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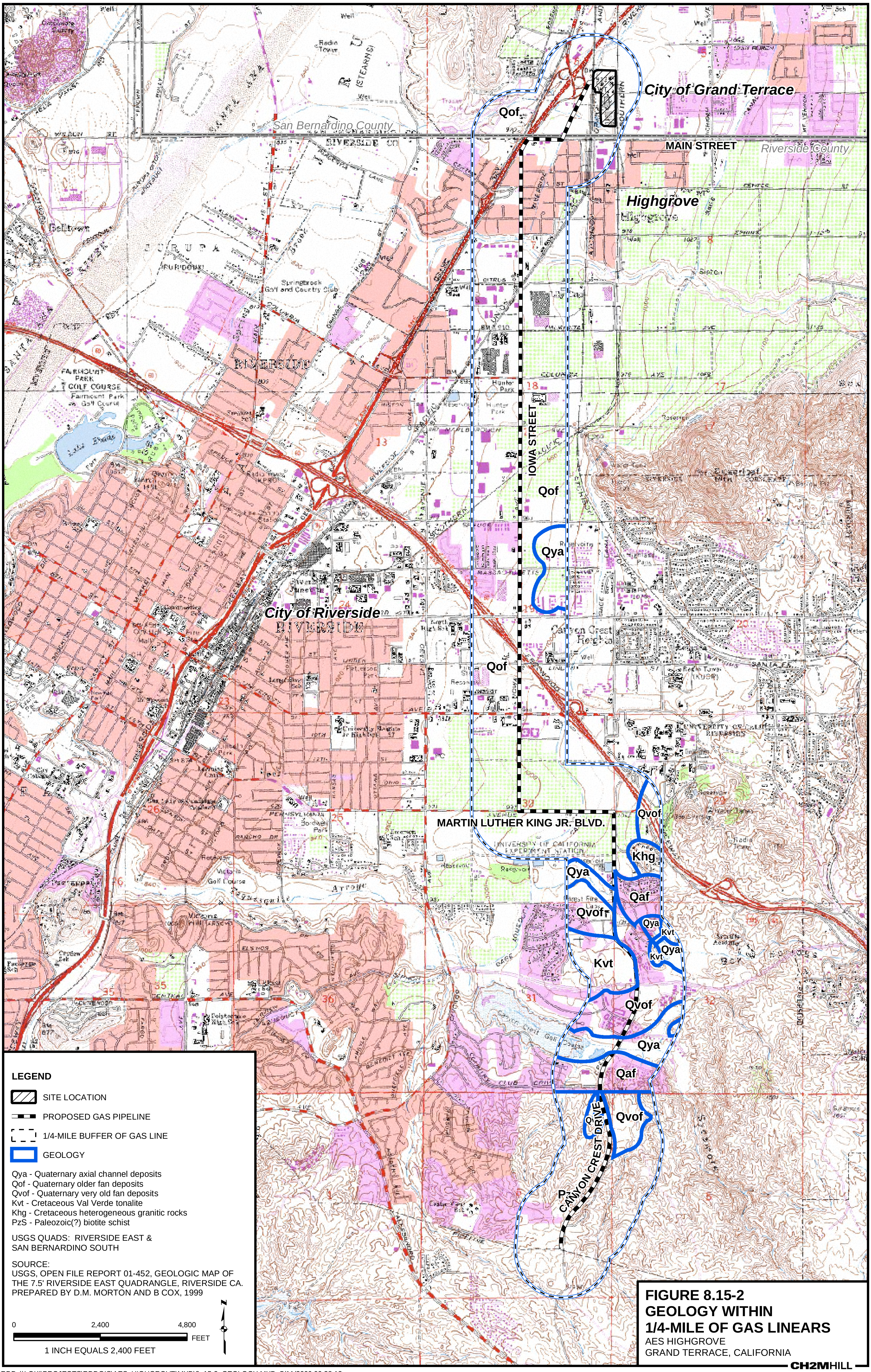

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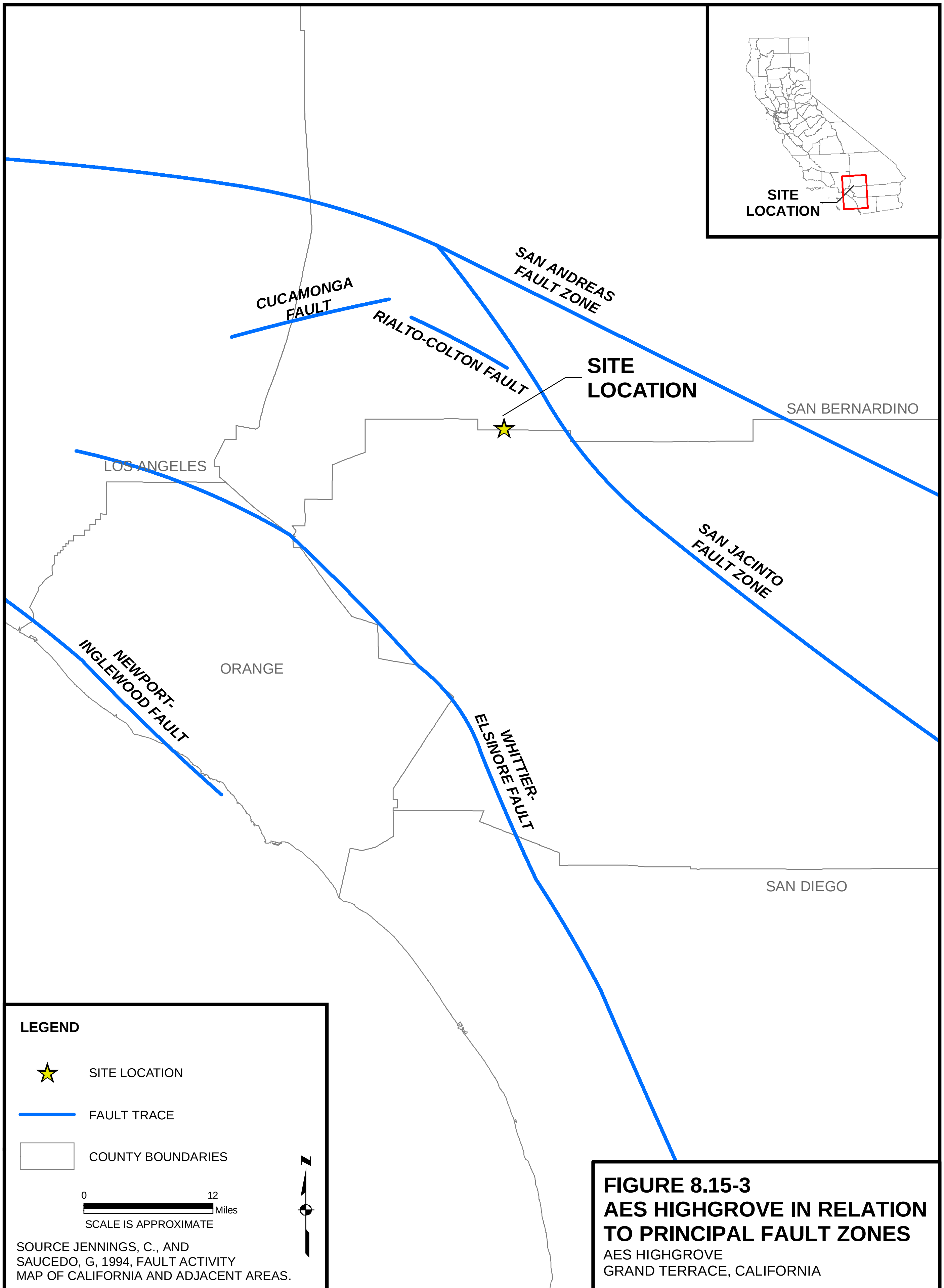

FIGURE 8.15-3
AES HIGHGROVE IN RELATION TO PRINCIPAL FAULT ZONES
AES HIGHGROVE
GRAND TERRACE, CALIFORNIA

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8.16 Paleontological Resources

8.16.1 Introduction

Paleontological resources are fossils, the remains of prehistoric plants and animals, and are important scientific and educational resources because of their use in: (1) documenting the presence and evolutionary history of particular groups of both extinct and extant organisms, (2) reconstructing the environments in which these organisms lived, and (3) in determining the relative ages of the strata in which they occur and the geologic events that resulted in the deposition of the sediments that formed these strata. This subsection summarizes the paleontological resources and the potential impacts on paleontological resources that may result from construction of the AES Highgrove project.

