5.12 Soils

This section presents a discussion of potential soils issues associated with the PHPP. Applicable LORS and existing conditions at the Project site and along its linear features are discussed. Baseline soils conditions are discussed, potential environmental impacts are identified, and mitigation measures are identified to minimize impacts to soils during Project construction and operation.

5.12.1 LORS Compliance

This section addresses the LORS applicable to soils that are relevant to the Project. Table 5.12-1 and the following text summarize the LORS that are expected to apply to the Project.

Table 5.12-1 LORS Applicable to Soils

LORS	Applicability	Where Discussed in AFC
Federal:		
Farmland Protection Policy Act	The Farmland Protection Policy Act requires the assessment of the Project's impacts on farmlands.	Sections 5.12.3
State:		
California Porter Cologne Water Quality Act	A National Pollution Discharge Elimination System (NPDES) California General Activities Construction Permit is necessary if an area greater than one acre will be disturbed. Industrial facilities (including power plants) with potential to affect storm water discharges are required to obtain an NPDES permit during operation (Industrial Storm Water General Permit).	Section 5.12.3
Local:		
City of Palmdale Building Code	The City of Palmdale requires a grading permit for earth moving activities exceeding 3 feet in depth or 20 cubic yards in volume.	Section 5.12.3

5.12.1.1 Federal LORS

The Farmland Protection Policy Act. The Farmland Protection Policy Act (FPPA) of 1981 was enacted to identify and protect the nation's farmlands. The purpose of the Act is to preserve agricultural and open space lands by discouraging premature and unnecessary conversion to urban uses. Projects are subject to FPPA requirements if they may irreversibly convert farmland (directly or indirectly) to nonagricultural use and are completed by a Federal agency or with assistance from a Federal agency. For the purpose of the FPPA, farmland includes designated Prime Farmland, Farmland of Statewide Importance, and Unique Farmland. Prime Farmland is defined as land with the best combination of physical and chemical characteristics able to sustain long-term production of agricultural crops. Farmland of Statewide Importance is defined as land with a good combination of physical and chemical characteristics for agricultural

production, having only minor shortcomings, such as less ability to store soil moisture, compared to Prime Farmland. Unique Farmland is defined as land used for the production of the State's major crops on soils not qualifying as Prime Farmland or Farmland of Statewide Importance.

There are no areas of Prime Farmland, Farmland of Statewide Importance, or Unique Farmland at or within two miles of the plant site or along the gas and water pipeline routes. The proposed transmission line route runs adjacent to several areas of Prime Farmland, specifically portions of the route that run along E Ave L in the north and the BP&L Road in the southeast. A map of Prime Farmland in the vicinity of the project and further discussion of impacts of the project on farmland are included in Section 5.7 Land Use.

5.12.1.2 State LORS

Porter-Cologne Water Quality Control Act. A disturbance of greater than one acre requires a California General Permit for Storm Water Discharges Associated with Construction Activity and thus the Project will require an NPDES Permit-California General Construction Activity Storm Water Permit prior to discharge of storm water facilities (also see Section 5.17, Water Resources). A key feature of the requirements under this permit is the management of erosion and soil movement. Industrial facilities in California (such as the proposed VV2 Project), with the potential to impact storm water discharges during operations are required to obtain an NPDES Permit-Industrial Storm Water General Permit (SWRCB Order 97-03 DWQ) to ensure proper management and reduction of potential pollutants in runoff.

5.12.1.3 Local LORS

The City of Palmdale requires grading permits for excavation or fill activities which are greater than three feet in depth or involved the movement of more than 20 cubic yards of earth.

5.12.1.4 Involved Agencies

The agency and person to contact for NPDES and grading permits are identified in Table 5.12-2.

Figure 5.12-1 Agencies and Agency Contacts

Contact	Phone/E-mail	Permit/Issue
Mike Plaziak, Office Manager Lahontan Regional Water Quality Control Board Victorville Office 14440 Civic Drive, Suite 200 Victorville, CA 92392	(760) 241-6583 / mplaziak@waterboards.ca.gov	NPDES Permit governing Storm Water Discharges Associated with Construction Activity for any disturbance of greater than one acre and for industrial activities.
Shane Walter, Director City of Palmdale Department of Building and Safety 38250 Sierra Highway Palmdale, CA 93550	(661) 267-5353 / swalter@cityofpalmdale.org	Grading Permits for earth moving activities greater than 3 feet in depth or 20 cubic yards in volume.

5.12.1.5 Required Permits and Permit Schedule

Table 5.12-3 describes required soils-related permits.

Table 5.12-2 Permits Required and Permit Schedule

Permit/Approval	Schedule
California General Permit for Storm Water Discharge Associated with Construction (NPDES Permit)	A Notice of Intent (NOI) application will be submitted 30 days prior to the start of construction.
California General Permit for Storm Water Discharge Associated with Industrial Activities	A Notice of Intent (NOI) will be filed the month prior to Project startup.
City of Palmdale Grading Permit	A grading plan and permit application will be submitted at least six weeks prior to the start of construction.

5.12.2 Affected Environment

This subsection discusses baseline soil conditions at the Project site. Physical soil properties and the potential for contaminated soils are discussed.

5.12.2.1 Regional Setting

The Project is located in Antelope Valley, in the western Mojave Desert. The Mojave Desert is part of the greater Mojave Desert Geomorphic Province. Characteristic landforms in the Mojave Desert include alluvial fans, plains, low pediments, and scattered buttes. The majority of the natural drainage in the vicinity of the Project site is to the northeast.

The climate in the Mojave Desert is characterized by hot, dry summers and cold, moderately wet winters. Typical of these conditions are mean summer temperatures above 80°F with annual rainfall of less than eight inches. While summers may produce an occasional thunderstorm, over 90% of the precipitation in the Palmdale area typically occurs between October and April. Average temperatures in December and January are below freezing. Strong prevailing winds blow from the west and are strongest in the spring (United States Department of Agriculture [USDA], 1970).

5.12.2.2 Plant site

The plant site is situated on a large alluvial fan. The ground surface at the plant site is relatively flat with a gentle slope trending downhill to the northeast. Surface elevations range from approximately 2,493 feet above mean sea level (amsl) in the northeast corner of the site to 2,535 feet amsl in the southwest corner. The site is underlain by Quaternary-age alluvium which is anticipated to be in excess of 500 feet thick. According to a 2007 preliminary geotechnical study of the plant site by Kleinfelder, Inc. (see AFC Appendix B), the plant site is underlain by alluvial soil deposits, generally comprised of alternating layers of various combinations of sand and silt.

Soils at the plant site include Adelanto coarse sandy loam, Cajon loamy sand, and Cajon loamy fine sand (National Resources Conservation Service, 2008). Figure 5.12-1 presents the soil types at the plant site. The following descriptions provide information on physical characteristics of soils at the plant site. The soil properties discussed include the potential for wind and water erosion of the soil types.

Adelanto coarse sandy loam, O to 2 percent slopes (AcA). The Adelanto soil series consists of well-drained soils that have formed on granitic alluvium. Adelanto soils are found on alluvial fans and terraces. The surface layer of AcA is a brown coarse sandy loam about 16 inches thick. Permeability is moderate. Availability of water holding capacity is 7.5 to nine inches. Fertility is low. Runoff is very slow, and the water erosion hazard is slight. Soil blowing is a moderate hazard. The land capability classification for this soil is VIIe for dryland and IIe for irrigated land. Class VII soils have very severe limitations that make them unsuitable for cultivation and that restrict their use mainly to grazing, forestland, or wildlife habitat. Class II soils have moderate limitations that restrict the choice of plants or that require moderate conservation practices. A subclass *e* designation indicates that a soil has a risk for erosion unless close-growing plant cover is maintained (USDA, 1970).

Cajon loamy sand, 0 to 2 percent slopes (CaA). The Cajon soil series consists of excessively drained soils that have formed on fans in granitic alluvium. The surface layer of Cajon loamy sand is a very pale-brown loamy sand about 9 inches thick. Permeability is rapid. Available water holding capacity is four to five inches. Fertility is low. Runoff is very slow, and the water erosion hazard is slight. The hazard of soil blowing is moderate, and in unprotected areas the soil blows readily. The land capability classification this soil is VIIe for dryland and IIIe for irrigated land. Class III soils have severe limitations that restrict the choice of plants or require special conservation practices, or both (USDA, 1970).

Cajon loamy sand, 2 to 9 percent slopes (CaC). CaC is similar in most characteristics to CaA. This soil occupies long, broad alluvial fans near Lancaster. In some places cobblestones and other stones are on the upper parts of the fans. In non-irrigated areas, hummocks of material deposited by wind cover about 20 percent of the surface. Runoff is slow and the hazard of erosion is slight. The land capability classification of this soil is VIIe for dryland and IIIe for irrigated land (USDA, 1970).

Cajon loamy fine sand, 0 to 2 percent slopes, hummocky (CcA2). Hummocks, made up of material deposited by wind, cover more than 90 percent of the area of this soil type. The hummocks are typically 2 to 3 feet high and are fairly well stabilized by vegetation. During periods of strong wind, however, some removal and deposition of soil material occurs. Available water holding capacity is three to five inches. The hazard of soil blowing is high. The land capability classification this soil is VIIe for dryland and IIIe for irrigated land (USDA, 1970).

5.12.2.3 Linear Facilities

The gas, reclaimed water (main and backup), sewer, and potable water pipelines routes run across the alluvium filled floor of Antelope Valley. The transmission line route also runs across the valley floor, and then crosses upland areas of the San Gabriel Mountains before reaching the Vincent substation. Detailed descriptions of the dominant soils encountered along the linear facility routes are provided below.

Gas Pipeline Route

Soils along the gas pipeline route include AcA, CaA, Cajon loamy sand with loamy substrate, CcA2, Gaviota rocky sandy loam, Hesperia fine sandy loam, Ramona coarse sandy loam, Ramona gravelly sandy loam, and Rosamond loam. Figure 5.12-1 presents the soil types along the linear facilities routes. Those soil types not discussed previously are described below.

Cajon loamy sand, loamy substratum, 0 to 2 percent slopes (CbA). Light-gray strata of loam are in this soil at a depth below 30 inches, and in a few places as deep as 40 inches. This loamy material is massive, is violently effervescent, and fairly hard to penetrate when dry. It varies in thickness, but it is generally about 15 inches thick. In areas not irrigated, hummocks of material deposited by wind cover about 40 percent of the surface. Permeability is moderate in this soil because of the underlying loamy material. The available water holding capacity is 5.0 to 7.0 inches. The capability classification for CbA is VIIe for dryland and IIe for irrigated land (USDA, 1970).

Gaviota rocky sandy loam, 15 to 30 percent slopes, hummocky (GaE2). The Gaviota soil series consists of well-drained to somewhat excessively drained soils that form in material from hard sandstone. Gaviota soils are found on uplands. The surface layer of GaE2 typically consists of 10 inches of a light brownish-gray massive sandy loam. GaE2 is well drained. Permeability is moderately rapid. Available water holding capacity is 1.0 to 2.0 inches. Fertility is low. Runoff is medium, and the hazard of erosion is moderate. The land capability class of GaE2 is VIIe for dryland (USDA, 1970).

Hesperia fine sandy loam, 0 to 2 percent slopes (HkA). The Hesperia soil series consists of well-drained soils formed in granitic alluvium. Hesperia soils are found on alluvial fans. The surface layer of Hesperia fine sandy loam is a pale brown loamy sand about four inches thick. Permeability is moderately rapid. Available water holding capacity is 7.5 to 8.5 inches. Fertility is low. Runoff is slow, and the water erosion hazard is slight to moderate. The hazard of soil blowing is moderate. The land capability classification this soil is VIIe for dryland and IIe for irrigated land (USDA, 1970).

Ramona coarse sandy loam, 2 to 5 percent slopes (RcB). The Ramona soil series consists of well-drained soils formed in granitic alluvium. Ramona soils are found on alluvial terraces. The surface layer of Ramona coarse sandy loam is a brown coarse sandy loam about four inches thick. Permeability is moderately slow. Available water holding capacity is eight to 10 inches. Fertility is moderate. Runoff is slow, and the water erosion hazard is slight. The hazard of soil blowing is slight to moderate. The land capability classification this soil is IVec for dryland and IIe for irrigated land. Class IV soils have very severe limitations that restrict the choice of plants or require very careful management, or both. A subclass *c* designation indicates that that the chief limitation of the soil is a climate that is very cold or very dry (USDA, 1970).

Ramona gravelly sandy loam, 2 to 9 percents (ReC). This soil is on terraces. The surface layer is brown, massive gravelly sandy loam about 12 inches thick. Gravel and cobblestones occur throughout the profile. Runoff is low to medium, and the hazard of erosion is slight to moderate. Because of the content of gravel and cobblestones in the soil, the amount of water held in the soil is low. Available water holding capacity is 5.5 to 7.5 inches. The land capability classification of ReC is IVec for dryland and IIIe for irrigated land (USDA, 1970).

Rosamond loam (Rp). The Rosamond soil series consists of moderately well-drained soils formed in granitic alluvium. Rosamond soils are found on low alluvial fans. The surface layer of Rp is a massive loam about six to eight inches thick. Permeability is moderate. Available water holding capacity is 10 to 11.5 inches. Runoff is very slow, and the erosion hazard is slight. The land capability classification this soil is VIIc for dryland and I for irrigated land. Class I soils have slight limitations that restrict their use (USDA, 1970).

