0 to 1 percent slopes
- FsA, Fresno fine sandy loam, strongly saline-alkali, 0 to 1 percent slopes
- FtA, Fresno sandy loam, slightly saline-alkali, 0 to 1 percent slopes
- FuA, Fresno sandy loam, moderately saline-alkali, 0 to 1 percent slopes
- FwA, Fresno-Dinuba sandy loams, strongly saline alkali, 0 to 1 percent slopes
- HbA, Hanford fine sandy loam, 0 to 3 percent slopes
- HdA, Hanford sandy loam, 0 to 3 percent slopes
- HdB, Hanford sandy loam, 3 to 8 percent slopes
- HddA, Hanford sandy loam, poorly drained variant, 0 to 1 percent slopes
- HdpA, Hanford sandy loam, moderately deep over silt, 0 to 1 percent slopes
- HdsA, Hanford sandy loam, deep over silt, 0 to 1 percent slopes
- HfA, Hilmar loamy sand, 0 to 1 percent
- HkbA, Hilmar loamy sand, slightly saline-alkali, 0 to 1 percent slopes
- TrA, Traver sandy loam, moderately saline-alkali, 0 to 1 percent slopes
- TuA, Tujunga loamy sand, 0 to 3 percent slopes
- W, Water
- WaA, Waukena fine sandy loam, slightly saline-alkali, 0 to 1 percent slopes
- WbA, Waukena fine sandy loam, moderately saline-alkali, 0 to 1 percent slopes
- WdA, Waukena sandy loam, slightly saline-alkali, 0 to 1 percent slopes
- WeA, Waukena sandy loam, moderately saline-alkali, 0 to1 percent slopes

Notes:
1. 1 mile around Project Site, 1/4 mile around NG Pipeline and Transmisson Line.
2. Source: U.S. Department of Agriculture, Natural Resources Conservation Service, Soil Survey Geographic (SSURGO) database for Stanislaus County, California.
3. The Grayson Substation is being developed as a separate Project

This map was compiled from various scale source data and maps and is intended for use as only an approximate representation of actual locations.

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FIGURE 5.11-1C
SOIL CLASSIFICATION OF SITE

ALMOND 2 POWER PLANT
CERES, CALIFORNIA

CH2MHILL

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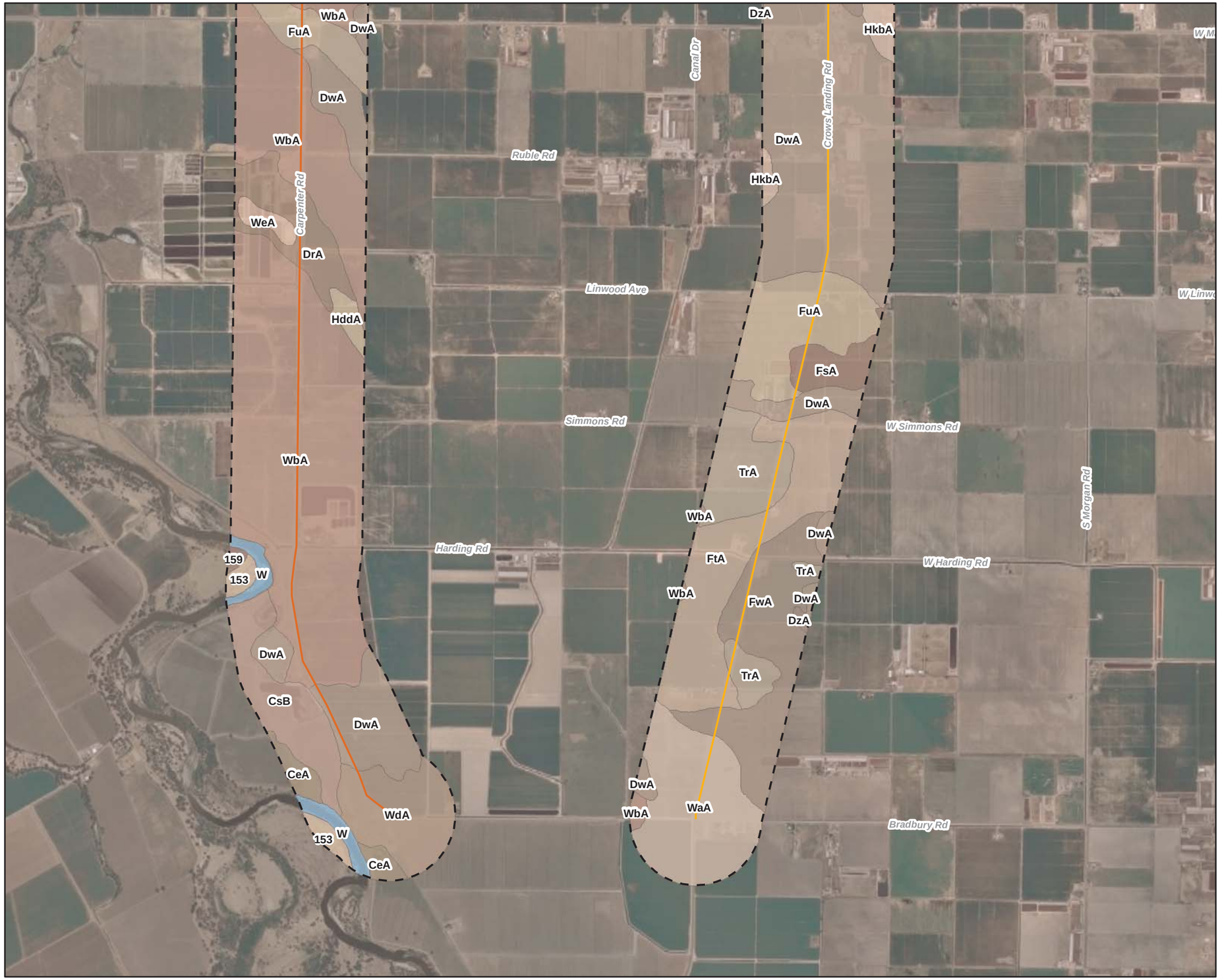
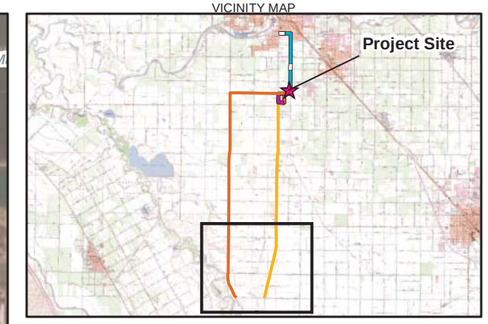