8.16.1.1 Project Description

The AES Highgrove project is the proposed construction of a nominal 300-megawatt (MW) peaking facility consisting of three natural-gas-fired turbines, and associated equipment. The proposed generating facility site is located on the property of the former Southern California Edison (SCE) Highgrove Generating Station in the City of Grand Terrace, in San Bernardino County. The proposed generating facility site is located in an industrially-zoned area of the City. It will connect to SCE's electrical transmission system via the adjacent 115-kV Highgrove Substation. Natural gas for the facility will be delivered to the generating station via a natural gas pipeline that will connect to an existing Southern California Gas (SoCalGas) transmission line (Line 2001) located approximately 7 miles (11.5 km) south of the project site in Riverside County. A proposed gas line and two alternate gas pipeline routes are reviewed (see Figure 8.16-1) and are included in this paleontologic resources assessment.

The natural gas line and short potable water line will be the only offsite laterals for this project. Industrial water will be supplied by an existing onsite well. Potable water for drinking and sanitary uses will be provided by the Riverside Highland Water Company from a water main about 1,300 feet south of the plant site on Main Street. Similarly, sanitary wastewater disposal will be via a hookup to the city's sanitary sewer, which is located on Taylor Street, bordering the plant. The power plant parcel will consist of approximately 9.8 acres of land under the Applicant's control.

8.16.2 Laws, Ordinances, Regulations, and Standards

Paleontological resources are non-renewable scientific and educational resources and are protected by several federal and state statutes (California Office of Historic Preservation, 1983; see also Marshall, 1976; West, 1991; Gastaldo, 1999), most notably by the 1906 Federal Antiquities Act and by the State of California's environmental regulations (California Environmental Quality Act [CEQA], Section 15064.5). Professional guidelines for the assessment and mitigation of impacts to paleontological resources have been disseminated by the Society of Vertebrate Paleontology (SVP; 1995, 1996). Construction of the proposed AES Highgrove project will be conducted in accordance with all laws, ordinances, regulations, and standards (LORS) applicable to paleontological resources. Federal, State, and County LORS applicable to paleontological resources are summarized in Table 8.16-1 and discussed briefly below, along with SVP guidelines. The cities of Grand Terrace and Riverside do not have LORS applicable to paleontological resources.

TABLE 8.16-1
LORS Applicable to Paleontological Resources

LORS	Applicability	Reference	Project Conformity
Antiquities Act of 1906	Protects paleontological resources on federal lands	Section 8.16.2.1, Page 8.16-2	Yes
Public Resources Code, Sections 5097.5/5097.9	Designates unauthorized removal or disturbance of fossil remains or fossil site on publicly owned lands in the State of California as a misdemeanor	Section 8.16.2.2, Page 8.16-3	Yes
CEQA, Appendix G(j)	Requires that impacts to paleontological resources be assessed and mitigated on all discretionary projects, public and private	Section 8.16.2.2 Pages 8.16-2, 8.16-3	Yes
San Bernardino and Riverside County General Plans	Emphasize the conservation of resources having the potential to provide information important in history and prehistory	Section 8.16.2.3 Pages 8.16-3, 8.16-4	Yes

8.16.2.1 Federal LORS

Federal protection for significant paleontological resources would only apply to the AES Highgrove project if any construction or other related project impacts occur on federally owned or federally managed lands. Federal legislative protection for paleontological resources stems primarily from the Antiquities Act of 1906 (PL 59-209; 16 United States Code 431 et seq.; 34 Stat. 225), which calls for protection of historic landmarks, historic and prehistoric structures, and other objects of historic or scientific interest on federal lands. Since no portion of the AES Highgrove project site is on federally owned or managed land, federal LORS do not apply to this project.

8.16.2.2 State LORS

The California Energy Commission (CEC) environmental review process under the Warren-Alquist Act is considered functionally equivalent to that of CEQA (Public Resources Code Sections 21000 et seq.). CEQA requires that public agencies and private interests identify the potential environmental analysis of their proposed projects on any object or site of significance to the scientific annals of California (Division I, California Public Resources Code Section 5020.1 [b]). Guidelines for the Implementation of CEQA (Public Resources Code Sections 15000 et seq.) define procedures, types of activities, persons, and public agencies required to comply with CEQA. Appendix G in Section 15023 provides an Environmental Checklist of questions that a lead agency should address if relevant to a project's environmental impacts. One of the questions to be answered in the Environmental Checklist (Section 15023, Appendix G, Section V, part c) is the following: "Would the project directly or indirectly destroy a unique paleontological resource or site…?"

Although CEQA does not define what is "a unique paleontological resource or site," Section 21083.2 defines "unique archaeological resources" as "…any archaeological artifact, object, or site about which it can be clearly demonstrated that, without merely adding to the current body of knowledge, there is a high probability that it meets any of the following criteria:

1. [It] contains information needed to answer important scientific research questions and that there is a demonstrable public interest in that information.
2. It has a special and particular quality such as being the oldest of its type or the best available example of its type.
3. [It] is directly associated with a scientifically recognized important prehistoric or historic event."

Making accommodation for the type of antiquity involved, this definition of "unique archaeological resources" is equally applicable to recognizing "a unique paleontological resource or site." Additional guidance is provided in CEQA Section 15064.5 (a)(3)(D), which indicates "generally, a resource shall be considered historically significant if it has yielded, or may be likely to yield, information important in prehistory or history."

Section XVII, part a, of the CEQA Environmental Checklist asks a second question equally applicable to paleontological resources: "Does the project have the potential to eliminate important examples of the major periods of California history or pre-history?" Fossils are important examples of the major periods of California prehistory. To be in compliance with CEQA, environmental impact assessments, statements, and reports must answer both these questions in the Environmental Checklist. If the answer to either question is *yes* or *possibly*, a mitigation and monitoring plan must be designed and implemented to protect significant paleontological resources.

The CEQA lead agency having jurisdiction over a project is responsible to ensure that paleontological resources are protected in compliance with CEQA and other applicable statutes. The lead agency with the responsibility to ensure that fossils are protected during construction of the proposed AES Highgrove project is the CEC. California Public Resources Code Section 21081.6, entitled Mitigation Monitoring Compliance and Reporting, requires that the CEQA lead agency demonstrate project compliance with mitigation measures developed during the environmental impact review process.

Other state requirements for paleontological resource management are in California Public Resources Code Chapter 1.7, Section 5097.5 (Stats. 1965, c. 1136, p. 2792), entitled Archaeological, Paleontological, and Historical Sites. This statute defines any unauthorized disturbance or removal of a fossil site or fossil remains on public land as a misdemeanor and specifies that state agencies may undertake surveys, excavations, or other operations as necessary on state lands to preserve or record paleontological resources. This statute would not apply to the proposed AES Highgrove project since construction or other related project impacts would not occur on publicly owned or managed lands.