Reclaimed Water Pipeline Route

Soils along the reclaimed water pipeline route include AcA, CaA, CbA, CcA2, HkA, Hesperia loam, and Rosamond fine sandy loam. Those soil types not discussed previously are described below.

Hesperia loam, 0 to 2 percent slopes (HnA). The surface layer is an overwash consisting of loam or very fine sandy loam 5 to 14 inches thick derived from weathered schist. Available water holding capacity is eight to nine inches. Runoff is very slow, and the hazard of erosion is slight. The land capability classification of HnA is VIIc for dryland and I for irrigated land (USDA, 1970).

Rosamond fine sandy loam (Ro). The surface layer of Rosamond fine sandy loam is a light brownish-gray loamy sand about four inches thick. Permeability is moderate. Available water holding capacity is 9.5 to 11 inches. Fertility is moderate. Runoff is slow, and the water erosion hazard is slight. The hazard of soil blowing is moderate. The land capability classification this soil is VIIe for dryland and IIe for irrigated land (USDA, 1970).

Sanitary Wastewater Pipeline Route

The sanitary pipeline route between the plant site and the existing Los Angeles County Sanitation District sewer line runs through an area of CaA soil.

Potable Water Pipeline Route

The potable water pipeline will run through areas of CaA and CaC soils.

Transmission Line Route

Soils along the transmission line route include Amargosa rocky coarse sandy loam, Arizo gravelly loamy sand, Arizo loamy fine sand, CaA, CaC, CbA, CcA2, Castaic-Balcom silty clay loam, Dune land, Gaviota rocky sandy loam, Greenfield sandy loam, Hanford coarse sandy loam, Hanford gravelly sandy loam, Hanford sandy loam, HkA, HnA, Hesperia loamy fine sand, Hesperia fine sandy loam, Las Posas loam, Las Posas-Toomes rocky loam, Ramona sandy loam, Ramona gravelly sandy loam, Riverwash, Rosamond loamy fine sand, Ro, Rp, Terrace escarpments, and Vista coarse sandy loam. Those soil types not discussed previously are described below.

Amargosa rocky coarse sandy loam (AmF2) – Amargosa series soils are excessively drained soils that formed in material weathered from granitic rock. AmF2 is found in hilly uplands. The surface layer in a typical profile is brown and yellowish-brown coarse sandy loam about 13 inches thick. Rocky outcrops cover two to 10 percent of the surface, and many areas are cut by shallow gullies. Permeability is moderately rapid. Available water holding capacity is one to 2.5 inches. Fertility is very low. Runoff is rapid, and the hazard of water erosion is moderate to high. The land capability classification for AmF2 is VIIe for dryland (USDA, 1970).

Arizo gravelly loamy sand, 0 to 5 percent slopes (AsB). The Arizo soil series consists of excessively drained soils derived chiefly from granitic rock but partly from schistose rock. Arizo soils are found on alluvial fans along Big Rock Creek and Little Rock Wash. The surface layer of Arizo gravelly loamy sand is a pale-brown gravelly loamy sand about three inches thick. Permeability is very rapid. Available water holding capacity is two to three inches. Fertility is low. Runoff is very slow, and the water erosion hazard is slight. The hazard of soil blowing is moderate. The land capability classification this soil is VIIe for dryland (USDA, 1970).

Arizo loamy fine sand, 0 to 2 percent slopes (AtA). The surface layer of this soil is 20 to 24 inches thick in most places. The surface layer has been reworked by wind, and the soil is subject to blowing when the wind is strong. Windblown hummocks, 18 to 24 inches high, generally occupy about 50 to 60 percent of the surface. Available water holding capacity is three to four inches. Fertility is low. Runoff is very slow, and the water erosion hazard is slight. The hazard of soil blowing is high. The land capability classification this soil is VIIe for dryland and IVe for irrigated land (USDA, 1970).

Castaic-Balcom silty clay loams, 30 to 50 percent slopes, eroded (CmF2). The Castaic series consists of well-drained soils that formed in material from soft shale and sandstone. Castaic soils are found on uplands. The surface layer of CmF2 typically consists of approximately nine inches of pale-brown silty clay loam. Permeability is moderately slow. Available water holding capacity is five to seven inches. Fertility is moderate. Runoff is rapid, and the hazard of erosion is high. The land capability classification of CmF2 is VIe for dryland. Class VI soils have severe limitations that make them generally unsuitable for cultivation and that restrict their use mainly to pasture, rangeland, forestland, or wildlife habitat (USDA, 1970).

Dune land (DuD). Dune land consists of poorly graded fine sand that has been piled by wind into rolling hills and ridges. About 70 percent of the total area is actively shifting. The remaining 30 percent is stabilized by vegetation. The hazard of soil blowing is very high. The land capability classification of DuD is VIIIe for dryland. Class VIII soils have limitations that preclude commercial plant production and that restrict their use to recreational purposes, wildlife habitat, watershed, or aesthetic purposes (USDA, 1970).

Gaviota rocky sandy loam, 30 to 50 percent slopes, eroded (GaF2). This soil is in mountainous terrain. In most places sheet and rill erosion are moderate, and a few areas are cut by deep gullies. Outcrops of rock cover up to 10 percent of the total area. Drainage is somewhat excessive in this soil. Runoff is rapid, and the hazard of erosion is high. The land capability classification is VIIe for dryland (USDA, 1970).

Greenfield sandy loam, 2 to 9 percent slopes (GsC). The Greenfield soil series consists of sell-drained soils that have formed in granitic alluvium. These soils are found on alluvial fans and terraces. The surface layer of GsC typically consists of pale-brown sandy loam approximately five inches thick. Permeability is moderately rapid. Available water holding capacity is 7.5 to 9/0 inches. Fertility is moderate. Runoff is slow to medium, and the hazard of erosion is slight to moderate. The land capability classification of GsC is IVec for dryland and Ile for irrigated land (USDA, 1970).

Hanford coarse sandy loam, 2 to 9 percent slopes (HbC). The Hanford soil series consists of well-drained to somewhat excessively drained soils that have formed in granitic alluvium. Hanford soils are found on alluvial fans. The surface layer of Hanford coarse sandy loam is a pale-brown coarse sandy loam about eight inches thick. Permeability is moderately rapid. Available water holding capacity is five to seven inches. Fertility is low. Runoff is slow, and the water erosion hazard is slight. The hazard of soil blowing is slight. The land capability classification this soil is IVec for dryland and IIs for irrigated land. A subclass *s* designation indicates that the soil is limited mainly because it is shallow, droughty, or stony (USDA, 1970).

Hanford gravelly sandy loam, 2 to 9 percent slopes ((HdC). The amount of gravel in the profile of HdC ranges from 20 to 35 percent. Drainage is somewhat excessive in this soil. Available water holding capacity is five to seven inches. Fertility is low. The land capability classification for HdC is IVec for dryland and IIe for irrigated land (USDA, 1970).

Hanford sandy loam, 2 to 9 percent slopes (HcC). This soil is dominantly sandy loam and fine sandy loam throughout, but otherwise it is similar to Hanford coarse sandy loam. Available water holding capacity is six to 7.5 inches. Fertility is moderate. Runoff is slow, and the water erosion hazard is slight. The hazard of soil blowing is slight. The land capability classification for HcC is IVec for dryland and IIs for irrigated land (USDA, 1970).

Hesperia fine sandy loam, 2 to 5 percent slopes (HkB). The surface layer of this soil consists of approximately four inches of pale-brown fine sandy loam. Permeability is moderately rapid. Available water holding capacity is 7.5 to 8.5 inches. Fertility is moderate. Runoff is slow, and the hazard of water erosion is slight to moderate. The hazard of soil blowing is moderate. The land capability classification for HkB is VIIe for dryland and IIe for irrigated land (USDA, 1970).

Hesperia loamy fine sand, 0 to 2 percent slopes (HgA). The surface layer of this soil consists of eight to 10 inches of loamy fine sand, but otherwise it is similar to Hesperia fine sandy loam. Available water holding capacity is 6.5 to 7.5 inches. Runoff is very slow, and the water erosion hazard is slight. The land capability classification this soil is VIIe for dryland and IIe for irrigated land (USDA, 1970).

Hesperia loamy fine sand, 0 to 2 percent slopes, hummocky (HgA2). Hummocks of material deposited by wind cover about 80 percent of the area. The hummocks range up to three feet in height. Available water holding capacity is six to 7.5 inches. Fertility is low. Runoff is slow and the hazard of erosion due to water is slight. The hazard of soil blowing is high on this soil. The land capability classification for HgA2 is VIIe for dryland and IIe for irrigated land (USDA, 1970).

Las Posas loam, 9 to 30 percent slopes (LaE). The Las Posas soil series consists of moderately deep, well-drained soils that formed in material weathered from tuff and basalt. Las Posas soils are found on uplands. The surface layer of LaE consists of a dark brown loam about three inches thick. Available water holding capacity is four to seven inches. Runoff is medium to rapid in this soil and the hazard of erosion is moderate to high. The land capability classification for LaE is IVe for irrigated land (USDA, 1970).

Las Posas-Toomes rocky loam, 30 to 50 percent slopes (LdF). The surface layer of this soil is a dark brown loam about three inches thick. Permeability is moderately slow. Available water holding capacity is four to seven inches. Fertility is low. Runoff is rapid, and the hazard of erosion is high. The land capability classification for this soil is VIIe (USDA, 1970).

Ramona sandy loam, 9 to 30 percent slopes, eroded (RdE2). This soil formed in old granitic alluvium laid down in a series of fairly narrow fingerlike ridges. The surface layer of this soil is brown, massive sandy loam about 12 inches thick. Runoff is medium to rapid, and the hazard of erosion is moderate to high. The land capability classification for this soil is VIe (USDA, 1970).

Ramona gravelly sandy loam, 9 to 30 percent slopes (ReE). The surface layer of this soil is brown, massive gravelly sandy loam that is slightly acid and about 12 inches thick. Gravel and cobblestones occur throughout the profile. Available water holding capacity is 5.5 to 7.5 inches. Runoff is medium to rapid, and the hazard of erosion is moderate to high. The land capability classification for this soil is Vie for dryland (USDA, 1970).

Riverwash (Rg). Riverwash consists of sandy material in the beds of intermittent streams. Narrow stringers of gravelly sand occupy many of the areas. During each flood, fresh deposits of alluvium are laid down and removed as the result of streambank erosion. The hazard of soil blowing is slight to moderate. Little to no vegetation is present. This land type has no value for farming. The land capability classification of Rg is VIIIw for dryland. A *w* designation indicates that water in or on the soil interferes with plant growth or cultivation (USDA, 1970).

Rosamond loamy fine sand (Rm). The surface layer of this soil is a soft, light brownish-gray loamy fine sand. It ranges from 10 to 16 inches in thickness and from massive to platy in structure. Available water holding capacity is nine to 10.5 inches. Soil blowing is a moderate hazard in this soil. The land capability classification this soil is VIIe for dryland and IIe for irrigated land (USDA, 1970).

Rosamond loamy fine sand, hummocky (Rm2). This soil consists of loamy fine sand that has been piled into hummocks by wind. The hummocks occur in a fine pattern and are 12 to nearly 36 inches high. Available water holding capacity is nine to 10 inches. The hazard of soil blowing is high. The land capability classification of Rm2 is VIIe for dryland and IIe for irrigated land (USDA, 1970).

Terrace escarpments (TsF) – Terrace escarpments consist of short, moderately steep to steep faces or breaks that separate the terrraces from the lower lying alluvial fans. The surface layer generally is coarse sandy loam. Runoff is medium to rapid, and the hazard of erosion is moderate to high. The land capability classification of TsF is VIIe for dryland (USDA, 1970).

Vista coarse sandy loam, 30 to 50 percent slopes (VsF). The Vista soil series consists of well-drained soils that formed in material weathered from granitic rock. Vista soils are found on foothills in the uplands. Typically the surface layer is a brown coarse sandy loam about 16 inches thick. Permeability is moderately rapid. Available water holding capacity is 2.5 to 3.5 inches. Fertility is low. Runoff is rapid, and the hazard of erosion is high. The land capability classification this soil is VIIe (USDA, 1970).

5.12.3 Environmental Impacts

Environmental impacts associated with the construction and operations of the Project are discussed in the following sections.

Significance criteria were developed based on California CEQA Guidelines and evaluated using professional judgment. Impacts would be considered significant if:

- Substantially increased wind or water-induced soil erosion occurred as result of Project construction or operation,
- Substantially increased sedimentation occurred in areas adjacent to construction areas, or
- Construction activities were to occur in areas of high erosion susceptibility and the disturbed areas were left exposed and not properly stabilized.

5.12.3.1 Construction

The soils at the plant site will be subject to wind and water erosion during construction activities. Impacts associated with soil erosion include increased soil loss and increased sediment yields downstream from the disturbed areas. The hazard for water erosion for the soil types at the plant site is slight; the hazard for wind

erosion is moderate to high. The hazard for water erosion along the gas and water pipeline routes ranges from slight to moderate; the hazard for wind erosion ranges from slight to moderate. The hazards for water and wind erosion along the transmission line route range from slight to high. Without implementation of mitigation measures, potential wind and water erosion in the Project area could be relatively high in disturbed areas for most of the soils.