VICINITY MAP



LEGEND

- Natural Gas Pipeline (Alternate A)
- Natural Gas Pipeline (Alternate B)
- 115-kV Circuit 1 Line (Corridor 1)
- 115-kV Circuit 2 Line (Corridor 2)
- Reconductored 69kV Sub-Transmission Line
- Laydown Area
- Project Site
- Proposed Grayson Substation
- Buffer

Soil Type

- 153, Columbia fine sandy loam, channeled, partially drained, 0 to 2 percent slopes
- 159, Columbia complex, 0 to 2 percent slopes
- CeA, Columbia loam, 0 to 1 percent slopes
- CsB, Columbia soils, channeled, 0 to 8 percent slopes
- DeA, Delhi loamy sand, 0 to 3 percent slopes
- DgA, Delhi loamy sand, silty substratum, 0 to 3 percent slopes
- DrA, Dinuba sandy loam, 0 to 1 percent slopes
- DtA, Dinuba sandy loam, deep, 0 to 1 percent slopes
- DuA, Dinuba sandy loam, poorly drained variant, 0 to 1 percent slopes
- DwA, Dinuba sandy loam, slightly saline-alkali, 0 to 1 percent slopes
- DzA, Dinuba sandy loam, very poorly drained variant, slightly saline- alkali
- FrA, Fresno fine sandy loam, moderately saline-alkali, 0 to 1 percent slopes
- FsA, Fresno fine sandy loam, strongly saline-alkali, 0 to 1 percent slopes
- FtA, Fresno sandy loam, slightly saline-alkali, 0 to 1 percent slopes
- FuA, Fresno sandy loam, moderately saline-alkali, 0 to 1 percent slopes
- FwA, Fresno-Dinuba sandy loams, strongly saline alkali, 0 to 1 percent slopes
- HbA, Hanford fine sandy loam, 0 to 3 percent slopes
- HdA, Hanford sandy loam, 0 to 3 percent slopes
- HdB, Hanford sandy loam, 3 to 8 percent slopes
- HddA, Hanford sandy loam, poorly drained variant, 0 to 1 percent slopes
- HdpA, Hanford sandy loam, moderately deep over silt, 0 to 1 percent slopes
- HdsA, Hanford sandy loam, deep over silt, 0 to 1 percent slopes
- HfA, Hilmar loamy sand, 0 to 1 percent
- HkbA, Hilmar loamy sand, slightly saline-alkali, 0 to 1 percent slopes
- TrA, Traver sandy loam, moderately saline-alkali, 0 to 1 percent slopes
- TuA, Tujunga loamy sand, 0 to 3 percent slopes
- W, Water
- WaA, Waukena fine sandy loam, slightly saline-alkali, 0 to 1 percent slopes
- WbA, Waukena fine sandy loam, moderately saline-alkali, 0 to 1 percent slopes
- WdA, Waukena sandy loam, slightly saline-alkali, 0 to 1 percent slopes
- WeA, Waukena sandy loam, moderately saline-alkali, 0 to1 percent slopes

Notes:
1. 1 mile around Project Site, 1/4 mile around NG Pipeline and Transmisson Line.
2. Source: U.S. Department of Agriculture, Natural Resources Conservation Service, Soil Survey Geographic (SSURGO) database for Stanislaus County, California.
3. The Grayson Substation is being developed as a separate Project

This map was compiled from various scale source data and maps and is intended for use as only an approximate representation of actual locations.