8.16.2.3 County and City LORS

California Planning and Zoning Law requires each county and city jurisdiction to adopt a comprehensive, long-term General Plan for its development. The General Plan is a policy document designed to give long-range guidance to those making decisions affecting the future character of the planning area. It represents the official statement of the community's physical development as well as its environmental goals. The General Plan also acts to clarify and articulate the relationship and intentions of local government to the rights and expectations of the general public, property owners, and prospective investors. Through its general plan, the local jurisdiction can inform these groups of its goals, policies, and development standards; thereby communicating what must be done to meet the objectives of the general plan.

Both the San Bernardino County and Riverside County General Plans have Conservation Elements that emphasize the conservation of resources that are important to the history of the area, including cultural resources. Paleontological resources are commonly subsumed under this category at the local level because they too have the potential to provide "information important in history and prehistory." Per CEQA, the cultural resources section of the "San Bernardino County Initial Study Environmental Checklist Form" specifically asks if a given project would directly or indirectly destroy a unique paleontological resource.

8.16.2.4 Professional Standards

To assist in the compliance with applicable laws, the SVP, an international scientific organization of professional vertebrate paleontologists, has disseminated guidelines (SVP, 1995; 1996) that outline acceptable professional practices in the conduct of paleontological resource assessments and surveys; monitoring and mitigation; data and fossil recovery; sampling procedures; and specimen preparation, identification, analysis, and museum curation. The SVP's guidelines are a commonly used standard against which paleontological monitoring and mitigation programs are evaluated. Briefly, SVP guidelines recommend that each project have literature and museum archival reviews, a field survey, and, if there is a high potential for disturbing significant fossils during project construction, a mitigation plan that includes monitoring by a qualified paleontological monitor, salvage of fossils if encountered, preparation and identification of salvaged fossils, and placement of curated fossil specimens into a permanent, retrievable public museum collection (such as the San Bernardino County Museum).

8.16.3 Setting

The study area includes the AES Highgrove plant site as well as three alternate natural gas pipeline routes that extend approximately 7 miles (11.5 km) south of the plant site to a point of interconnection with a regional gas transmission pipeline, Line 2001 (see Figure 8.16-2).

8.16.3.1 Geographic Setting

The project area lies in the Inland Empire area of southern California between the San Bernardino and San Jacinto mountains of the Transverse Ranges to the northeast and east, respectively, and the Chino Hills and Santa Ana mountains to the west and southwest, respectively. Physiographically, it lies on the northwestern portion of the Perris Block, an eroded surface of Mesozoic crystalline rock between the Santa Ana and the San Jacinto mountains (Woodford et al., 1971). The Box Springs Mountains lie immediately to the east of the pipeline alternate routes. The La Loma Hills lie immediately to the west and northwest of the plant site. Father to the east, the San Jacinto Fault Zone lies at the eastern base of the Box Springs Mountains and marks the eastern edge of the Perris Block. To the west, the Elsinore and Chino Fault Zones lie along the eastern margin of the Santa Ana Mountains and mark the western limit of the Perris Block.

Within the context of the Perris Block, the project area encompasses two distinct physiographic units. To the north of Tequesquite Arroyo, the plant site and approximately

5 miles (8.2 km) of the proposed gas pipeline and alternate routes lie within the Santa Ana River Valley in the vicinity of Riverside and Colton (Figure 8.16-1). The remaining southern portion of the gas pipeline routes to the south ascend onto the northwestern margin of the Perris Plain, represented by the northwestern edge of the Perris Surface (Woodburn et al., 1971). The northeast-southwest trending northern margin of the Perris Plain may be structurally controlled, but no fault is currently mapped in that area (Morton and Cox, 2001; Woodford et al., 1971). Elevations in the Santa Ana River Valley are generally below about 1,000 feet (305 m), while elevations on the Perris Plain are about 1,700 feet (520 m) on the Perris Surface near the southern termini of the gas pipeline route alternatives. The northwestern edge of the Paloma Surface of the Perris Plain lies about 1.5 miles (2.5 km) east of the southern termini of the gas pipeline routes, and elevations on that surface there are around 1,500 feet (460 m). Morton and Cox (2001) note that, in this area, the lower-elevation Paloma Surface is mantled with alluvium while the higher Perris Surface is generally characterized by exposed or very thinly mantled bedrock.

8.16.3.2 Geologic Setting

Limited exposures of metamorphic rocks of probable Paleozoic age are present in the project area. These rocks, originally sedimentary in nature, were subject to high-temperature metamorphism during the emplacement of the Mesozoic igneous batholith in this area. They include biotite schist, impure quartzite, marble, and other calc-silicate rocks (Morton and Cox, 2001).

Igneous rocks emplaced in the crust primarily during the Late Mesozoic dominate the basement geology. In the project area, these rocks are of the Peninsular Range Batholith (Morton and Miller, 2003). In most areas they were originally overlain by varying depths of Quaternary alluvium and, in some cases, by artificial fill (ibid.; Morton and Cox, 2001). Rocks of the Peninsular Range Batholith were emplaced during the Cretaceous Epoch, which ended about 64 million years ago. These granitic rocks vary in mineralogical composition and, in the project area, are principally tonalite and granodiorite (Morton and Cox, 2001), represented chiefly by the Val Verde tonalite.

Quaternary (Pleistocene and Holocene) sediments exposed in the project area are primarily alluvial fan deposits issuing from the Box Springs Mountains to the east along the northern portion of the pipeline alternative routes north of Tequesquite Arroyo and the plant site. Older alluvium of less certain provenance lies along the southern portion of the pipeline routes south of the Tesquesquite Arroyo, on the northwest edge of the Perris Plain. Artificial fill and Holocene eolian and sheet wash sediments typically mantle these units. In areas south of Tequesquite Arroyo extensive excavations associated with roadway and housing tract development have removed this alluvium in many places and exposed the underlying Val Verde tonalite.

The project area has been subject to considerable development and, as a consequence, much of the geology is obscured by buildings, pavement, landscaping, and artificial fill. South of the Tequesquite Arroyo deep road cuts reveal primarily extensive exposures of Cretaceous Val Verde tonalite.

8.16.4 Resource Inventory

8.16.4.1 Resource Inventory Methods

A records search and literature review was conducted for this project by the San Bernardino County Museum, the regional repository for paleontological records in this area. It is included as Confidential Appendix 8.16A (Scott, 2005). Subsequent to the receipt of the results of the records search, an initial paleontological field survey of the project area was conducted by Mr. Russel Hasting on February 5, 2005. Mr. Hasting is a trained field paleontologist with more than 4 years of paleontological field experience in California, including other projects licensed by the CEC, such as the Walnut Energy Center. This was followed by a field review of the project area on April 11, 2005, by the project Paleontologic Resource Specialist, Dr. Geoffrey Spaulding. Areas where undisturbed or possibly undisturbed sediments were accessible were walked, while areas where the ground surface was obscured were subject to a windshield survey. Prior to field work and during the preparation of this assessment, the geological literature covering the project area also was consulted.

The potential paleontological productivity of each rock unit in the study area was assessed based on the abundance of fossil remains it has yielded and previously recorded fossil sites it contains in the broader study area of the Inland Empire (Riverside, San Bernardino, and the Perris Plain).