During construction, erosion impacts could result from disturbance or stripping of soils in the area of the proposed facilities, laydown areas, and temporary roadways. With the implementation of mitigation measures included in the CEC-required Drainage, Erosion, and Sediment Control Plan (DESCP) and the construction-phase Storm Water Pollution Prevention Plan (SWPPP), soil erosion is expected to be minor and impacts less than significant.

Grading for the Project will not require import or export of earthen materials to/from the site; borrow sites for fill material and dump sites for cut material will be located on site. Project impacts on agricultural land are also expected to be less than significant and are discussed in Section 5.7, Land Use.

5.12.3.2 Operation

Although the primary risk of erosion is associated with soil disturbances during the construction phase of the Project, there is a risk of continued erosional losses of unstable soils during the Project operations. With the implementation of the Best Management Practices (BMP) and associated monitoring activities included in the operation phase SWPPP and the CEC-required DESCP, soil erosion would be expected to be minor during Project operation. As a standard operating procedure, soil stabilizers will be utilized within the solar array area in order to reduce the amount of dust deposited on the solar collectors.

Impacts of Project operations-phase air emissions on soil-vegetation systems are addressed in Section 5.2, Air Quality. Impacts of air emissions on soils could include increased soil temperature and moisture stress and/or increased runoff and erosion resulting from damage to vegetative cover. As discussed in Section 5.2, total modeled air emissions concentrations for the Project are well below significance criteria and the potential for adverse impacts to either soils or vegetation is negligible.

5.12.3.3 Cumulative Impacts

With the implementation of measures to control erosion and sedimentation, including standard good construction practices and the mitigation measures discussed below in Section 5.12.4, the Project would have minimal impacts on soils conditions. Other projects considered in the cumulative evaluation are identified and described in Section 5.1; the cumulative projects would be required to comply with the same water quality-related regulatory programs (e.g., NPDES permits and grading ordinances) as the PHPP and would be expected to control erosion under these regulations. Thus, significant cumulative soils impacts would not be expected. The Project would have minimal impacts on agricultural resources, and thus would not contribute significantly to possible cumulative impacts.

5.12.4 Mitigation Measures

Implementation of the mitigation measure presented below will minimize soil loss (and thus also protect water quality), from Project construction and operation phase activities.

SOIL-1 A DESCP will be developed and implemented to ensure minimum soil loss and to maintain water quality. Temporary and long-term erosion control measures will be constructed and maintained as necessary during and following construction until long-term stabilization has been established for the life of the Project. Such erosion and sedimentation control measures may include but are not limited to: minimizing disturbance; wetting the roads in active construction areas and laydown areas; controlling speed on unpaved surfaces; placing gravel in entrance ways; use of straw bales, silt fences, and earthen berms to control runoff; restoration of native plant communities where possible in areas outside the solar array field by natural revegetation or by seeding and transplanting.

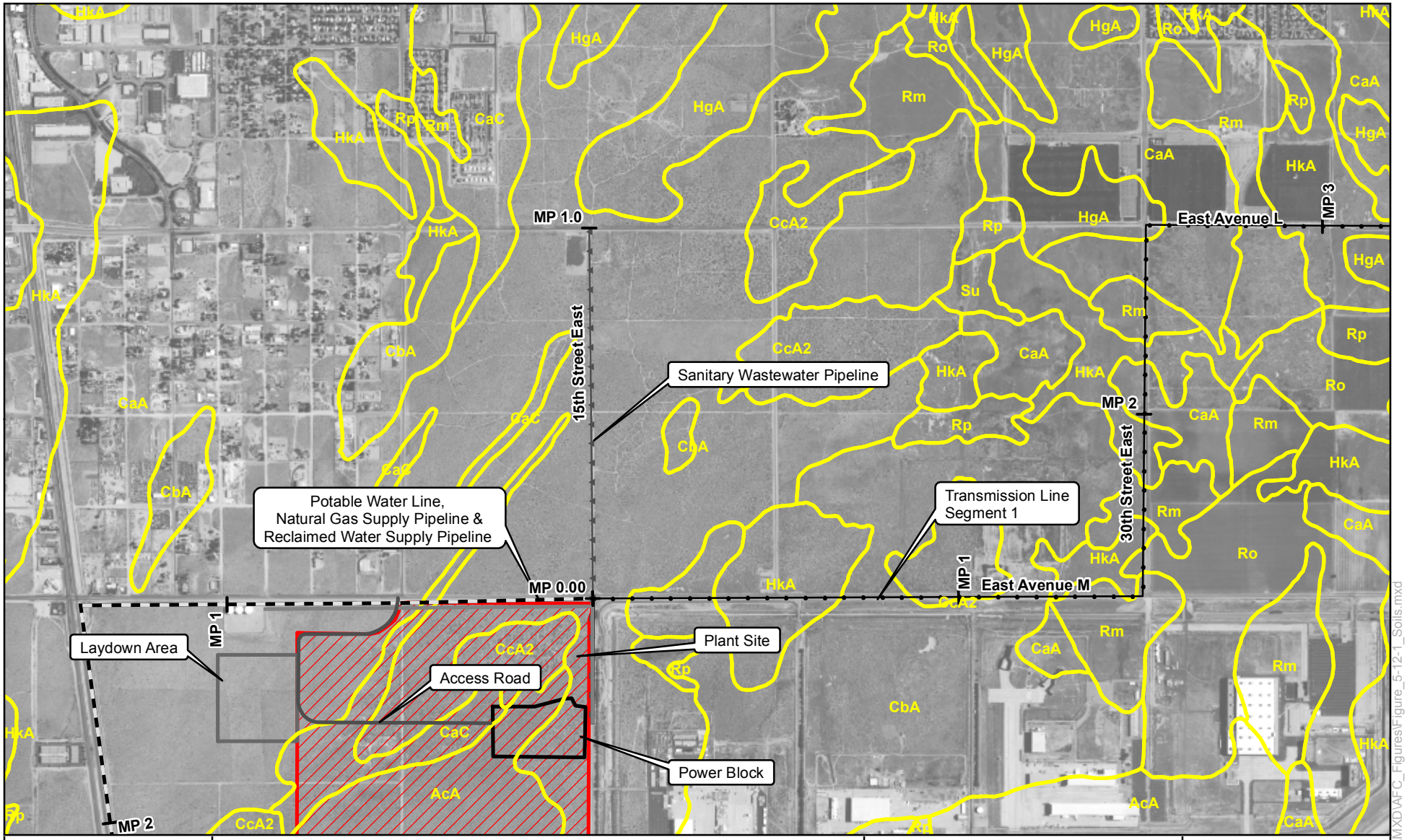
SOIL-2 Conduct Project construction grading in compliance with good industry practice and City of Palmdale grading permit requirements.

SOIL-3 Conduct Project construction activities and operation in accordance with the construction- and operations-phase SWPPPs and associated Monitoring Program and with the DESCP submitted to the CEC (the DESCP will encompass both project phases); these documents will include Best Management Practices (e.g., use of runoff control measures such as hay bales and silt fences, regular inspections of drainage control structures) to reduce erosion and sedimentation.

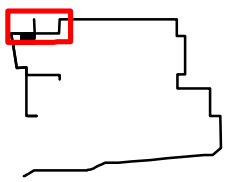
5.12.5 References

Natural Resources Conservation Service, 2008. Web Soil Survey. Accessed at http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx, June 4.

United States Department of Agriculture (USDA), 1970. Soil Survey of the Antelope Valley Area, California. Fieldwork by G.A. Woodruff, W.J. McCoy, and W.B. Sheldon.



Map Location



Legend

- Plant Site
- Power Block
- Laydown Area
- Soil Polygons (See Soils Legend for Definitions)
- Potable Water Line
- Natural Gas Supply Pipeline
- Reclaimed Water Supply Pipeline
- Sanitary Wastewater Pipeline
- Transmission Line
- Access Road

N W E S

1:24,000

0 2,000 4,000 6,000 Feet

Palmdale Hybrid Power Project

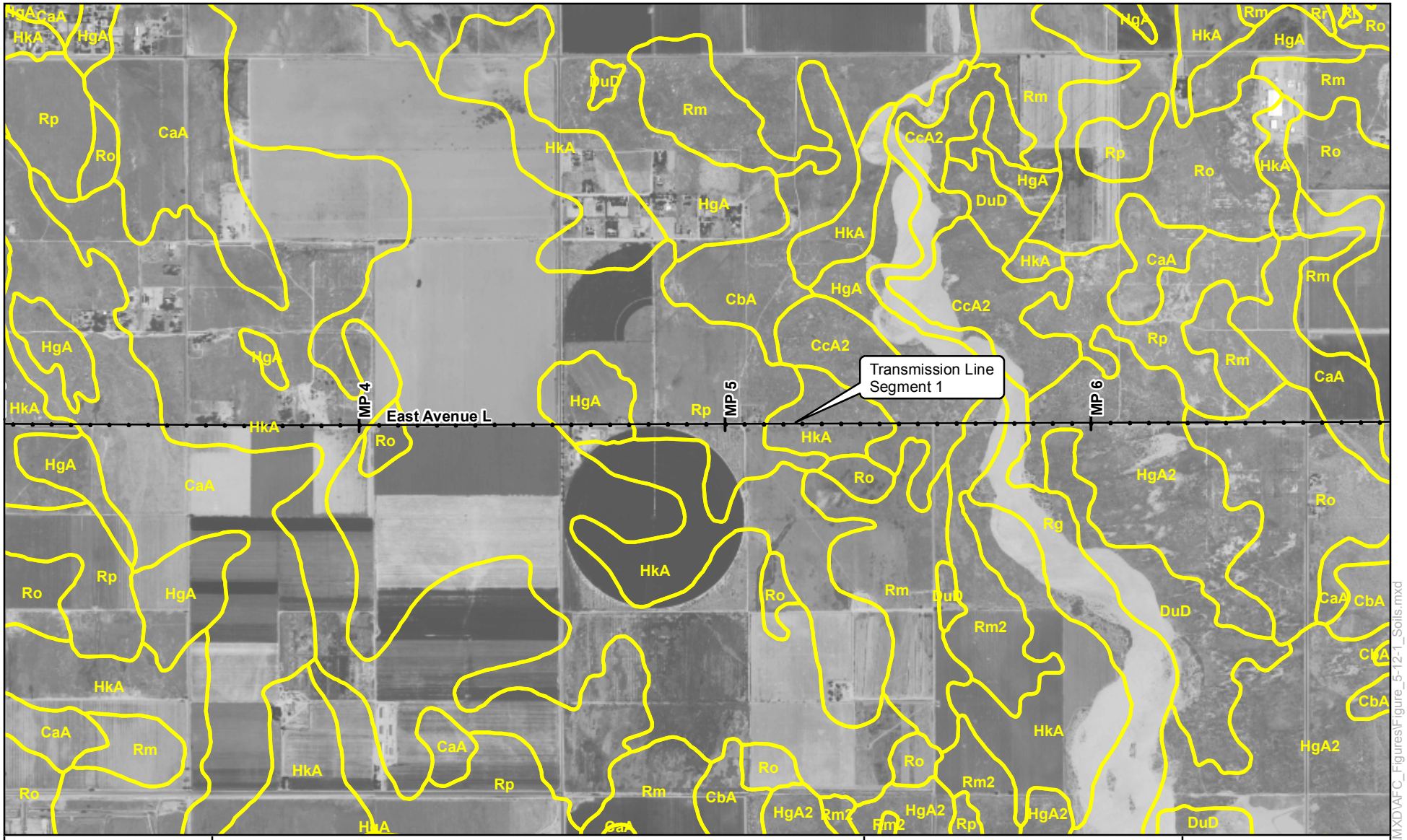
Figure 5.12-1
Soils

Mapsheet 01 of 14

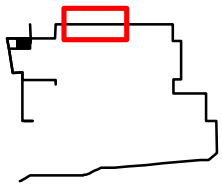
PALMDALE
a place to call home
Inland Energy, Inc.
ENSR | AECOM

Project: 10855-002
Date: July 2008

Y:\Projects\InlandEnergy\Palmdale\MXD\AFC_Figures\Figure_5-12-1_Soils.mxd



Map Location



Legend

- Plant Site
- Power Block
- Laydown Area
- Soil Polygons (See Soils Legend for Definitions)
- Potable Water Line
- Natural Gas Supply Pipeline
- Reclaimed Water Supply Pipeline
- Sanitary Wastewater Pipeline
- Transmission Line
- Access Road

1:24,000

0 2,000 4,000 6,000 Feet

N W E S

Palmdale Hybrid Power Project

Figure 5.12-1
Soils

Mapsheet 02 of 14

PALMDALE
a place to call home

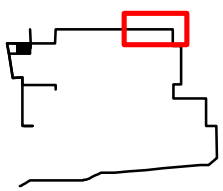
Inland Energy, Inc.