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Feet

FIGURE 5.11-1D
SOIL CLASSIFICATION OF SITE

ALMOND 2 POWER PLANT
CERES, CALIFORNIA

CH2MHILL

5.11.1.1 Agricultural Use

Based on a review of aerial photography, it appears that a portion of the land immediately surrounding the proposed A2PP project site is used for agricultural production. Main crops in the area appear to be nut trees and alfalfa/pasture grasses. Based on observations made during the biological field survey, most of the agricultural land along the linear features (natural gas pipeline and transmission lines) was planted with either alfalfa or grasses; however, it is expected that these fields may also be used at times for other crops depending on crop rotation cycles.

5.11.1.2 Soil Mapping Units

Table 5.11-1 describes the properties of the soil mapping units that are found in the vicinity of the proposed A2PP project site. As indicated, the soil mapping units in the project area are generally sandy loams or loamy sands formed in alluvial deposits. These soils are very deep and well drained, with moderately rapid permeability. Due to the developed, industrial nature of the project area and vicinity, it is possible that soil conditions could vary significantly from those shown in the NRCS soil survey. Industrial development often entails significant mixing of local soils from grading and the import of construction fill soils beneath foundations and roadways. These imported soils would have to be suitable for engineered structures and roadways, and would be expected to consist of well-graded materials containing a mix of particle sizes (particle sizes ranging from silt to gravel). Imported soils would not be expected to contain materials that are unsuitable for engineering purposes, such as organic debris or expansive clays.

5.11.1.3 Potential for Soil Loss and Erosion

The factors that have the largest effect on soil loss include long, steep slopes; lack of vegetation; and erodible soils with high proportions of silts and very fine sands. The soils found in the proposed A2PP project area are nearly level, with an estimated average slope of less than two percent.

In general, soils at the proposed A2PP project site are medium to coarse grained and range between sandy loam and loam sand in texture (USDA-NRCS, 2008). 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. Based on the soil survey information, the soils at the proposed A2PP project site are expected to have moderate wind and water erosion potential.

It should be noted that given the historical filling, grading, and construction on the majority of the A2PP project site, soils at the site may not be the same as those mapped in the soil survey. The majority of the area may consist of imported fill material, which, if exposed, could be subject to different (higher or lower) rates of water and wind erosion than the native soils, depending on their actual properties and degree of compaction.

5.11.1.4 Other Significant Soil Characteristics

The industrialized nature of the A2PP project site may have led to significant changes to the native soil described in the NRCS soil survey. The northern three-quarters of the project site was formerly a borrow area used during the development of the adjacent WinCo facility. The area was previously excavated approximately 6.5 feet below grade and was recently

backfilled with commercially available fill (Davies, 2008). Additionally, the southern quarter of the project site is currently used as the retention pond for the existing Almond Power Plant. The pond will be filled to ground level at the beginning of construction, likely with non-native soil. Because the majority of the soil in the project site has been disturbed, the soil characteristics are likely to be different than those described in the soil survey. It is assumed that the non-native soil material previously used to fill the borrow pit as well as non-native soil material that will likely be used to fill the retention basin will be suitable for engineering purposes and will not contain organic debris or expansive clays. A geotechnical evaluation has recently been performed to ensure that the non-native fill soils are suitable for supporting the A2PP, and will be provided to the California Energy Commission when available.

5.11.2 Environmental Analysis

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

5.11.2.1 Significance Criteria

The potential for impacts to soil resources and their uses (such as agriculture) were evaluated with respect to the criteria described in Appendix G of the California Environmental Quality Act (CEQA) Guidelines (§15000–15387, California Code of Regulations [CCR] Title 14, Chapter 3). An impact is considered potentially significant if it would:

- Involve changes in the existing environment which, because of their location or nature, could result in conversion of Farmland to non-agricultural 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 (International Code Council, 1997), 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.

5.11.2.2 Farmland Conversions

The proposed A2PP project site is adjacent to farmland in a mixed land-use area that includes areas zoned for agriculture. The project site itself currently consists of gravel and weeds, and is zoned for industrial use. Alignment of the natural gas pipeline alternatives will occur within TID and County road rights-of-way, and will not intersect any parcels with Williamson Act contracts. Portions of the new transmission lines will be both within TID and County road rights-of-way and private property; however, neither intersects any parcels with Williamson Act contracts. Although construction will occur in the road right-of-way, minor and temporary impacts may occur to adjacent lands with Williamson Act contracts. These impacts will be mitigated post construction, and the land returned to its preconstruction state. Reconductoring of the 69-kV sub-transmission line will not require ground disturbance, and subsequently, parcels within and outside of the transmission line

right of way will not be impacted. For these reasons, the proposed A2PP project will not result in the conversion of any agricultural land to a non-agricultural use.