8.16.4.2 Results: Geology and Stratigraphy

8.16.4.2.1 Rocks Lacking or Unlikely To Yield Fossils

The results of the paleontological records review, available geological literature and geologic mapping, and the field surveys were used to determine the nature of the geology and the paleontological sensitivity of the rocks in the vicinity of the project. The study area is largely developed and little of the ground surface is visible. Therefore, greater reliance was placed on the literature and records review than on the negative results of the field surveys.

Paleozoic Rocks

South of Tequesquite Arroyo and west of Chicago Street there are mapped a number of limited outcrops of calc-silicate metamorphic rock of probable Paleozoic age (Morton and Cox, 2001). Other Paleozoic calc-silicate rocks and schists intermixed with Cretaceous granitic rocks also outcrop within one mile (1.6 km) of the southern portion of the pipeline routes.

These rocks were extensively altered by metamorphism during the emplacement of the adjacent Mesozoic granitic batholiths. Due to their highly metamorphosed nature, the probability of recovering fossils from these rocks is extremely remote. Therefore, they possess low paleontological potential.

Mesozoic Rocks

Crystalline igneous rocks of the Val Verde pluton and the Box Springs plutonic complex comprise the Mesozoic igneous suite in the project area. From their southern termini the gas pipeline extends north over the Cretaceous Val Verde tonalite until about the position of the Tequesquite Arroyo. Heterogeneous porphyritic granodiorites of the Box Springs plutonic complex comprise the ridge extending west from Sugar Loaf Mountain, immediately to the east of the project area. Porphyritic granodiorite also comprises the proximal portion of the La Loma Hills to the west and northwest of the plant site.

Although igneous volcanic rocks (chiefly volcanic ash and volcanic debris flow deposits) may occasionally yield fossil materials, these plutonic rocks represent molten material that cooled at depth beneath the earth's crust. Plutonic igneous rocks, therefore, do not contain fossils and therefore possess no paleontological potential.

Artificial Fill

Artificial fill is mapped by Morton and Cox (2001) between Chicago Avenue and Canyon Crest Drive, south of Tequesquite Arroyo. This fill is associated with residential development of the generally steep terrain descending from the Perris Plain and Box Springs Mountains to the Santa Ana River Valley. Field review revealed that artificial fill is widespread elsewhere in the study area south of Tequesquite Arroyo. In areas north of the arroyo, agricultural activities and urban development in the Riverside area have resulted in the deposition of variable thicknesses of disturbed sediments and artificial fill.

Artificial fill could have fragmentary fossil material transported from other sites. Even if such were the case, this material would be out of stratigraphic context and, therefore, have no scientific value and minimal, if any, educational value due to its lack of context and fragmentary nature. Therefore, artificial fill has low paleontological potential.

8.16.4.2.2 Potentially Fossiliferous Sediments

The results of the field survey indicate that the surficial geology of much of the plant site and the gas pipeline route alternatives is obscured by industrial, urban and residential development, and by agricultural activities. Therefore, geological maps were the primary source used to determine the extent of potentially fossiliferous sedimentary units in the project area.

Although alluvial fan deposits are generally thought to be subaerial, coarse-grained sediments deposited in a high-energy regime with consequently low paleontological sensitivity, experience in the study area has shown that certain facies of these alluvial units yield important vertebrate fossils (see below). Other sedimentary rocks, such as the highly fossiliferous San Timoteo Formation found farther east in the San Jacinto Valley, are not known to be present in the project area (Morton and Cox, 2001; Morton and Miller, 2003; Scott, 2005).

Early to Middle Pleistocene Alluvium

Older alluvium of probable Early to Middle Pleistocene age occurs intermittently through the study area (Morton and Cox, 2001; and Morton and Miller, 2003). Outcrops are mapped primarily south of Tequesquite Arroyo, and along the western piedmont of the Box Springs Mountains. It also underlies the general vicinity of the plant site. It is well-oxidized and indurated, and commonly contains local duripans and silcretes indicative of soil formation processes in a more humid climatic regime than the semi-arid climate typical of the area today. Morton and Miller (2003) note that alluvial clasts in the La Loma Hills were transported from the San Gabriel Mountains, suggesting that some of these older alluvial units may have originated from more distant sources than the Box Springs Mountains.

Middle to Late Pleistocene Alluvium

Younger alluvial fan deposits extending west and northwest from the Box Springs Mountains to the Santa Ana River Valley are mapped by Morton and Cox (2001) and Morton and Miller (2003) as Middle to Late Pleistocene in age. These deposits occur north of the Tequesquite Arroyo. They are usually indurated and oxidized, but neither the degree of induration nor the reddening of these sediments is as strongly developed as the older Pleistocene alluvium.

Late Pleistocene to Holocene Alluvium

The youngest alluvial deposits in the study area are usually restricted to well-defined drainages and arroyos extending west from the topographic high represented by the Box Spring Mountains. In contrast to the oxidized soils of the older alluvial units, there is little to no evidence of reddening in these sediments and their color is buff to gray. They are often somewhat consolidated, but are rarely indurated to the degree exhibited by the older alluvium. Late Pleistocene alluvium, as well as the older alluvial units, is commonly blanketed by middle to late Holocene eolian and sheet wash sediments. In areas of low relief, this Holocene overburden can reach a depth of up to 15 feet (4.6 m) and, normally, attains a depth of at least 5 feet (1.5 m) (e.g., Onken, 2001).

8.16.4.3 Results: Paleontological Resources

The paleontological resources records review conducted for this project encompassed an area extending 9 miles (14.7 km) in all directions from the proposed pipeline routes and the plant site (Confidential Appendix 8.16A). No previously recorded fossil sites have been documented within the footprint of the plant site or of the alternate gas pipeline routes. No previously recorded fossil site occurs within 4 miles of the project area. The majority of vertebrate and paleobotanical sites recorded in this search area are from the highly fossiliferous San Timoteo beds of Frick (1921), which are assigned a Plio-Pleistocene age. The closest outcrops of the San Timoteo beds lie approximately 3.6 miles (5.9 km) east of the plant site along the San Jacinto Fault Zone, where local tectonic uplift has exposed these sediments (Morton and Miller, 2003).

No paleontological resources were identified in the course of the field survey. The underlying geology of most of the project area, including the proposed pipeline and alternative routes, is obscured by development, vegetation, and Holocene or artificial overburden.

8.16.4.3.1 Paleontological Sensitivity of Paleozoic and Mesozoic Rocks

The Paleozoic and Mesozoic rocks in the study area are either highly metamorphosed, or are igneous in origin. No fossils have been recorded for these rocks, and none are expected in the project area. Therefore, these rocks are assigned a Low Sensitivity rating for paleontological resources.

8.16.4.3.2. Paleontological Sensitivity of Pleistocene (Irvingtonian and Rancholabrean) Sediments

At least three different-age alluvial units are recognized in the project area, and they range in age from Early Pleistocene to Late Pleistocene and Holocene. There is no record of these specific geologic units having yielded fossils in the immediate vicinity of the project, but similar alluvial sediments elsewhere in the area have yielded rich records of primarily Rancholabrean fauna and flora. These finds have varied in depth from about 13 feet (4 m) below original ground surface, to greater than 437 feet (133 m) below ground surface, and have come to light mainly as a result of construction-related excavations (Reynolds and Reynolds, 1991; Springer et al., 1998, 1999). They include records of saber-tooth cat (*Smilodon fatalis*), mammoth (*Mammuthus columbi*), mastodon (*Mammut americanum*), horse (*Equus* spp.), camel (*Camelops hesternus*), and other members of the extinct Pleistocene megafauna that used to inhabit these valleys. Paleobotanical remains that have been recovered from these sediments include logs of juniper or cedar (Cupressaceae), the seeds and cone scales of ponderosa pine (*Pinus ponderosa*), and the seeds and fruit of manzanita species (*Arctostaphylos* spp.). These plant species now occur only at higher elevations in the surrounding mountains

Because of the abundant and significant fossil material that has been recovered from Pleistocene alluvium in the region, these sediments are assigned a High Sensitivity rating for paleontological resources.