ENSR | AECOM

Project: 10855-002
Date: July 2008

Y:\Projects\InlandEnergy\Palmdale\MXD\AFC_Figures\Figure_5-12-1_Soils.mxd

Map Location



Legend

- Plant Site
- Power Block
- Laydown Area
- Soil Polygons (See Soils Legend for Definitions)
- Potable Water Line
- Natural Gas Supply Pipeline
- Reclaimed Water Supply Pipeline
- Sanitary Wastewater Pipeline
- Transmission Line
- Access Road

1:24,000

0 2,000 4,000 6,000 Feet

N W E S

Palmdale Hybrid Power Project

Figure 5.12-1
Soils

Mapsheet 03 of 14

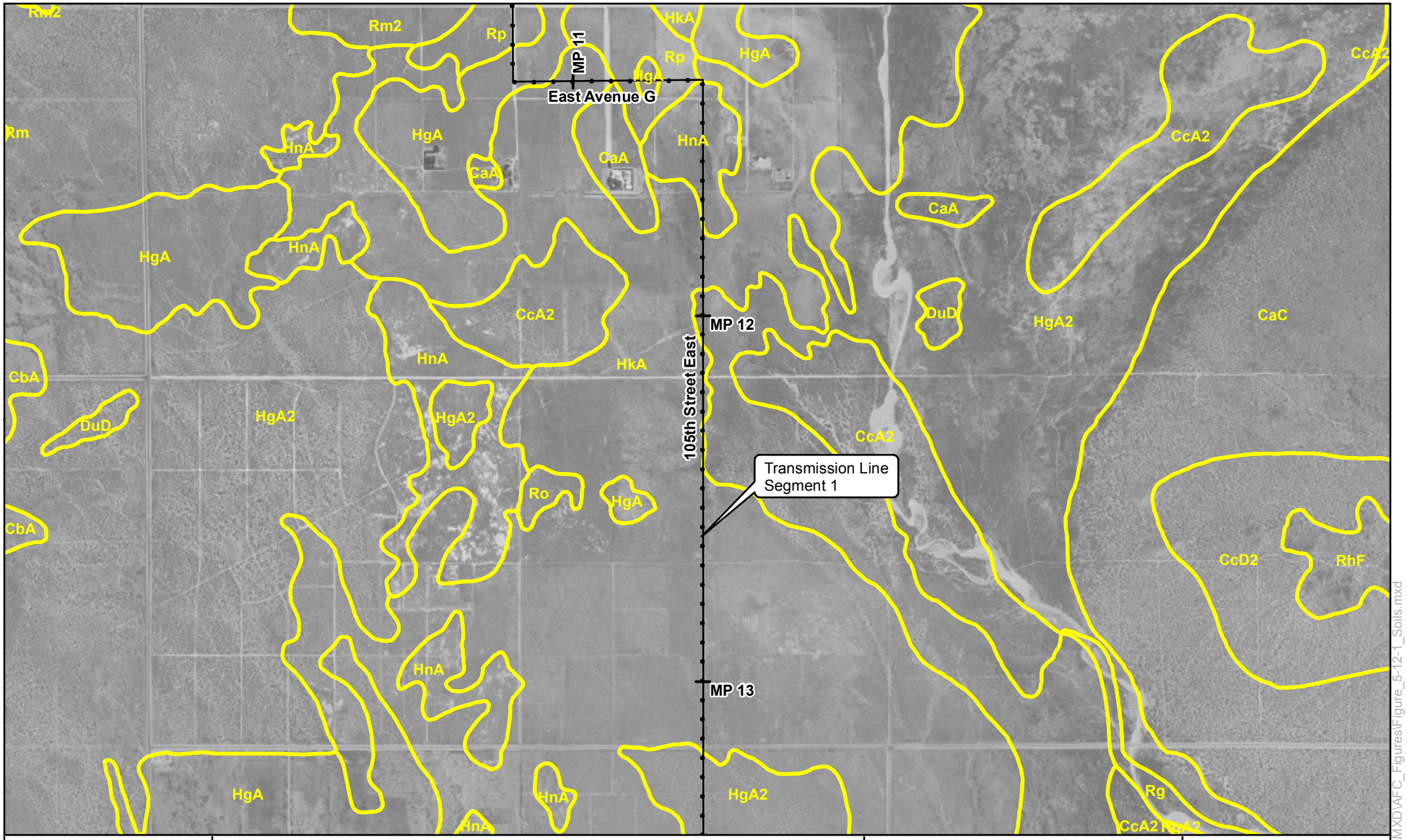
PALMDALE
a place to call home

Inland Energy, Inc.

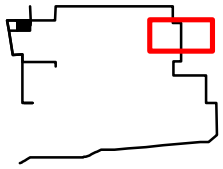
ENSR | AECOM

Project: 10855-002
Date: July 2008

Y:\Projects\InlandEnergy\PalmdaleIM\XD\AFC_Figures\Figure_5-12-1_Soils.mxd



Map Location



Legend

- Plant Site
- Power Block
- Laydown Area
- Soil Polygons (See Soils Legend for Definitions)
- Potable Water Line
- Natural Gas Supply Pipeline
- Reclaimed Water Supply Pipeline
- Sanitary Wastewater Pipeline
- Transmission Line
- Access Road

1:24,000

0 2,000 4,000 6,000 Feet

N W E S

Palmdale Hybrid Power Project

Figure 5.12-1
Soils

Mapsheet 04 of 14

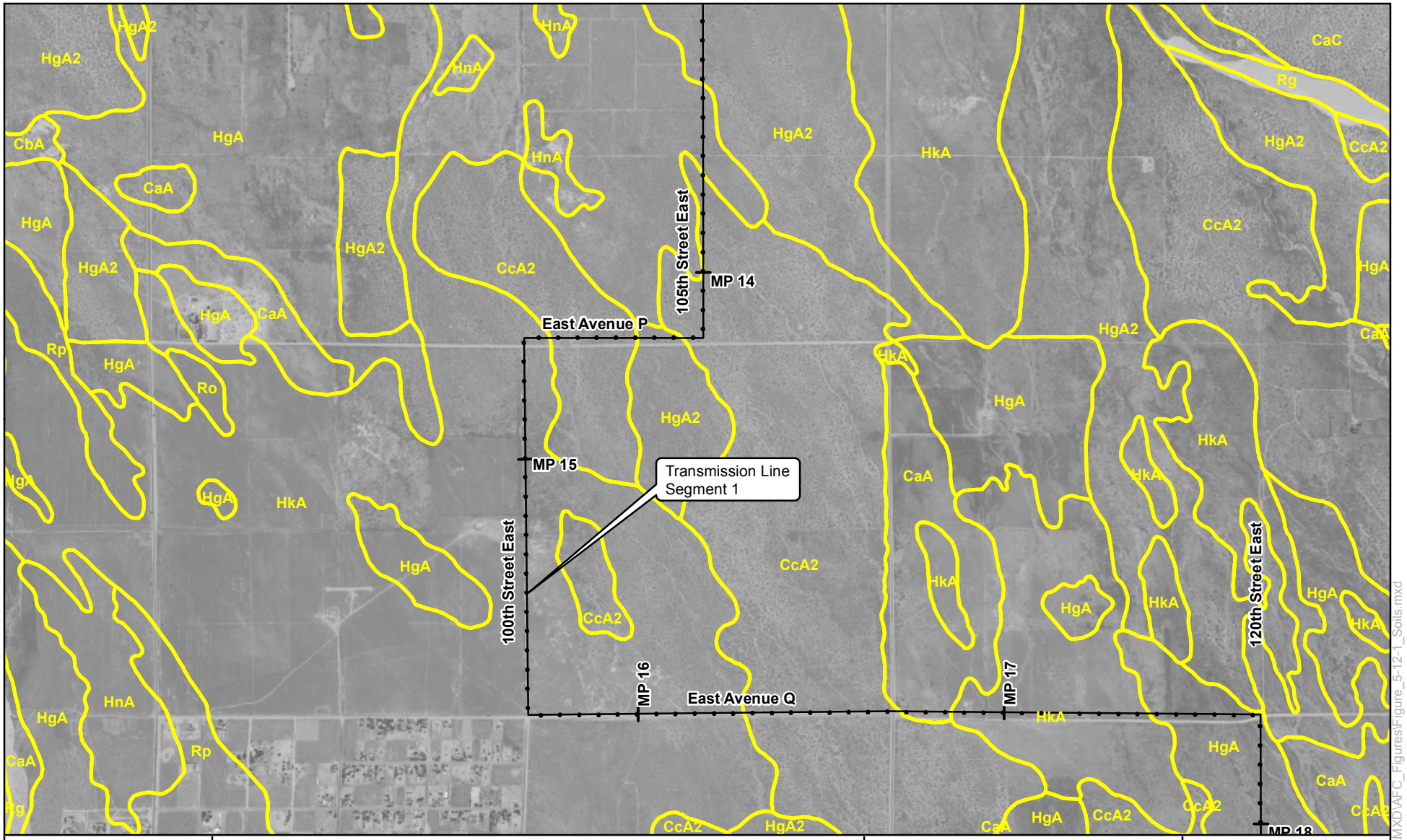
PALMDALE
a place to call home

Inland Energy, Inc.

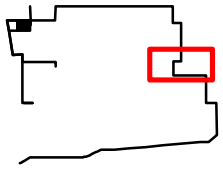
ENSR | AECOM

Project: 10855-002
Date: July 2008

Y:\Projects\InlandEnergy\Palmdale\MXD\AFC_Figures\Figure_5-12-1_Soils.mxd



Map Location



Legend

- Plant Site
- Power Block
- Laydown Area
- Soil Polygons (See Soils Legend for Definitions)
- Potable Water Line
- Natural Gas Supply Pipeline
- Reclaimed Water Supply Pipeline
- Sanitary Wastewater Pipeline
- Transmission Line
- Access Road

1:24,000

0 2,000 4,000 6,000 Feet

N W E S

Palmdale Hybrid Power Project

Figure 5.12-1
Soils

Mapsheet 05 of 14

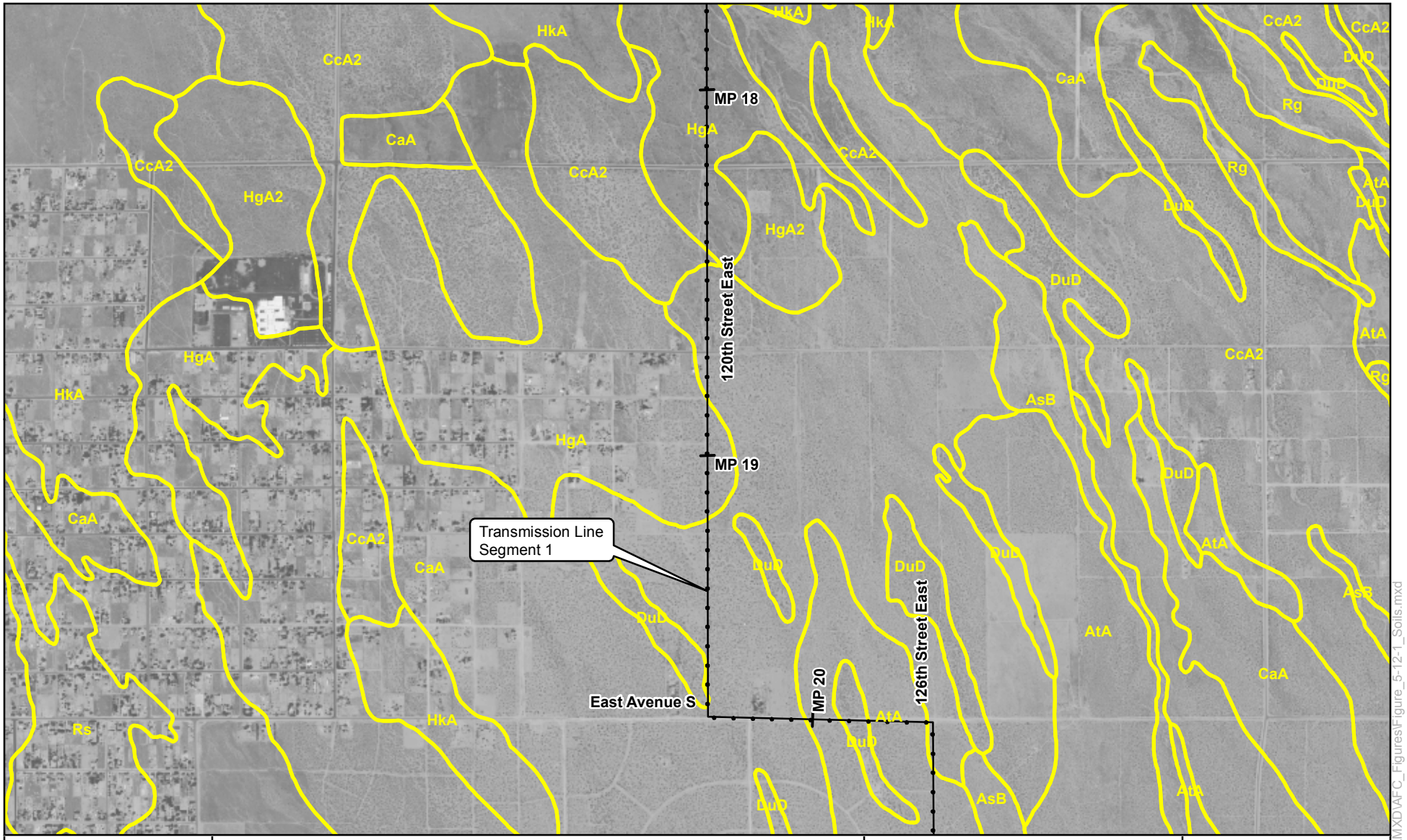
PALMDALE
a place to call home

Inland Energy, Inc.