5.11.2.3 Jurisdictional Wetlands and other Waters of the United States

Based on the developed nature of the project site, no wetlands or other jurisdictional waters of the United States will be impacted by the proposed A2PP project. Section 5.2, Biological Resources, addresses this topic in greater detail.

5.11.2.4 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 depends 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 lead to excessive soil erosion are not present at the A2PP project site (e.g., no long, steep slopes or erodible soils), little soil erosion is expected during the construction period. In addition, construction best management practices (BMPs) will be implemented during construction, as described in the Stormwater Pollution Prevention Plan (SWPPP) that is required for all construction projects over 1 acre under the general permit covering discharges of stormwater from construction activities. The National Pollutant Discharge Elimination System (NPDES) General Permit for Storm Water Discharges Associated with Construction Activity (General Permit; Water Quality Order 99-08-DWQ) is described in the sections that follow. The California Energy Commission (CEC) also requires that project owners develop and implement a drainage, erosion, and sediment control plan (DESCP) to reduce the impact of runoff from a construction site. Therefore, impacts from soil erosion are expected to be less than significant. General Permit requirements also include construction site inspections and monitoring to ensure that the BMPs described in the SWPPP/DESCP are properly implemented and provide an effective combination of erosion and sediment controls.

While the potential for soil erosion on the proposed A2PP project site is expected to be nominal, quantitative estimates of erosion by water and wind are provided in the following sections.

5.11.2.4.1 Water Erosion

An estimate of soil loss during construction by water erosion was developed using the Revised Universal Soil Loss Equation (RUSLE2), and is summarized in Table 5.11-2. Detailed calculations for the soil loss estimates are found in Appendix 5.11A.

TABLE 5.11-2
Construction Soil Loss Estimates Using the 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
Project Site (4.60 acres)	Grading	2	0.84	0.0010	0.0078
	Construction	12	0.22	0.0061	—
Laydown Area (1.85 acres)	Grading	1	0.28	0.0017	0.0043
(0.925 acres exposed; 0.925 paved or graveled)	Construction	12	0.74	0.020	—
Transmission Lines					
Corridor 1 (1.56 acres for construction; 0.0066 acre for pole footprints)	Grading	2	0.0016	0.0045	0.0000
	Construction	4	0.33	0.0090	—
Corridor 2 (2.16 acres for construction; 0.0092 acre for pole footprints)	Grading	2	0.0023	0.0065	0.0000
	Construction	4	0.47	0.013	—
Reconductored 69-kV sub-transmission line (0.00 acre for construction; 0.00 acre for pole footprints – Reconductoring only)	Grading	0	0.0000	0.0000	0.0000
	Construction	0	0.0000	0.0000	—
Natural Gas Pipelines					
Alternate A (55.20 acres for construction; 4.42 acres for trench)	Grading	6	2.22	0.33	0.0075
	Construction	6	11.74	0.33	—
Alternate B (67.64 acres for construction; 5.41 acres for trench)	Grading	6	2.77	0.41	0.0092
	Construction	6	14.73	0.41	—
Project Soil Loss Estimates	Total	12	34.31	1.53	0.03

[a]Soil losses (tons/acre/year) are estimated using RUSLE2 software available online at: http://fargo.nserl.purdue.edu/rusle2_dataweb/ (verified 23 Jan 2009).

[b]Acreages assume 30-foot corridors for the transmission lines and 100-foot corridors for the natural gas construction corridor. Trench for the natural gas pipeline is assumed to be 4 feet wide. Transmission line pole holes are assumed to have a 4-foot-by-4-foot excavation footprint.

The following assumptions, which are also shown in Appendix 5.11A, were used in the model.

- The A2PP construction site is approximately 4.6 acres. Active soil grading will occur over a 2-month period. Following grading, disturbed soils will be exposed for an additional 10-month active construction period, after which the majority of the site will be paved or occupied by structures. It is assumed that around 1/10th of the project site will have exposed bare soil during the construction period.

- 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 A2PP site coordinates using site-specific rainfall estimates from online National Weather Service data (NOAA, 2008).
- 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 RUSLE2 calculations, an average slope of 1.5 percent (i.e., mid-point of 0 to 3 percent slope class) was assumed for the Hanford sandy loam soil unit (HdA), and an average slope of 0.5 percent was used for the Hanford sandy loam, moderately deep over silt soil unit (HdpA).

Soil losses are estimated using the following RUSLE2 conditions:

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

Active grading soil losses were approximated using: Management: bare ground; rough surface soil conditions; Contouring: Rows up and down hill; Diversion/terracing: None; and Strips and Barriers: None.

Construction soil losses **with implementation of construction BMPs** were approximated using: Management: Silt fence; Contouring: Perfect, no row grade; Diversion/terracing: None; and Strips and Barriers: two silt fences, one at end of slope.