8.16.4.3.3. Paleontological Sensitivity of Holocene Sediments and Artificial Fill

Throughout the area, Holocene sediments occur as a mantle over older alluvium, and normally consist of carbonate-rich eolian silts and fine sands, and sheet wash debris. A distinct unconformity and soil usually separates these sediments from underlying Pleistocene sediments. Significant paleontological resources have not been recovered from Holocene-age sedimentary units in the region. Holocene sediments are, therefore, assigned a Low Sensitivity rating for paleontological resources. However, some of the Late Pleistocene age fossil finds in the region have been dated by radiocarbon and are as young as 13,000 to 14,000 years, placing them only 3,000 to 4,000 years older than the Pleistocene/Holocene boundary. Therefore, monitoring of excavations of these sediments should take place if a reasonable probability exists that construction would disturb underlying Pleistocene deposits.

While artificial fill may contain fragmentary fossil material, that material would be out of stratigraphic context and, therefore, of no scientific value. Similarly, the educational value of any fragmentary material recovered from artificial fill would be minimal. Consequently, this soil is assigned a Low Sensitivity rating for paleontological resources. However, like Holocene units, monitoring of excavations of artificial fill should take place if there is a reasonable probability that construction would disturb underlying Pleistocene deposits.

8.16.5 Impacts

Impacts to paleontological resources from construction and operation of the AES Highgrove facility are evaluated in the following subsections.

8.16.5.1 Discussion of Impacts

8.16.5.1.1 Paleontological Resource Significance Criteria

In its standard guidelines for assessment and mitigation of adverse impacts to paleontological resources, the SVP (1995) established three categories of sensitivity for paleontological resources: high, low, and undetermined. The paleontological importance or sensitivity of a stratigraphic unit reflects: (1) its potential paleontological productivity (and thus sensitivity), and (2) the scientific significance of the fossils it has produced. The potential paleontological productivity of a stratigraphic unit exposed in a project area is based on the abundance of fossil specimens and/or previously recorded fossil sites in exposures of that unit in or near that project site. The underlying assumption of this assessment method is that exposures of a stratigraphic unit are most likely to yield fossil remains in quantity (and quality) similar to those previously recorded from that unit.

An individual fossil specimen is considered scientifically important and significant if it is: (1) identifiable, (2) complete, (3) well preserved, (4) age diagnostic, (5) useful in paleoenvironmental reconstruction, (6) a type or topotypic specimen, (7) a member of a rare species, (8) a species that is part of a diverse assemblage, and/or (9) a skeletal element different from, or a specimen more complete than, those now available for that species (SVP, 1995). For example, identifiable land mammal fossils are considered scientifically important because of their potential use in providing age determinations and paleoenvironmental reconstructions for the sediments in which they occur. Moreover, vertebrate remains are comparatively rare in the fossil record. Although fossil plants are less frequently considered to be significant fossils, as sessile (attached in place) organisms they are actually more sensitive indicators of their environment and, thus, more valuable than mobile mammals for paleoenvironmental reconstructions.

Under SVP (1995) standard guidelines, stratigraphic units in which fossils have been previously found are deemed to have a high sensitivity and a high potential to produce additional fossils. In areas of high sensitivity, full-time monitoring by a professionally trained paleontologist is recommended during any project ground disturbance. Stratigraphic units that are not sedimentary in origin or that have not been known to produce fossils in the past are deemed to have low or undetermined sensitivity and monitoring is usually not recommended nor needed during project construction in these units. Stratigraphic units that have not had any previous paleontological resource surveys or fossil finds are deemed undetermined until surveys and mapping are done to determine their sensitivity. After reconnaissance surveys, observation of exposed strata, and possibly subsurface testing, a qualified paleontologist can usually determine whether the stratigraphic unit should be categorized as having high, low, or undetermined sensitivity; that is, whether there is a high, low, or undetermined potential to encounter fossil resources during construction. In keeping with the significance criteria of the SVP (1995), all vertebrate fossils are categorized as being of significant scientific value and all stratigraphic units in which vertebrate fossils have previously been found have high sensitivity. According to SVP (1995) standard guidelines, sensitivity comprises both: (a) the potential for yielding abundant or significant vertebrate fossils or for yielding a few significant fossils, large or small, vertebrate, invertebrate, or botanical; and (b) the importance of recovered evidence for new and significant taxonomic, phylogenetic, paleoecologic, or stratigraphic data.

Using the criteria of the SVP (1995), the significance of the potential adverse impacts of earthmoving on the paleontological resources of each stratigraphic unit exposed in and near the project site was assessed, including the proposed gas pipeline route and alternatives. The paleontological sensitivity of the stratigraphic unit in turn reflects the potential for fossil remains and fossil sites being encountered during earthmoving. However, it should be noted that any impact on a fossil site or a fossil-bearing rock unit during construction would be considered significant, regardless of the previously determined paleontological importance of the rock unit in which the site or fossiliferous layer occurs. For example, grading in an area underlain by a rock unit with low sensitivity would have only a low potential to disturb fossil remains (i.e., the rock unit would have low sensitivity to adverse impacts). However, the loss of any fossil remains from that rock unit would be a significant impact.

8.16.5.2 Paleontological Resource Impact Assessment

No impacts to non-renewable paleontological resources would occur from operation of the proposed AES Highgrove facility or associated gas pipeline. Impacts to paleontological resources would only occur from construction-related excavations that would be sufficiently deep to affect sediments possessing high paleontological sensitivity. Based on prior detailed geomorphologic investigations on the Perris Plain (Onken, 2001), the depth below which paleontologically sensitive sediments (if present) have the potential to be disturbed is considered to be the minimal depth of the Holocene overburden, or about 5 feet (1.5 m) below original ground surface.

Significant impacts to paleontological resources would occur from construction-related excavations at depth greater than 5 feet at the plant site to the extent that those excavations would disturb underlying Pleistocene alluvium, which is mapped as occurring in the area. Similarly, significant impacts would occur from trenching along the gas pipeline route in those areas that are underlain by Pleistocene alluvium, primarily north of Tequesquite Arroyo.

No significant impacts to paleontologic resources would occur from trenching along the pipeline route in those areas underlain by Paleozoic metamorphic rocks, by Mesozoic granitic rocks, or by artificial fill. These areas occur primarily south of Tequesquite Arroyo.

Site grading at depths of less than 5 feet below original ground surface is not expected to result in significant adverse impacts to paleontological resources, as the ground surface in the area is already relatively flat, is covered by Holocene overburden, and has already been disturbed by previous construction activities. Support activities such as the emplacement of temporary construction offices, proposed laydown area(s), and parking areas, are also expected to have no significant adverse impact on paleontological resources, as they also would be located on ground previously disturbed and will not involve ground disturbance at depths greater than 5 feet (1.5 m). However, deeper excavations for foundations, pipelines and conduits, and drainage basins, as well as trenching for the gas pipeline, would impact paleontologically sensitive sediments, and therefore, result in adverse impacts to paleontological resources.