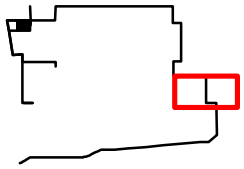
ENSR | AECOM

Project: 10855-002
Date: July 2008

Y:\Projects\InlandEnergy\Palmdale\MXD\AFC_Figures\Figure_5-12-1_Soils.mxd



Map Location



Legend

- Plant Site
- Power Block
- Laydown Area
- Soil Polygons (See Soils Legend for Definitions)
- Potable Water Line
- Natural Gas Supply Pipeline
- Reclaimed Water Supply Pipeline
- Sanitary Wastewater Pipeline
- Transmission Line
- Access Road

1:24,000

0 2,000 4,000 6,000 Feet

N W E S

Palmdale Hybrid Power Project

Figure 5.12-1
Soils

Mapsheet 06 of 14

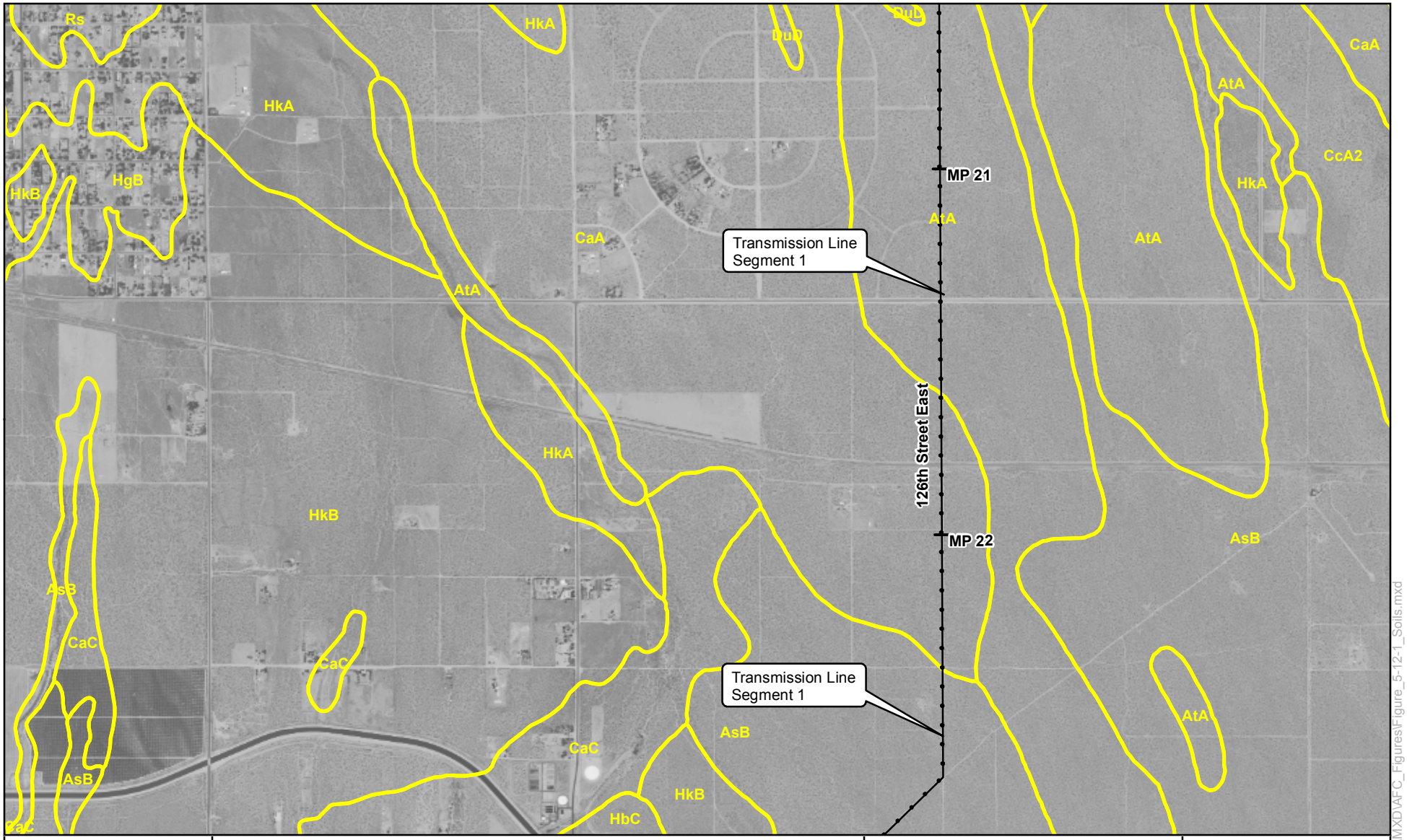
PALMDALE
a place to call home

Inland Energy, Inc.

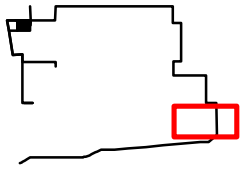
ENSR | AECOM

Project: 10855-002
Date: July 2008

Y:\Projects\InlandEnergy\Palmdale\MXD\AFC_Figures\Figure_5-12-1_Soils.mxd



Map Location



Legend

- Plant Site
- Power Block
- Laydown Area
- Soil Polygons (See Soils Legend for Definitions)
- Potable Water Line
- Natural Gas Supply Pipeline
- Reclaimed Water Supply Pipeline
- Sanitary Wastewater Pipeline
- Transmission Line
- Access Road

N W E S

1:24,000

0 2,000 4,000 6,000 Feet

Palmdale Hybrid Power Project

Figure 5.12-1
Soils

Mapsheet 07 of 14

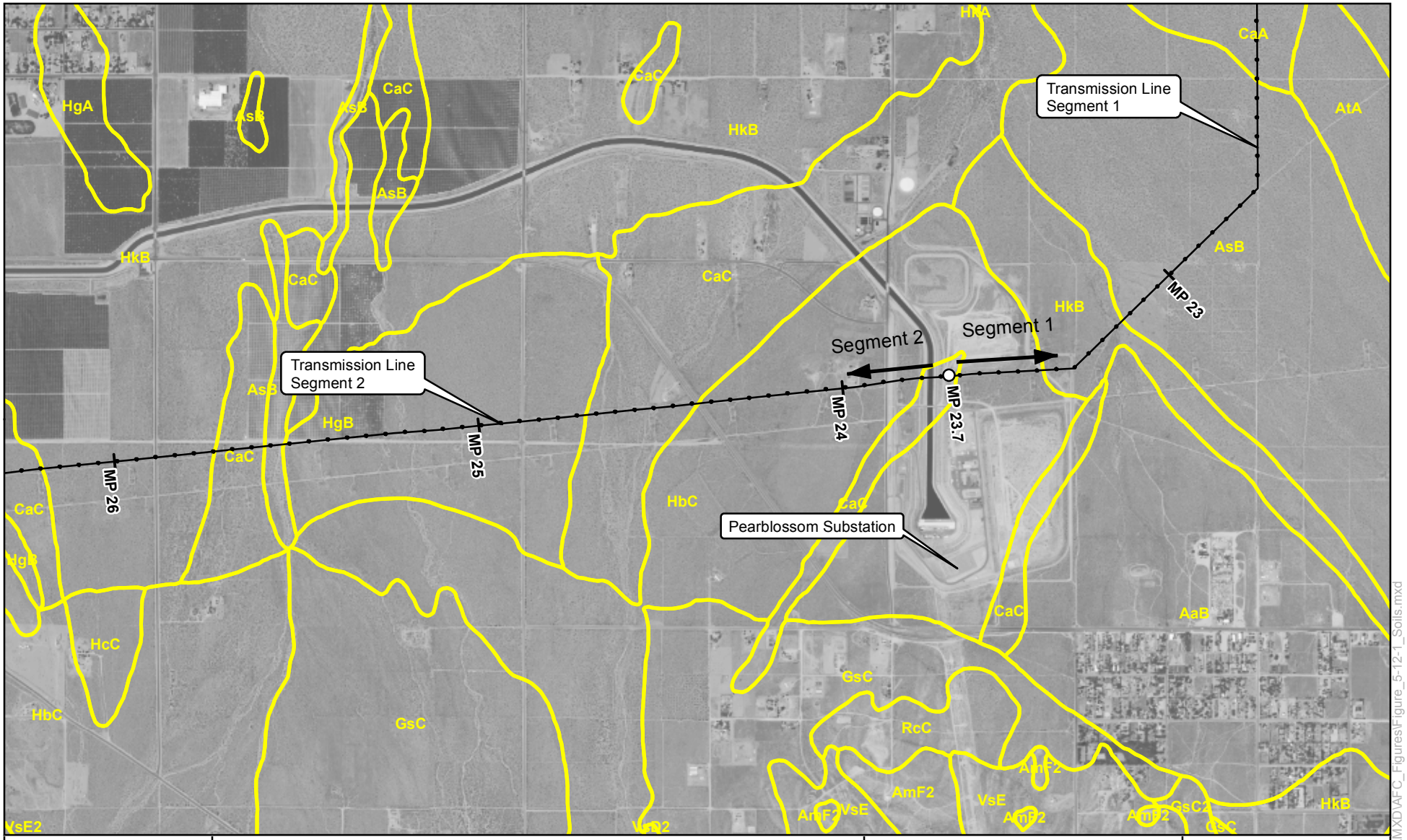
PALMDALE
a place to call home

Inland Energy, Inc.

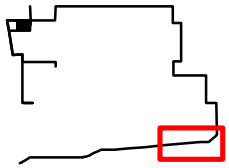
ENSR | AECOM

Project: 10855-002
Date: July 2008

Y:\Projects\InlandEnergy\Palmdale\MXD\AFC_Figures\Figure_5-12-1_Soils.mxd



Map Location



Legend

- Plant Site
- Power Block
- Laydown Area
- Soil Polygons (See Soils Legend for Definitions)
- Potable Water Line
- Natural Gas Supply Pipeline
- Reclaimed Water Supply Pipeline
- Sanitary Wastewater Pipeline
- Transmission Line
- Access Road

1:24,000

0 2,000 4,000 6,000 Feet

N W E S

Palmdale Hybrid Power Project

Figure 5.12-1
Soils

Mapsheet 08 of 14

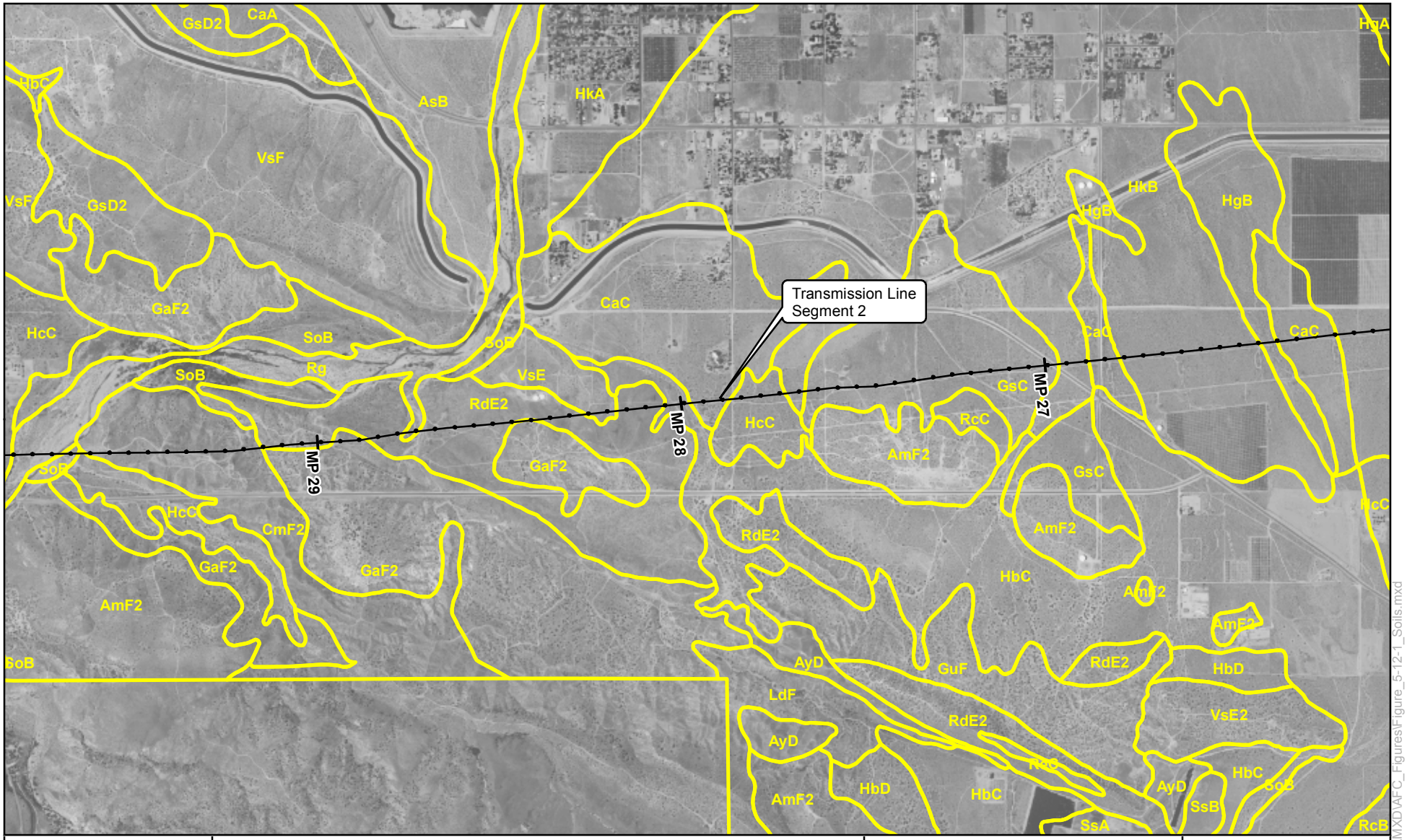
PALMDALE
a place to call home

Inland Energy, Inc.