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

With the implementation of appropriate BMPs that will be required under the General Permit, the total project soil loss is estimated to be 1.53 tons. This is considered to be a minimal amount, and would constitute a less-than-significant impact to soil resources. It should also be recognized that the estimate of accelerated soil loss by water is very conservative (overestimate of soil loss) because it assumes only a single BMP (i.e., silt fencing), whereas the SWPPP will require multiple soil erosion control measures.

5.11.2.4.2 Wind Erosion

The potential for wind erosion of surface soil was estimated by calculating the total suspended particulates (TSP) that could 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 TSP matter 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 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 (U.S. Environmental Protection Agency [EPA], 1995; also in Table 11.9-4 in BAAQMD, 2005).

Table 5.11-3 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 9.60 tons over the course of the project construction cycle. This estimate is reduced to approximately 3.36 tons by implementing basic mitigation measures, such as water application (see mitigation measures, below), which will be identified in the SWPPP. These estimates are conservative because they make use of emission rates for a generalized soil rather than for site-specific soil properties.

TABLE 5.11-3
Soil Loss (TSP) from Grading and Wind Erosion

Emission Source	Acreage	Duration (months)	Unmitigated TSP (tons)	Mitigated TSP (tons)
Grading Dust				
Project Site	4.60	2	0.158	0.055
Laydown Area	1.85	1	0.032	0.011
Natural Gas Pipelines (4-ft trench)				
Alternate A	4.42	6	0.455	0.159
Alternate B	5.41	6	0.558	0.195
Transmission Line Pole Holes				
Corridor 1	0.007	2	0.0002	0.0001
Corridor 2	0.009	2	0.0003	0.0001
Reconductored 69-kV sub-transmission line	0.000	2	0.0000	0.0000
Transmission Line Total	0.016		0.0005	0.0002
Wind Blown Dust				
Project Site	4.60	10	0.146	0.051
Laydown Area	0.00	11	0.000	0.000
Natural Gas Pipelines (Corridor)				
Alternate A	55.20	2	3.496	1.224
Alternate B	67.64	2	4.284	1.499
Transmission Line Corridor				
Corridor 1	1.557	4	0.197	0.069
Corridor 2	2.164	4	0.274	0.096
Reconductored 69-kV sub-transmission line	0.000	4	0.000	0.000
Transmission Line Total	3.721	4	0.471	0.165
Estimated Total			**9.60**	**3.36**

Notes: Assumptions for these calculations are found in Appendix 5.11A.

5.11.2.5 Expansive Soils

According to the NRCS soil survey for Stanislaus County (USDA-NRCS, 2008), expansive soils should not be present and are not expected to be encountered in the proposed A2PP project area.

5.11.2.6 Compaction during Construction and Operation

Construction of the proposed project would result in soil compaction during the construction of the foundations, paved roadway, and parking areas. Soil compaction would also result from vehicle traffic along temporary access roads and in the equipment staging (laydown) and parking areas. Soil compaction increases soil density by reducing soil pore space. Reduced porosity likewise reduces the ability of the soil to absorb precipitation and transmit gases for respiration of plant roots and soil microfauna. Soil compaction can result in increased runoff, erosion, and sedimentation. The incorporation of BMPs, in accordance with the SWPPP/DESCP guidelines, during construction will result in less-than-significant impacts from soil compaction.

Before construction on the proposed plant begins, the retention pond at the existing Almond Power Plant will be filled and the area will be graded for the construction of the A2PP. Once the filling and grading of this area is complete, minimal additional grading is expected because the site is relatively flat. After grading, rainfall would run off the site as overland flow or would infiltrate the soil and percolate to groundwater. The laydown and parking areas will be graveled to allow for wet season use and further minimize soil erosion potential. Once construction is complete, the gravel will either be removed from the site or incorporated into the site paving. Heavy equipment stored on site will be placed on dunnage to protect it from ground moisture.

The proposed A2PP will be constructed in an area that has been disturbed by previous construction. It is expected that this area has already experienced compaction as a result of this previous activity. A portion of the proposed plant will be constructed on an area currently used as a retention basin, and therefore will require additional compaction of the fill in order to establish a stable foundation for buildings and roadways. The amount of soil compaction that will be required to establish permanent road beds and foundation areas for buildings at the rest of the site should be minimal. Because these areas will be paved or otherwise protected after construction, the overall anticipated effects of compaction during construction are considered to be less than significant.

Operation of the A2PP 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 are paved or will be graveled, and standard operational activities should not involve the disruption of soil. Therefore, impacts to soil from project operations would be less than significant.

5.11.2.7 Effects of Emissions on Soil-Vegetation Systems

There is a concern in some areas that emissions from a generating facility, principally NOx from the combustors, 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. Nitrogen

additions, including additions through aerial deposition, are also known to reduce the activity of mycorrhizal fungi in the soil.