8.16.6 Mitigation

8.16.6.1 Proposed Mitigation Measures

This section describes Applicant-proposed mitigation measures that would be implemented to reduce potential adverse impacts to significant paleontological resources resulting from construction of the power generation facility and gas pipeline. These proposed paleontological resource mitigation measures would reduce to an insignificant level the direct, indirect, and cumulative adverse impacts to paleontological resources that would result from project construction. The mitigation measures proposed below are in compliance with CEC environmental guidelines (CEC, 2000) and with SVP standard guidelines for mitigating adverse construction-related impacts on paleontological resources (SVP, 1995; 1996).

8.16.6.1.1 Paleontological Monitoring

During construction, earthmoving construction activities will be monitored where these activities occur at a sufficient depth and in a paleontologically sensitive geological unit and, therefore, would potentially disturb previously undisturbed sediment. Monitoring of surface grading and other activities at depths less than 5 feet (1.5 m) below the original ground surface is not proposed. These shallow activities have minimal probability to disturb paleontologically sensitive sediments. Monitoring will not be conducted in areas of artificial fill, in areas immediately underlain by metamorphic and igneous rocks, and in areas where exposed sediment will be buried but not otherwise disturbed.

8.16.6.1.2 Paleontological Resource Monitoring and Mitigation Plan

Prior to construction, a qualified paleontologist will be retained to design and implement a paleontological resources monitoring and mitigation program (PRMMP). The PRMMP will include a description of where and when construction monitoring will be required; emergency discovery procedures including avoidance of discovered resources; sampling and data recovery protocol; preparation, identification, and museum curation of any fossil specimens and data recovered; preconstruction coordination; worker education; and reporting.

This PRMMP will be consistent with SVP standard guidelines for the mitigation of construction-related adverse impacts on paleontological resources (SVP, 1995), as well as the requirements of the designated museum repository for any fossils collected. The Division of Geological Sciences of the San Bernardino County Museum in Redlands is the regional repository for recovered paleontological specimens.

Scientific recovery, preparation, identification, determination of significance, and curation into a public museum is considered by most land management agencies and by the SVP (1995) to adequately mitigate impacts to paleontological resources in most circumstances. Therefore, the implementation of these mitigation measures would reduce potentially significant adverse environmental impact of project-related ground disturbance on paleontological resources to an insignificant level by allowing for the recovery of fossil remains and associated specimen data, and corresponding geologic and geographic site data, that otherwise would be lost. With a well-designed and implemented PRMMP, project construction could actually result in beneficial impacts through the possible discovery of fossil remains that would otherwise not have been exposed without project construction and, therefore, would not have been known to science. The identification and analysis of fossil remains discovered on other projects in this area have helped answer important questions regarding the paleobiogeography, paleoecology, stratigraphy, and age of fossiliferous sediments in the Riverside region (e.g., Springer et al., 1998, 1999).

8.16.6.1.3 Construction Personnel Education

Prior to start of construction, construction personnel involved with earthmoving activities will be given a worker education briefing providing them with information that: fossils may be encountered, the appearance of fossils, and proper avoidance and notification procedures. This worker training will be prepared and presented by a qualified paleontologist.

8.16.6.2 Significant Unavoidable Adverse Impacts

Because potential impacts on paleontological resources resulting from construction of the AES Highgrove facility can be mitigated to an insignificant level, the proposed project would not cause significant unavoidable adverse impacts as defined by CEQA.

8.16.6.3 Cumulative Impacts

Disturbance or destruction of paleontological resources during project excavation has the potential to contribute to cumulative impacts. Impacts from this and other projects that may take place in the reasonably foreseeable future could cumulatively result in significant, adverse impacts to paleontological resources. These impacts would include the destruction of nonrenewable paleontological resources as a consequence of disturbance by earthmoving, and the consequent loss of their scientific data and educational potential.

However, the potential cumulative impacts to paleontological resources during project-related ground disturbance would be low as long as the mitigation measures proposed above are fully-implemented to: recover the resources, ensure they are identified, have their significance determined, have a written report is prepared, and ensure they are curated into a public museum. When properly implemented, the mitigation measures proposed above would effectively recover the value to science of any significant fossils discovered during project construction. Thus, with mitigation the proposed project would not cause or contribute to significant cumulative impacts to paleontological resources.

8.16.6.4 Project Conformity

Development and implementation of these monitoring and mitigation measures will maintain conformity with the LORS identified in Section 8.16.2.

8.16.7 Involved Agencies and Agency Contacts

There are no state or local agencies having specific jurisdiction over paleontological resources. However, in San Bernardino County, the Division of Geological Sciences of the San Bernardino County Museum maintains an active paleontological resources mitigation program, and acts on behalf of the County on issues dealing with paleontological resources mitigation and management. The CEQA lead agency having specific responsibility to ensure that paleontological resources are protected in compliance with CEQA and other applicable statutes during construction of the AES Highgrove facility is the CEC. California Public Resources Code Section 21081.6, entitled Mitigation Monitoring Compliance and Reporting, requires that the CEQA lead agency demonstrate project compliance with mitigation measures developed during the environmental impact review process.

8.16.8 Permits Required and Permit Schedule

No state or local agency requires a paleontological collecting permit to allow for the recovery of fossil remains discovered as a result of construction-related earthmoving on private or public lands, except for federal lands. Removal of paleontological resources from federal lands requires a Cultural Resource Use Permit from the Bureau of Land Management. However, since no federal lands are involved in this project, no permits will be required.

8.16.9 References

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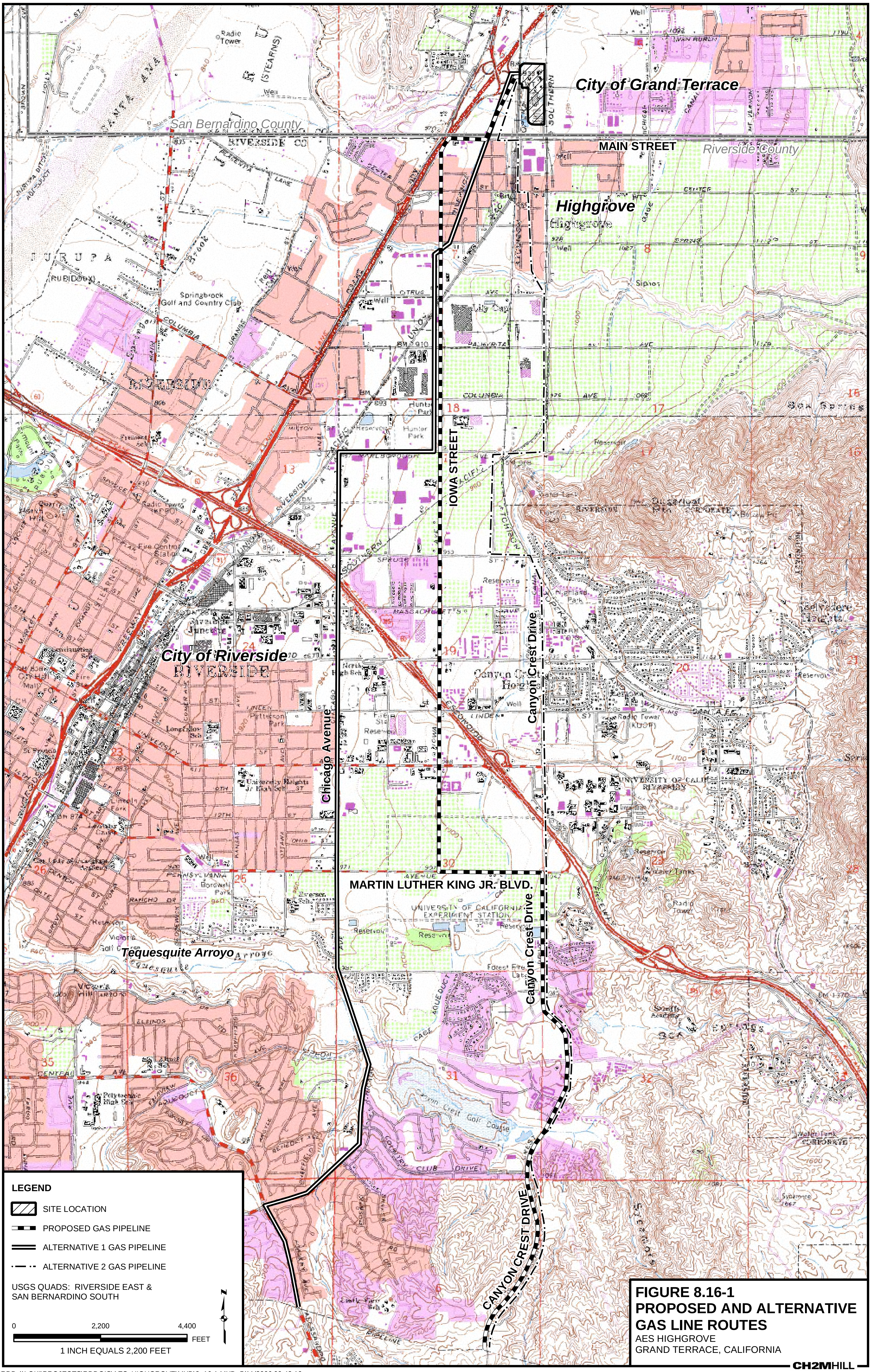