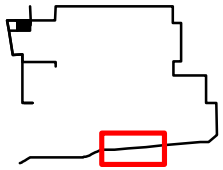
ENSR | AECOM

Project: 10855-002
Date: July 2008

Y:\Projects\InlandEnergy\PalmdaleMXD\AFC_Figures\Figure_5-12-1_Soils.mxd



Map Location



Legend

- Plant Site
- Power Block
- Laydown Area
- Soil Polygons (See Soils Legend for Definitions)
- Potable Water Line
- Natural Gas Supply Pipeline
- Reclaimed Water Supply Pipeline
- Sanitary Wastewater Pipeline
- Transmission Line
- Access Road

1:24,000

0 2,000 4,000 6,000 Feet

N W E S

Palmdale Hybrid Power Project

Figure 5.12-1
Soils

Mapsheet 09 of 14

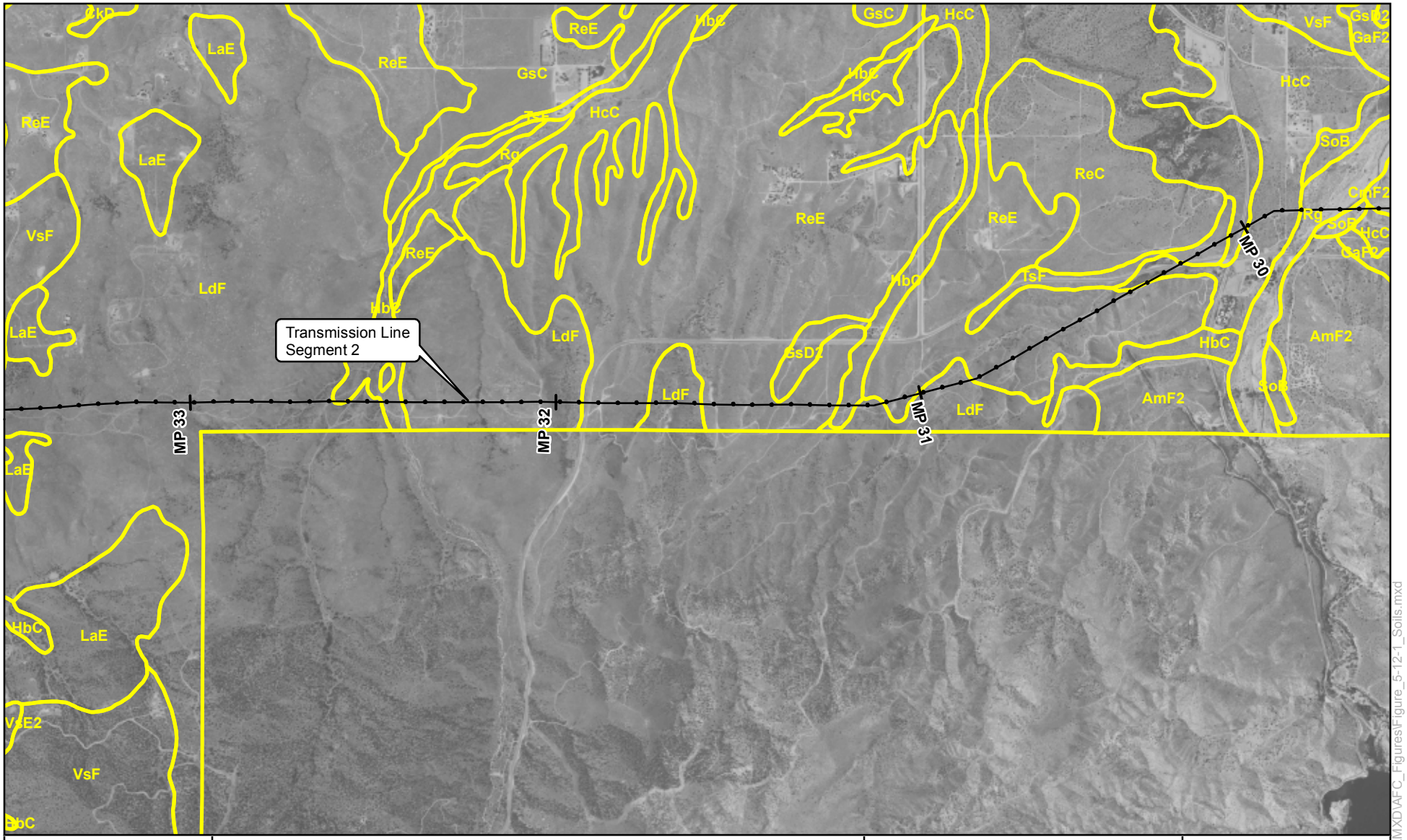
PALMDALE
a place to call home

Inland Energy, Inc.

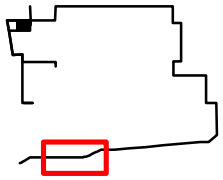
ENSR | AECOM

Project: 10855-002
Date: July 2008

Y:\Projects\InlandEnergy\Palmdale\MXD\AFC_Figures\Figure_5-12-1_Soils.mxd



Map Location



Legend

- Plant Site
- Power Block
- Laydown Area
- Soil Polygons (See Soils Legend for Definitions)
- Potable Water Line
- Natural Gas Supply Pipeline
- Reclaimed Water Supply Pipeline
- Sanitary Wastewater Pipeline
- Transmission Line
- Access Road

1:24,000

0 2,000 4,000 6,000 Feet

N W E S

Palmdale Hybrid Power Project

Figure 5.12-1
Soils

Mapsheet 10 of 14

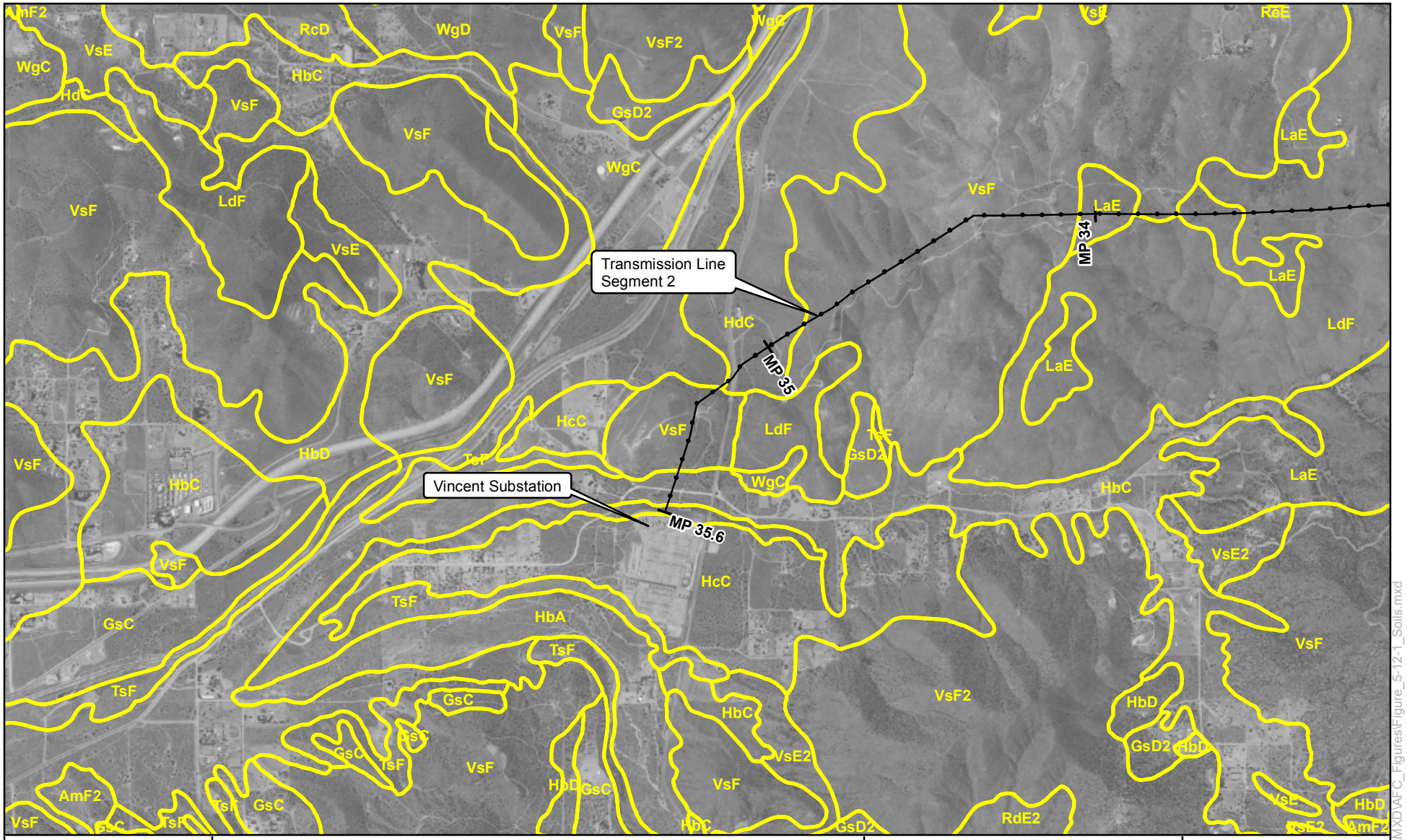
PALMDALE
a place to call home

Inland Energy, Inc.

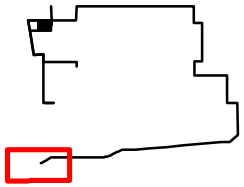
ENSR | AECOM

Project: 10855-002
Date: July 2008

Y:\Projects\InlandEnergy\Palmdale\MXD\AFC_Figures\Figure_5-12-1_Soils.mxd



Map Location



Legend

- Plant Site
- Power Block
- Laydown Area
- Soil Polygons (See Soils Legend for Definitions)
- Potable Water Line
- Natural Gas Supply Pipeline
- Reclaimed Water Supply Pipeline
- Sanitary Wastewater Pipeline
- Transmission Line
- Access Road

1:24,000

0 2,000 4,000 6,000 Feet

N W E S

Palmdale Hybrid Power Project

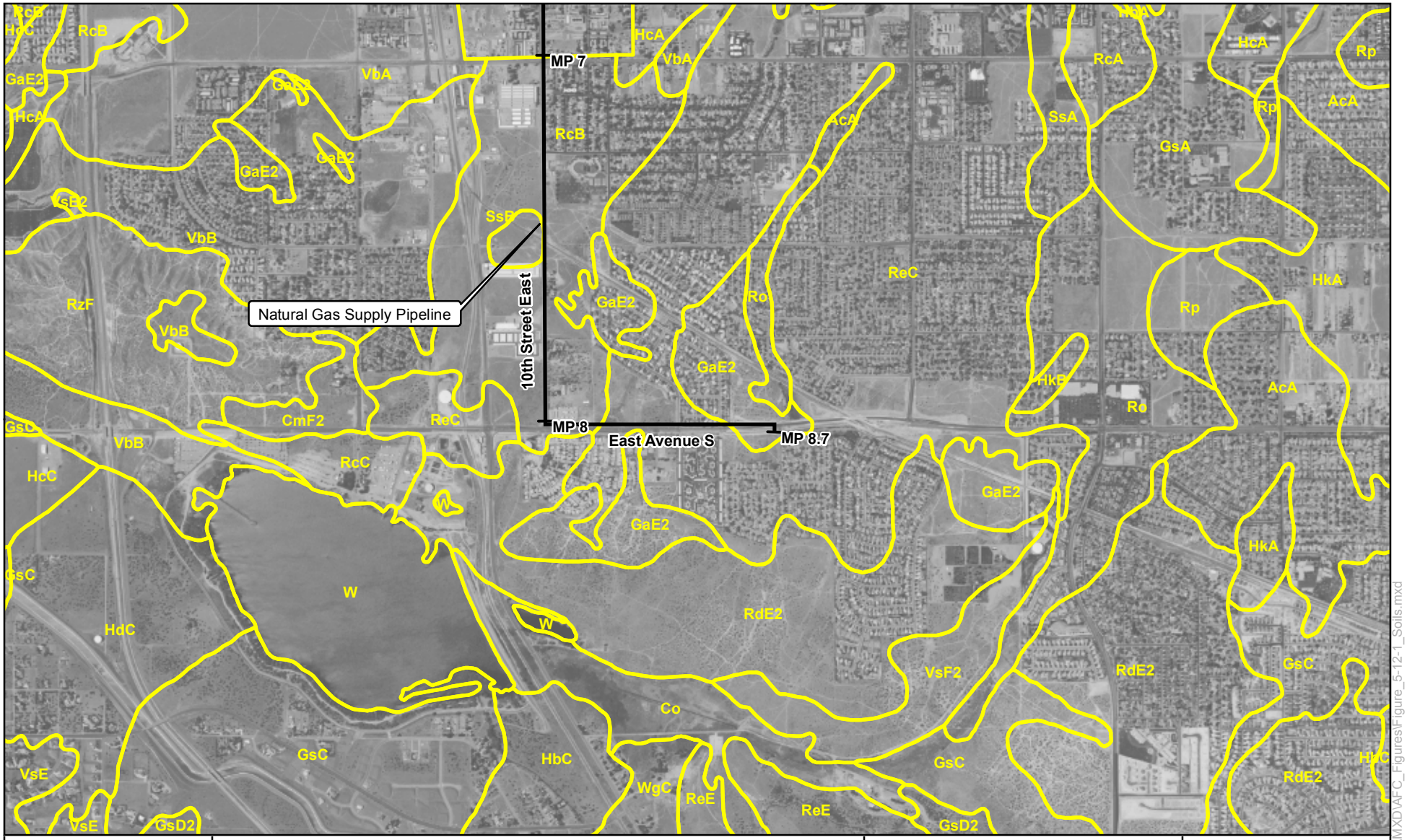
Figure 5.12-1
Soils

Mapsheet 11 of 14

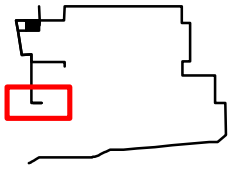
PALMDALE
a place to call home
Inland Energy, Inc.
ENSR | AECOM