The additional nitrogen from air emissions from the A2PP is expected to be negligible when compared to the nitrogen content in fertilizers that are likely already being applied in cultivated fields. Additionally, there are no serpentine habitats in or surrounding the project area. Therefore, it is assumed that the addition of small amounts of nitrogen to the area would result in a less-than-significant impact to soil-vegetation systems. Additional discussion regarding nitrogen deposition and impacts to biological resources in the area may be found in Section 5.2, Biological Resources.

5.11.2.8 Transmission Line Reconductoring

The existing Almond Power Plant/Crows Landing Substation single-circuit, 69-kV sub-transmission line is scheduled to be reconductored to allow for increased power transmission. The line is built within the existing county road, railroad, and City of Modesto right of way. Work will progress along the county road in a 20-foot-wide path. Disturbance to the soil will occur solely through the parking of vehicles and extending of still legs (Tucker, 2009). It is assumed that the disturbance will occur on currently vegetated areas. Therefore, it is assumed that the transmission line reconductoring would result in less-than-significant impacts.

5.11.3 Cumulative Effects

A cumulative impact refers to a proposed project's incremental effect when considered 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 (Public Resources Code §21083; 14 CCR 15064(h), 15065(c), 15130, and 15355).

For 2008–2009, the City of Ceres has 19 public works projects, five commercial/industrial projects, 10 city-related plans or programs either planned or currently under way. Of these projects, three are within a 1-mile radius of the project site and/or transmission routes, and include:

- **Crows Landing (Flea Market) and Ceres Lions Park Wells –** Addition of a 650 to 725-gallon per minute (gpm) well at the Crows Landing Flea Market and second 650-gpm well at Ceres Lions Park. Design of the pumps is under way.
- **Lagoon Cleaning Project –** As part of the City of Ceres' effort to improve the treatment system, percolation ponds east of Morgan Avenue and south of E. Service Road are being dredged, with completion expected in early 2009.
- **Larger Stand-by Power at Blaker Reservoir –** The City of Ceres plans to either replace the existing stand-by power unit currently capable of powering two of the six booster pumps, with a power unit capable of running four booster pumps, or add a second unit to power the two additional pumps. This project is currently in the planning phase.

In addition to these capital projects, the City of Ceres has an additional 30 project applications approved and five pending within the Planning Department. Of the 30 approved projects, three are industrial and are within the Service Road Industrial Master Plan area, two are residential within the Brown Annexation Master Plan area, and one

residential project is within the Westpoint Master Plan area; these projects are within approximately 1 mile of the project site. The pending applications include one residential project (34 units) and three commercial projects (a total of 410,000 square feet). These projects range between 2.5 to 3 miles away from the A2PP.

In December 2008, 29 projects applications were under review with the Stanislaus County Planning Division, including general plan amendments and rezonings, and applications to develop residential, office, commercial, and industrial uses as well as religious, educational, and health institutions; agricultural-related uses; and natural resource extraction (Stanislaus County, 2008 and 2009). These projects were located elsewhere in the County in the areas of Salida, Waterford, Oakdale, Patterson, Keyes, Knights Ferry, Denaire, Turlock, Empire, Hughson, Newman, and Modesto.

Additionally, TID is preparing an environmental impact report for the TID Hughson-Grayson 115-kV Transmission Line and Substation Project, which includes the proposed Grayson Substation (State Clearinghouse Number 2009012075). In addition to the substation, the Hughson-Grayson project consists of an approximately 10-mile-long, 115-kV transmission line; a 0.5-mile-long, 69-kV transmission line from the existing TID Almond Power Plant; and a second 69-kV transmission line that extends 0.8 mile east from the proposed substation. The Notice of Preparation was issued on January 26, 2009, and reissued February 10, 2009. The Draft Environmental Impact Report is anticipated to be issued in July 2009.

Because the A2PP is a permitted use at the proposed site and would not result in significant adverse impacts that cannot be mitigated, impacts from the A2PP would not likely combine with those from the projects being processed in the city limits to result in cumulative significant impacts. Similarly, because the A2PP site is in a primarily agricultural area of the county, it is unlikely the A2PP's project impacts would combine with those of projects occurring elsewhere in the County to result in significant cumulative impacts.

As previously described, the project would have no permanent effect on agriculture because there are no agricultural uses at the proposed A2PP project site and because agricultural uses would be restored along the transmission and gas pipeline alignment after construction. The project's expected minor to negligible effects on soil erosion, sedimentation, and compaction are not considered to be significant, particularly with the application of onsite construction BMPs. The A2PP site is surrounded by rural land use, and there are no plans to develop these areas in the near future. Therefore, the potential for cumulative impacts of the proposed A2PP combined with other projects would be insignificant.

5.11.4 Mitigation Measures

BMPs, in accordance with the SWPPP and DESCP, will be used to minimize erosion and sediment transport at the site during construction. These erosion-control measures would be required to help maintain water quality, protect property from damage due to erosion, and prevent accelerated soil erosion or dust generation that removes topsoil and destroys soil productivity. Temporary and permanent erosion and sediment control measures are described below. With implementation of control measures, soil losses due to erosion are expected to be negligible during both construction and subsequent operation of the project.