FIGURE 8.16-1
PROPOSED AND ALTERNATIVE GAS LINE ROUTES
AES HIGHGROVE
GRAND TERRACE, CALIFORNIA

CH2MHILL

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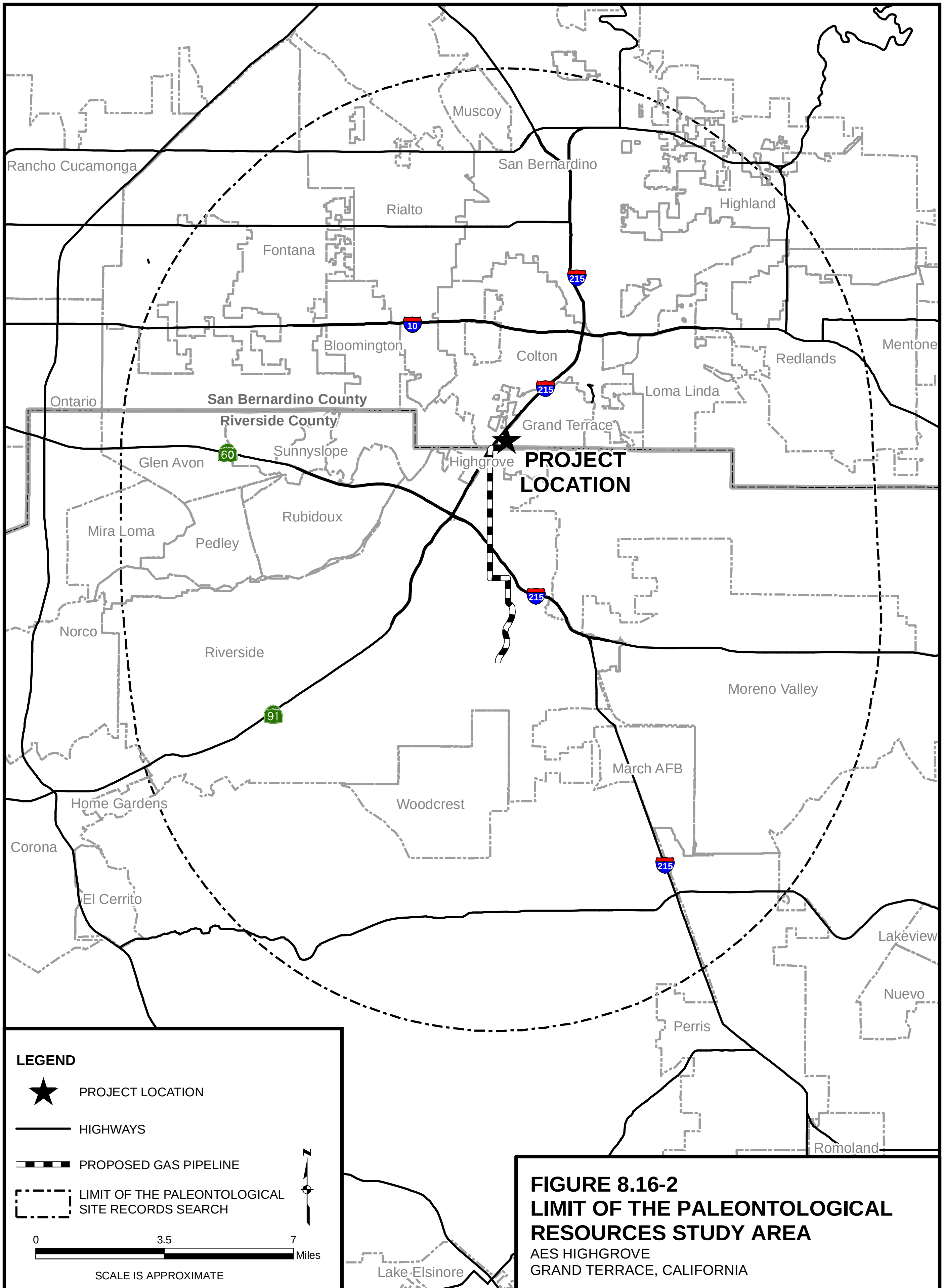

FIGURE 8.16-2
LIMIT OF THE PALEONTOLOGICAL RESOURCES STUDY AREA
AES HIGHGROVE
GRAND TERRACE, CALIFORNIA

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SECTION 9.0

Alternatives

9.1 Introduction

The California Environmental Quality Act (CEQA) requires consideration of "a range of reasonable alternatives to the project, or to the location of the project, which would feasibly attain most of the basic objectives of the project but would avoid or substantially lessen any of the significant effects of the project, and evaluate the comparative merits of the alternatives" [14 CCR. 15126.6(a)]. Thus, the focus of an alternatives analysis should be on alternatives that "could feasibly accomplish most of the basic objectives of the project and could avoid or substantially lessen one or more of the significant effects" [14 CCR 15126.6(c)]. The CEQA Guidelines further provide that "[a]mong the factors that may be used to eliminate alternatives from detailed consideration in an EIR are: (i) failure to meet most of the basic project objectives, (ii) infeasibility, or (iii) inability to avoid significant environmental impacts" (*Id*.).

A range of reasonable alternatives that could feasibly attain most of the basic objectives of the proposed AES Highgrove Project are identified and evaluated in this section. These include:

- The "No Project" alternative (that is, not developing a new power generation facility and not demolishing the existing Generating Station equipment);
- Alternative site locations for constructing and operating the Highgrove Project within the historic property boundaries of the SCE Highgrove Generating Station;
- Alternatives routes for the natural gas line;
- Alternative water supply sources; and
- Alternative generation technologies.

9.2 Project Objectives

AES has identified several basic objectives for the development of a power project. These objectives include:

- To construct and operate a nominal 300-MW, natural-gas-fired, simple-cycle generating facility specifically designed to serve peak electricity demand in the Southern California region.
- To remove an existing 1950s-vintage steam generator power plant and replace the existing plant with a state of the art peaking facility at a location already adapted to power plant operations.
- To provide competitively-priced peak load electricity for sale to electric service providers, which may result in savings that can be passed along to ratepayers.