Project: 10855-002
Date: July 2008

Y:\Projects\InlandEnergy\Palmdale\MXD\AFC_Figures\Figure_5-12-1_Soils.mxd



Map Location



Legend

- Plant Site
- Power Block
- Laydown Area
- Soil Polygons (See Soils Legend for Definitions)
- Potable Water Line
- Natural Gas Supply Pipeline
- Reclaimed Water Supply Pipeline
- Sanitary Wastewater Pipeline
- Transmission Line
- Access Road

1:24,000

0 2,000 4,000 6,000 Feet

N W E S

Palmdale Hybrid Power Project

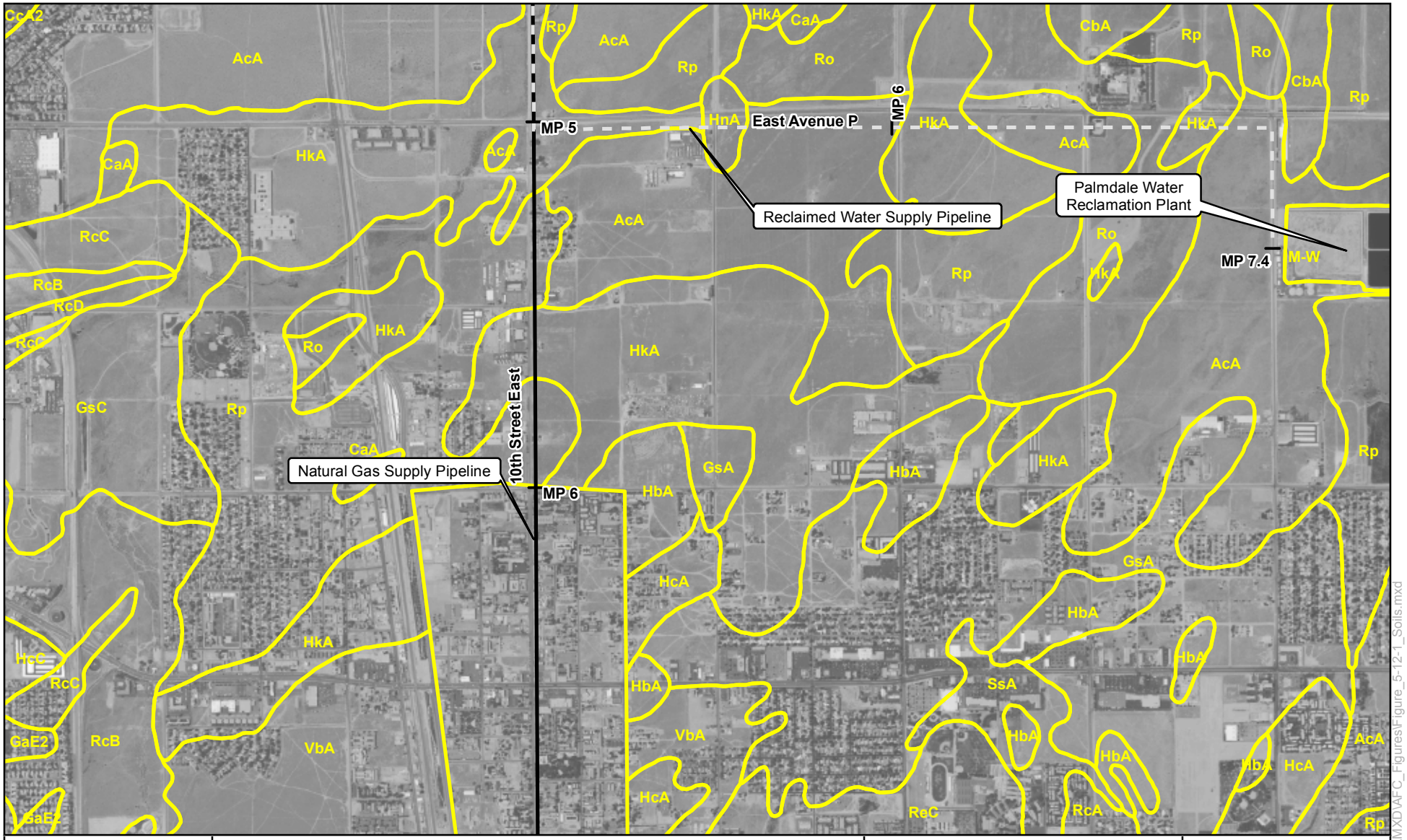
Figure 5.12-1
Soils

Mapsheet 12 of 14

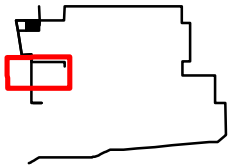
PALMDALE
a place to call home
Inland Energy, Inc.
ENSR | AECOM

Project: 10855-002
Date: July 2008

Y:\Projects\InlandEnergy\Palmdale\MXD\AFC_Figures\Figure_5-12-1_Soils.mxd



Map Location



Legend

- Plant Site
- Power Block
- Laydown Area
- Soil Polygons (See Soils Legend for Definitions)
- Potable Water Line
- Natural Gas Supply Pipeline
- Reclaimed Water Supply Pipeline
- Sanitary Wastewater Pipeline
- Transmission Line
- Access Road

1:24,000

0 2,000 4,000 6,000 Feet

N W E S

Palmdale Hybrid Power Project

Figure 5.12-1
Soils

Mapsheet 13 of 14

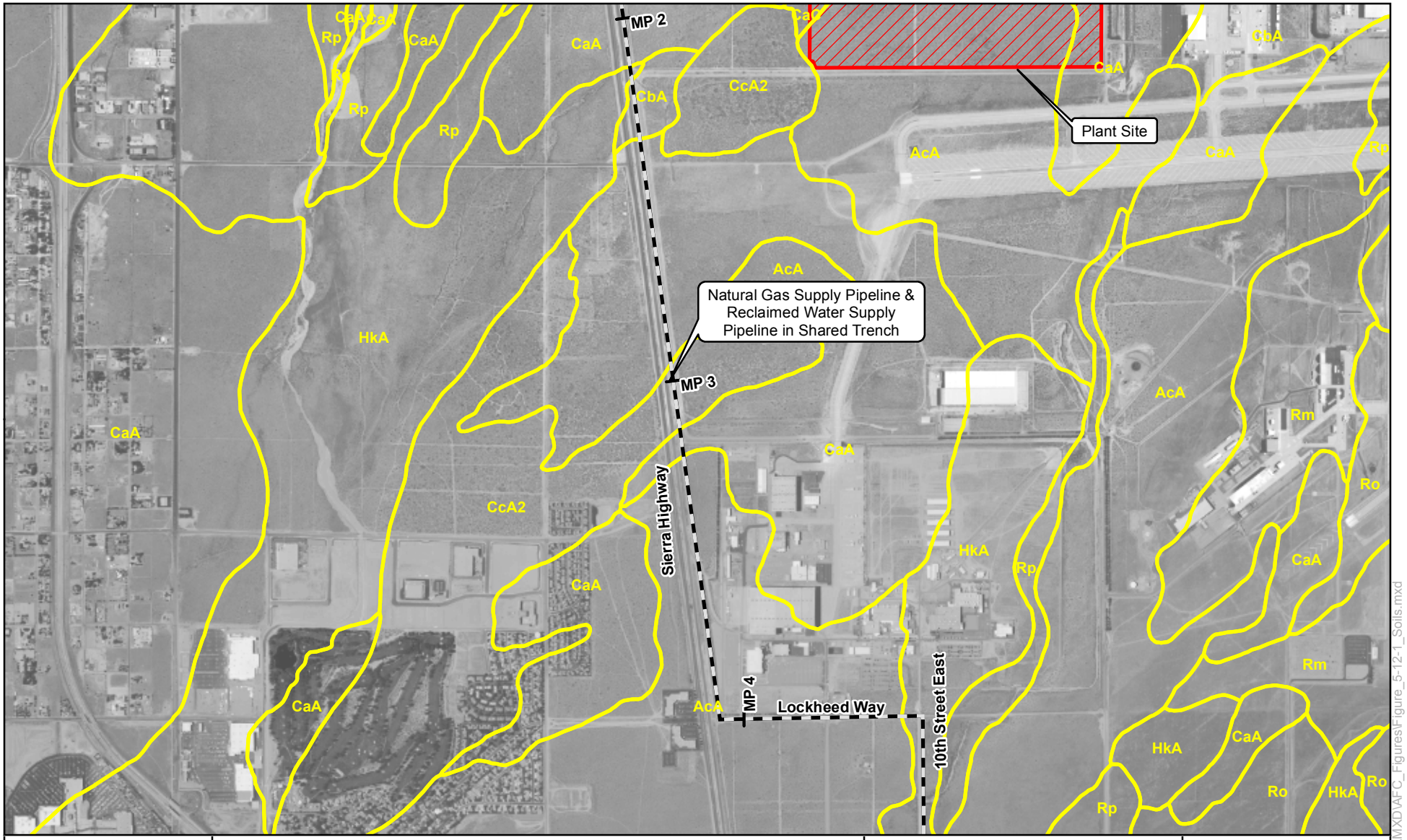
PALMDALE a place to call home

Inland Energy, Inc.

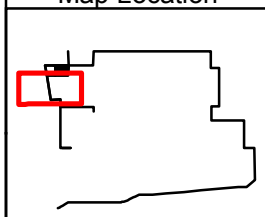
ENSR | AECOM

Project: 10855-002
Date: July 2008

Y:\Projects\InlandEnergy\Palmdale\MXD\AFC_Figures\Figure_5-12-1_Soils.mxd



Map Location



Legend

- Plant Site
- Power Block
- Laydown Area
- Soil Polygons (See Soils Legend for Definitions)
- Potable Water Line
- Natural Gas Supply Pipeline
- Reclaimed Water Supply Pipeline
- Sanitary Wastewater Pipeline
- Transmission Line
- Access Road

1:24,000

0 2,000 4,000 6,000 Feet

N W E S

Palmdale Hybrid Power Project

Figure 5.12-1
Soils

Mapsheet 14 of 14

PALMDALE
a place to call home

Inland Energy, Inc.