5.11.4.1 Temporary Erosion Control Measures

Temporary erosion control measures would be installed before construction begins, and would be evaluated and maintained during construction. Construction BMPs typically include revegetation, mulching, physical stabilization, dust suppression, berms, ditches, and sediment barriers. These temporary measures would be removed from the site after the completion of construction.

During construction of the project, 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 fences. 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 entire site perimeter. 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 (e.g., silt fences properly 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 paved 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 South Coast Air Quality Monitoring District (SCAQMD) CEQA Handbook (1993) and were used to estimate the effectiveness of the mitigation measures. Table 5.11-4 summarizes the mitigation measures and PM_{10} reduction efficiencies. Additional fugitive dust mitigation measures are discussed in Section 5.1, Air Quality.

TABLE 5.11-4
Mitigation Measures for Fugitive Dust Emissions

Mitigation Measure	PM_{10} Emission Reduction Efficiency (%)
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)

5.11.4.2 Permanent Erosion Control Measures

Permanent erosion control measures on the site may include graveling, paving, the installation of drainage systems, and revegetation, as appropriate.

5.11.5 Laws, Ordinances, Regulations, and Standards

Federal, state, county, and local LORS applicable to soils are discussed in this section and summarized in Table 5.11-5.

TABLE 5.11-5
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) with amendments	Regulates stormwater discharge from construction and industrial activities	SWRCB and Central Valley RWQCB	5.11.5.1.1
Natural Resources Conservation Service (1983), National Engineering Handbook, Sections 2 and 3	Standards for soil conservation	Natural Resources Conservation Service	5.11.5.1.2
State			
Porter-Cologne Water Quality Control Act	Law for regulation of surface and ground water quality in the state	SWRCB and Central Valley RWQCB	5.11.5.2.1
Local			
Stanislaus County General Plan; Chapter 7 – Agricultural Element	Provides limits for development of agricultural soils	Stanislaus County Planning and Community Development Department	5.11.5.3.1
Stanislaus County Code; Title 13, Streets, Sidewalks, and Public Places	Provides requirements for construction of underground utilities along County roads.	Stanislaus County Planning and Community Development Department	5.11.5.3.1
Stanislaus County Code; Title 16, Buildings and Construction	Provides the Building Code for Stanislaus County, including general design standards and an amendment to the California Building Code for grading.	Stanislaus County Planning and Community Development Department	5.11.5.3.1

TABLE 5.11-5
Laws, Ordinances, Regulations, and Standards for Soils

LORS	Requirements/ Applicability	Administering Agency	AFC Section Explaining Conformance
Stanislaus County Code; Title 21, Zoning	Provides information on zoning and outlines the accepted uses for lands under a Williamson Contract.	Stanislaus County Planning and Community Development Department	5.11.5.3.1
Stanislaus County Standards and Specifications	Provides the County's minimum requirements for excavation safety, dust controls, earthwork, erosion and pollution prevention, and more.	Stanislaus County Department of Public Works	5.11.5.3.1
Stanislaus County Storm Water Management Plan	Regulates BMPs for construction activities.	Stanislaus County Department of Public Works	5.11.5.3.1
City of Ceres Municipal Code	Provides grading requirements and permit information, preliminary soil report requirements, regulates BMP's for construction activities, and gives general design standards.	City of Ceres Planning Division	5.11.5.3.1
City of Ceres General Plan; Chapters 4 (Public Utilities and Services) and 6 (Agricultural and Natural Resources)	Provides goals and policies regarding the development of public utilities, and the conversion of agricultural land.	City of Ceres Planning Division	5.11.5.3.1
City of Ceres Improvement Standards	Provides the City's minimum requirements for earthwork and construction activities.	City of Ceres Public Works Department	5.11.5.3.1

RWQCB = Regional Water Quality Control Board
SWRCB = State Water Resources Control Board

5.11.5.1 Federal LORS

5.11.5.1.1 Federal Water Pollution Control Act of 1972 (Clean Water Act)

The Federal Water Pollution Control Act of 1972, commonly referred to as the Clean Water Act (CWA), effectively prohibits point source discharges of pollutants to a water of the U.S. unless authorized under an NPDES permit. The 1987 CWA amendments established a framework for regulating municipal and industrial stormwater discharges under the NPDES program. In 1990, EPA published final regulations that established stormwater permit requirements for specific industrial categories, including construction. The SWRCB is the NPDES permitting authority in California and has adopted a statewide

general permit for stormwater discharges associated with construction activity (General Construction Storm Water Permit, or "General Permit;" SWRCB, 1999) that applies to projects resulting in one or more acres of soil disturbance. The General Permit is currently under revision, and the revised permit is expected to be approved by the SWRCB in 2009. The proposed A2PP project will result in disturbance of more than one acre of soil; therefore, the project will require coverage under the General Permit, along with development and implementation of a site-specific SWPPP, which identifies BMPs that are adequate to control erosion and sediment transport from the site. The requirements are described in greater detail in Section 5.15, Water Resources.