ENSR | AECOM

Project: 10855-002
Date: July 2008

Y:\Projects\InlandEnergy\Palmdale\MXD\AFC_Figures\Figure_5-12-1_Soils.mxd

Survey Area	Los Angeles County, California, West San Fernando Valley Area

Mapunit Symbol	Mapunit Name
100	Anacapa sandy loam, 2 to 9 percent slopes
101	Anacapa-Urban land complex, 0 to 2 percent slopes
102	Badland
103	Balcom silty clay loam, 9 to 15 percent slopes
104	Balcom silty clay loam, 15 to 30 percent slopes
105	Balcom silty clay loam, 30 to 50 percent slopes
106	Balcom silty clay loam, 50 to 75 percent slopes
107	Capistrano-Urban land complex, 0 to 2 percent slopes
108	Capistrano-Urban land complex, 2 to 9 percent slopes
109	Chualar-Urban land complex, 2 to 9 percent slopes
110	Conejo-Urban land complex, 0 to 2 percent slopes
111	Conejo-Urban land complex, 2 to 9 percent slopes
112	Cropley-Urban land complex, 0 to 2 percent slopes
113	Cropley-Urban land complex, 2 to 9 percent slopes
114	Danville-Urban land complex, 0 to 2 percent slopes
115	Friant fine sandy loam, 50 to 75 percent slopes
116	Gaviota sandy loam, 9 to 30 percent slopes
117	Gaviota sandy loam, 30 to 50 percent slopes
118	Gazos silty clay loam, 15 to 30 percent slopes
119	Gazos silty clay loam, 30 to 50 percent slopes
120	Gazos-Balcom complex, 30 to 50 percent slopes
121	Lopez shaly clay loam, 30 to 50 percent slopes
122	Millsholm loam, 30 to 50 percent slopes
123	Mocho-Urban land complex, 0 to 2 percent slopes
124	Mocho-Urban land complex, 2 to 9 percent slopes
125	Rock outcrop-Friant complex, 50 to 75 percent slopes
126	Rock outcrop-Gaviota complex, 30 to 75 percent slopes
127	San Emigdio-Urban land complex, 0 to 2 percent slopes
128	Saugus loam, 15 to 30 percent slopes
129	Saugus loam, 30 to 50 percent slopes
130	Soboba gravelly loamy sand, 0 to 2 percent slopes
131	Soboba gravelly loamy sand, 2 to 9 percent slopes
132	Soper gravelly sandy loam, 15 to 30 percent slopes
133	Soper gravelly sandy loam, 30 to 50 percent slopes
135	Tujunga-Urban land complex, 0 to 2 percent slopes
136	Urban land-Xerorthents-Friant complex, 15 to 30 percent slopes
137	Vista coarse sandy loam, 30 to 50 percent slopes
138	Xerorthents, 0 to 30 percent slopes
139	Xerorthents-Urban land-Balcom complex, 5 to 15 percent slopes
140	Xerorthents-Urban land-Balcom complex, 15 to 30 percent slopes
141	Xerorthents-Urban land-Gazos complex, 5 to 15 percent slopes
142	Xerorthents-Urban land-Gazos complex, 15 to 30 percent slopes
143	Xerorthents-Urban land-Saugus complex, 15 to 30 percent slopes
144	Water
145	Dam
146	Debris basin
147	Mipolomol-Topanga association, 30 to 75 percent slopes
160	Xerorthents, landscaped, 0 to 9 percent slopes
200	Cumulic Haploxerolls, 0 to 9 percent slopes
290	Topanga-Mipolomol-Sapwi association, 30 to 75 percent slopes
330	Linne-Los Osos-Haploxerepts association, 30 to 75 percent slopes
450	Sapwi loam, 30 to 75 percent slopes
500	Balcom silty clay loam, 30 to 50 percent slopes

501	Balcom silty clay loam, 15 to 30 percent slopes
502	Balcom silty clay loam, 50 to 75 percent slopes
503	Balcom-Balcom, dark surface association, 30 to 75 percent slopes
510	Capistrano-Urban land complex, 0 to 9 percent slopes
520	Mocho-Urban land complex, 0 to 2 percent slopes
530	Xerorthents-Urban land-Balcom complex, 0 to 30 percent slopes
531	Xerorthents-Urban land-Balcom complex, 0 to 15 percent slopes
532	Xerorthents-Urban land-Gazos complex, 0 to 30 percent slopes

Survey Area	Antelope Valley Area, California

Mapunit Symbol	Mapunit Name
131	Edmundston gravelly sandy loam, 50 to 75 percent slopes
134	Edmundston-Godde-Tollhouse complex, 50 to 75 percent sl opes
148	Jawbone gravelly loamy sand, 15 to 75 percent slopes
188	Tunis-Walong complex, 50 to 75 percent slopes
AaB	Adelanto loamy sand, 2 to 5 percent slopes
AcA	Adelanto coarse sandy loam, 2 to 5 percent slopes
AdB	Adelanto gravelly sandy loam, 2 to 5 percent slopes
AgF	Agua Dulce stony loam, 30 to 50 percent slopes
AmF2	Amargosa rocky coarse sandy loam, 9 to 55 percent slopes, eroded
AnE	Anaverde loam, 15 to 30 percent slopes
ApF	Anaverde rocky loam, 30 to 50 percent slopes
AsB	Arizo gravelly loamy sand, 0 to 5 percent slopes
AtA	Arizo loamy fine sand, 0 to 2 percent slopes
AyD	Ayar clay loam, 5 to 15 percent slopes
CaA	Cajon loamy sand, 0 to 2 percent slopes
CaC	Cajon loamy sand, 2 to 9 percent slopes
CaF	Calleguas shaly loam, 30 to 50 percent slopes
CbA	Cajon loamy sand, loamy substratum, 0 to 2 percent slopes
CcA2	Cajon loamy fine sand, 0 to 2 percent slopes, hummocky
CcD2	Cajon loamy fine sand, 9 to 15 percent slopes, hummocky
ChC	Calvista-Hi Vista complex, 2 to 9 percent slopes
ChE	Calvista-Hi Vista rocky complex, 9 to 30 percent slopes
CkC	Castaic silty clay loam, 2 to 9 percent slopes
CkD	Castaic silty clay loam, 9 to 15 percent slopes
CmD	Castaic-Balcom silty clay loams, 9 to 15 percent slopes
CmE	Castaic-Balcom silty clay loams, 15 to 30 percent slopes
CmF	Castaic-Balcom silty clay loams, 30 to 50 percent slopes
CmF2	Castaic-Balcom silty clay loams, 30 to 50 percent slopes, eroded
CmG2	Castaic-Balcom silty clay loams, 50 to 65 percent slopes, eroded
CnG3	Castaic and Saugus soils, 30 to 65 percent slopes, severely eroded
Co	Chino loam
CyA	Cortina sandy loam, 0 to 2 percent slopes
CyC	Cortina sandy loam, 2 to 9 percent slopes
CzC	Cortina cobbly sandy loam, 2 to 9 percent slopes
DA	Dams
DU	Dumps
DuD	Dune land
GaE2	Gaviota rocky sandy loam, 15 to 30 percent slopes, eroded
GaF2	Gaviota rocky sandy loam, 30 to 50 percent slopes, eroded
GbF	Gazos clay loam, 30 to 50 percent slopes
GcE	Godde loam, 15 to 30 percent slopes
GdF	Godde rocky loam, 30 to 50 percent slopes
GoD	Gorman sandy loam, 9 to 15 percent slopes
GoD2	Gorman sandy loam, 9 to 15 percent slopes, eroded
GoE2	Gorman sandy loam, 15 to 30 percent slopes, eroded
GoF2	Gorman sandy loam, 30 to 50 percent slopes, eroded
GP	Gravel pits
GsA	Greenfield sandy loam, 0 to 2 percent slopes
GsC	Greenfield sandy loam, 2 to 9 percent slopes
GsC2	Greenfield sandy loam, 2 to 9 percent slopes, eroded
GsD2	Greenfield sandy loam, 9 to 15 percent slopes, eroded
GuF	Gullied land
HaB2	Hanford loamy sand, 2 to 5 percent slopes, hummocky

HbA	Hanford coarse sandy loam, 0 to 2 percent slopes
HbC	Hanford coarse sandy loam, 2 to 9 percent slopes
HbD	Hanford coarse sandy loam, 9 to 15 percent slopes
HcA	Hanford sandy loam, 0 to 2 percent slopes
HcC	Hanford sandy loam, 2 to 9 percent slopes
HdC	Hanford gravelly sandy loam, 2 to 9 percent slopes
HeC	Hanford sandy loam, calcareous variant, 2 to 9 percent slopes
HfA	Hanford loam, 0 to 2 percent slopes
HgA	Hesperia loamy fine sand, 0 to 2 percent slopes
HgA2	Hesperia loamy fine sand, 0 to 2 percent slopes, hummocky
HgB	Hesperia loamy fine sand, 2 to 5 percent slopes
HkA	Hesperia fine sandy loam, 0 to 2 percent slopes
HkB	Hesperia fine sandy loam, 2 to 5 percent slopes
HmA	Hesperia fine sandy loam, loamy substratum, 0 to 2 percent slopes
HnA	Hesperia loam, 0 to 2 percent slopes
LaE	Las Posas loam, 9 to 30 percent slopes
LdF	Las Posas-Toomes rocky loams, 30 to 50 percent slopes
LeF	Lebec rocky loam, 15 to 50 percent slopes
M-W	Miscellaneous water
Me	Merrill sandy loam
MfA	Metz loamy sand, 0 to 2 percent slopes
MfC	Metz loamy sand, 2 to 9 percent slopes
MgA	Metz loam, 0 to 2 percent slopes
MgB	Metz loam, 2 to 5 percent slopes
MhE2	Millsholm rocky loam, 15 to 30 percent slopes, eroded
MhF2	Millsholm rocky loam, 30 to 50 percent slopes, eroded
MoA	Mocho sandy loam, 0 to 2 percent slopes
MpA	Mocho loam, 0 to 2 percent slopes
MpC	Mocho loam, 2 to 9 percent slopes
MzB	Mohave coarse sandy loam, 2 to 5 percent slopes
OaC	Oakdale sandy loam, 2 to 9 percent slopes
ObA	Oak Glen sandy loam, 0 to 2 percent slopes
ObC	Oak Glen sandy loam, 2 to 9 percent slopes
OcC	Oak Glen gravelly sandy loam, 2 to 9 percent slopes
OdA	Oak Glen loam, 0 to 2 percent slopes
OdC	Oak Glen loam, 2 to 9 percent slopes
OgC	Ojai loam, 2 to 9 percent slopes
OgD	Ojai loam, 9 to 15 percent slopes
OgE	Ojai loam, 15 to 30 percent slopes
OgF	Ojai loam, 30 to 50 percent slopes
OgF2	Ojai loam, 30 to 50 percent slopes, eroded
OhF	Ojai loam, thin surface variant, 30 to 50 percent slopes
OzE	Ojai-Zamora loams, 15 to 30 percent slopes
Po	Pond loam
Ps	Pond silty clay loam
Px	Pond-Oban complex
RcA	Ramona coarse sandy loam, 0 to 2 percent slopes
RcB	Ramona coarse sandy loam, 2 to 5 percent slopes
RcC	Ramona coarse sandy loam, 5 to 9 percent slopes
RcD	Ramona coarse sandy loam, 9 to 15 percent slopes
RdE2	Ramona sandy loam, 9 to 30 percent slopes, eroded
ReC	Ramona gravelly sandy loam, 2 to 9 percent slopes
ReE	Ramona gravelly sandy loam, 9 to 30 percent slopes
RfB	Ramona loam, 2 to 5 percent slopes
RfC	Ramona loam, 5 to 9 percent slopes
Rg	Riverwash
RhF	Rock land
Rm	Rosamond loamy fine sand
Rm2	Rosamond loamy fine sand, hummocky

Ro	Rosamond fine sandy loam
Rp	Rosamond loam
Rr	Rosamond loam, saline-alkali
Rs	Rosamond loam, sandy loam substratum
Rt	Rosamond silty clay loam
Ru	Rosamond silty clay loam, saline-alkali
RzF	Rough broken land
Sa	Sandy alluvial land
ScE	Saugus loam, 15 to 30 percent slopes
ScF	Saugus loam, 30 to 50 percent slopes
ScF2	Saugus loam, 30 to 50 percent slopes, eroded
ShE	Sheridan sandy loam, 15 to 30 percent slopes
ShE2	Sheridan sandy loam, 15 to 30 percent slopes, eroded
ShF	Sheridan sandy loam, 30 to 50 percent slopes
ShF2	Sheridan sandy loam, 30 to 50 percent slopes, eroded
SoB	Soboba cobbly loamy sand, 2 to 5 percent slopes
SsA	Sorrento loam, 0 to 2 percent slopes
SsB	Sorrento loam, 2 to 5 percent slopes
Su	Sunrise loamy fine sand
Sv	Sunrise sandy loam
Sw	Sunrise sandy loam, shallow
Sx	Sunrise loam
Sy	Sunrise loam, saline-alkali
TrF	Temescal-Rock land complex, 30 to 50 percent slopes
TsF	Terrace escarpments
Tt2	Tray fine sand, hummocky
Tu	Tray sandy loam
Tv	Tray sandy loam, saline-alkali
Tw	Tray loam, saline-alkali
VaA	Vernalis sandy loam, 0 to 2 percent slopes
VbA	Vernalis loam, 0 to 2 percent slopes
VbB	Vernalis loam, 2 to 5 percent slopes
VcA	Vernalis clay loam, 0 to 2 percent slopes
VsD2	Vista coarse sandy loam, 9 to 15 percent slopes, eroded
VsE	Vista coarse sandy loam, 15 to 30 percent slopes
VsE2	Vista coarse sandy loam, 15 to 30 percent slopes, eroded
VsF	Vista coarse sandy loam, 30 to 50 percent slopes
VsF2	Vista coarse sandy loam, 30 to 50 percent slopes, eroded
W	Water
WgC	Wyman gravelly loam, 2 to 9 percent slopes
WgD	Wyman gravelly loam, 9 to 15 percent slopes
WoC	Wyman cobbly loam, 5 to 9 percent slopes
YoA	Yolo loam, 0 to 2 percent slopes
YoC	Yolo loam, 2 to 9 percent slopes
ZaC	Zamora loam, 2 to 9 percent slopes
ZaD	Zamora loam, 9 to 15 percent slopes
ZcC	Zamora clay loam, 2 to 9 percent slopes