5.11.5.1.2 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. The proposed A2PP will need to conform to these standards during grading and construction to limit soil erosion.

5.11.5.2 State LORS

5.11.5.2.1 California Porter-Cologne Water Quality Control Act

The Porter-Cologne Water Quality Control Act (California Water Code, Division 7) is the state law governing water quality in California, and designates responsibilities to the SWRCB and nine RWQCBs to coordinate and control water quality. As described above, in 1999, the SWRCB adopted a general NPDES permit, in compliance with the CWA, to regulate stormwater discharges from construction sites greater than 1 acre in size. The proposed A2PP site lies within the jurisdiction of the Central Valley RWQCB; this RWQCB would ensure that the project complies with the General Construction Permit requirements.

5.11.5.3 Local LORS

5.11.5.3.1 Stanislaus County

Applicable Stanislaus County regulations include the General Plan (Stanislaus County, 1994), the County Code (Quality Code Publishing, 2008), the Improvement Standards (Standards and Specifications – Stanislaus County Public Works, 2007), and the Storm Water Management Plan (Stanislaus County, 2003).

One section of the General Plan that may be relevant to soils is the Agricultural Element (Section 7). Policies and goals regarding soil and agricultural land conservation are found in this section of the plan (which also includes objectives for protecting air and water quality).

The Stanislaus County Code describes county rules and regulations. Several of the Code "Titles" may apply to this project, including Title 13 (Streets, Sidewalks, and Public Places; esp. 13.04), Title 16 (Buildings and Construction, esp. 16.05), and Title 21 (Zoning, esp. 21.20).

The county Improvement Standards document describes design standards and permitting instructions for grading, storm drainage, and construction that would apply to construction of the A2PP linear features that fall outside of the City of Ceres boundary. Compliance with the requirements of these standards will be subject to review by the Director of Public Works before permits are issued or construction can take place.

Additionally, the county developed a Storm Water Management Plan (Stanislaus County, 2003), in compliance with Phase II Municipal Separate Storm Sewer (MS4) permit requirements, that describes actions that will be taken by the county to ensure construction activities within the county implement effective BMPs to control erosion and sedimentation.

Personal communications with Stanislaus County staff indicated that grading permits would not be needed for this project (Ford, 2009)

5.11.5.3.2 City of Ceres

Applicable City of Ceres regulations include the Municipal Code (LexisNexis Municipal Codes, 2008), the General Plan (City of Ceres, 1997) and the Improvement Standards (City of Ceres Public Works Department, 1997).

The City of Ceres Municipal Code outlines city regulations and standards. Several of the Code "titles" may apply to this project, including Title 12 (Streets and Sidewalks; esp 12.08), Title 13 (Water and Sewer; esp 13.18), Title 15 (Buildings and Construction; esp 15.02), and Title 17 (Subdivisions; esp 17.24).

The General Plan gives City goals and policies, and serves as the "long term vision for the physical evolution" of the City (City of Ceres, 1997). The plan was designed to guide day-to-day decisions concerning the development of the City of Ceres through 2015. Several of the chapters may apply to this project, including Chapter 4 (Public Utilities and Services) and Chapter 6 (Agricultural and Natural Resources).

The Improvement Standards document outlines the requirements for building within the City of Ceres. Included are standards for streets and highways, sanitary sewers, public water supply lines, storm drain systems, construction, and project closure requirements. The Standards document also outlines the process for getting a project plan approved.

5.11.6 Agencies and Agency Contacts

Permits required for the proposed A2PP project, along with agency contacts are shown in Table 5.11-6. A grading permit application and permit approval will need to be obtained from the City of Ceres for work on the project site. Other permits will be obtained from the City and County if design plans warrant. Coverage under the General Construction Permit will need to be obtained prior to any construction disturbance on the site.

TABLE 5.11-6
Permits and Agency Contacts for Soils

Permit or Approval	Agency Contact	Applicability
Grading Permit Application & Permit	Tom Westbrook City of Ceres (209) 538-5778 Email: tom.westbrook@ci.ceres.ca.us Michael Brinton, City Engineer City of Ceres (209) 538-5621 Email: michael.brinton@ci.ceres.ca.us	Permit forms, applications, and guidelines
Stanislaus County Planning Department – No grading permit	Angela Frietas Deputy Director Stanislaus County Planning and	

TABLE 5.11-6
Permits and Agency Contacts for Soils

Permit or Approval	Agency Contact	Applicability
needed	Community Development Department 1010 10th Street, Suite 3400 Modesto, CA 95354 (209) 525-6330	

5.11.7 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 within the timeframe specified by the agency. Coverage under the NPDES General Permit for construction activities is effective upon submitting a Notice of Intent to the SWRCB, with applicable fee, and developing and implementing a site-specific SWPPP.

5.11.8 References

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