- To construct a facility at an AES-owned or controlled property to capitalize on existing AES resources and establish community goodwill by removing the aging power plant.
- To help meet expected electrical demand growth in Southern California, including rapidly growing portions of San Bernardino and Riverside counties.
- To generate power at a location near the electric load, increasing reliability of the regional electricity grid and reducing regional dependence on imported power.
- To safely produce electricity and to do so without creating significant environmental impacts.

9.3 No Project Alternative

9.3.1 Description

If the No Project alternative is selected, AES would not receive authorization to construct and operate a new power generation facility and the existing plant would not be removed. Electricity required for local reliability and peaking requirements that would have been produced by the Highgrove Project would need to be generated by another source and/or imported to southern California. If the project is not constructed, alternative peak load sources include older power generation facilities that may operate less efficiently and may result in greater environmental impacts than the proposed facility.

The State of California has projected a shortfall in peak load power supply for the Southern California region. The No Project Alternative would not assist the State in meeting this projected peak load demand. The No Project Alternative does not meet the objectives to produce efficient cost-competitive electricity that will increase grid reliability and reduce dependence on imported power.

9.3.2 Potential Environmental Impacts

Potential environmental impacts from the No Project alternative would include continued degradation of local visual resources by not removing the existing, aging power plant. The No Project alternative would also result in the loss of a substantial new local property tax revenue source and other local economic benefits that would be created by the construction and operation of the Highgrove Project. In addition, the No Project alternative could result in greater fuel consumption and air pollution if older, less-efficient plants with higher air emissions are used to meet future peak demand that could be provided by the proposed Highgrove Project. Other insignificant environmental impacts that may be attributed to the Highgrove Project if constructed would not occur with the No Project Alternative.

9.4 Proposed and Alternative Sites

9.4.1 Alternative Site Selection Criteria

The Highgrove Project is a repowering of the existing old and inefficient power plant. The Project Site is the location of the former SCE Highgrove Generating Station and consists of a portion of the former Tank Farm Property and a portion of the existing Generating Station

Property. Demolition and removal of the existing generating equipment on the Generating Station Property and removal and relocation of the Highgrove Substation Controls to SCE's adjacent Highgrove Substation are activities integral to construction of the proposed project. Construction of the new project on the preferred site will capitalize on the close proximity to the Highgrove Substation, allowing the transmission interconnection to be constructed "onsite."

As consistent with Public Resources Section 25540.0 (b), evaluation of alternative sites is not required when a natural gas-fired thermal power plant is proposed for development at an existing industrial site and the project has a strong relationship to the existing industrial site. The former SCE Highgrove Generating Station site, which included both the Generating Station Property and the Tank Farm Property has an industrial zoning designation and since the 1950's has been used only for industrial activity. Because of the proximity to the existing Highgrove Substation and the property's former use for power plant operations, alternative sites that did not include former SCE Highgrove Property were not considered. Therefore, alternative sites considered for the proposed facility were those within the boundaries of the existing industrial use instead of alternative sites outside the former SCE Generating Station property boundaries.

According to Public Resource Code 25540.6 (b), evaluation of alternative sites is not required when a natural gas-fired thermal power plant is proposed for development at an existing industrial site and "the project has a strong relationship to the existing industrial site. The former SCE Highgrove Generating Station site, which included both the Generating Station Property and the Tank Farm Property has an industrial zoning designation and since the 1950s has been used only for industrial activity. Because of the proximity to the existing Highgrove Substation and the properties' former use for power plant operations, alternative sites that did not include former SCE Highgrove operations were not evaluated as alternatives.

In accordance with Public Resources Section 25540.0 (b) and in compliance with the key project objective to remove the existing 1950s-vintage steam generator power plant and construct a state-of-the-art peaking power generating facility at a location already adapted to power plant operations, only two properties warranted further consideration: the Generating Station Property and the Proposed Project Site.

9.4.2 Properties Considered

9.4.2.1 Generating Station Property

The Generation Station Property is an approximately 10-acre parcel that contains the power plant buildings and structures of the former SCE Highgrove Generating Station constructed in the 1950s. The site is located on Taylor Street about 300 feet north of Main Street. The Generating Station Property contains four large cooling tower structures on the southern end of the site, generating equipment in the center of the site, and an administration building/control room at its northern end (see Figure 9.4-1). The existing Generating Station is currently idle. The former oil "Tank Farm," which previously contained several large oil storage tanks, is located north of the Generating Station Property. Cage Park Property, a private park formerly used by SCE employees, borders the Generating Station property on the south.

9.4.2.2 Proposed Project Site

The proposed site for the Highgrove Project is a 9.8-acre parcel that is comprised of the Tank Farm Property and a small portion of the Generating Station Property.

The Tank Farm Property portion of the proposed site encompasses the northernmost 7.6 acres of the Project Site. At one time, three large storage tanks were located on the Tank Farm Property to store fuel oil for the existing power plant. The oil storage tanks were originally constructed approximately 10 feet below grade inside bermed areas. The fuel oil tanks were later removed from the Tank Farm Property by SCE. The Tank Farm Property is currently vacant; the berms that surrounded the oil storage tanks remain.

A parcel split and lot line adjustment will be completed prior to construction of the new facility; the 9.8-acre Project Site parcel is shown in Figure 9.4-1.

9.4.3 Environmental Considerations

In this section, the potential environmental impacts of the two sites considered are discussed in comparison to each other. The No Project alternative is also analyzed. Potential environmental impacts from use of the proposed site are presented in more detail in the 16 environmental subsections of Section 8 of this Application for Certification (AFC). Table 9.4-1 summarizes the impacts of the alternative site in comparison to the proposed site. Unless otherwise stated, it is assumed that the No Project alternative would not provide the beneficial outcomes of the project, would not meet the basic project objectives of the Applicant, and would not result in the impacts associated with the project.

TABLE 9.4-1
Summary Comparison of Environmental Effects Between the Alternative Sites that were Considered

Resource	Proposed Project Site	Generating Station Property
Air Quality	Given the design of the project, air impacts would be expected to be less than significant.	No difference.
Biological Resources	This industrial site is developed with no habitat value. No biological impacts are expected.	No difference.
Cultural Resources	There is insignificant cultural resources sensitivity at the proposed site.	No difference.
Land Use	The site is zoned Industrial (M2). The parcel configuration allows construction of the Proposed Project with greater setback from and less frontage on Taylor Street.	Greater Land Use Impact. The site is also zoned Industrial (M2). The parcel configuration would result in less setback from Taylor Street. In addition, this parcel has greater frontage on Taylor Street.
Noise	The Proposed Project Site is located further from sensitive residential areas. The plant's noise level at the nearest residence is projected to be about 52 dBA. This site is located further from other noise sensitive uses.	Greater Noise Impact. The site would be closer to sensitive residential areas. The plant's noise level at the nearest residence is projected to be about 56 dBA. This site is located closer to other noise sensitive uses.
Public Health	Given the design of the project, public health impacts are expected to be insignificant.	No difference.
Agriculture and Soils	Agricultural and soil erosion impacts would be insignificant.	No difference.

TABLE 9.4-1
Summary Comparison of Environmental Effects Between the Alternative Sites that were Considered

Resource	Proposed Project Site	Generating Station Property
Traffic and Transportation	No significant impacts on traffic and transportation are expected.	No difference.
Visual Resources	Impacts to Visual Resources would be insignificant. Demolition of the existing power plant represents an aesthetic improvement for the community. The project will be constructed approximately 10 feet below street grade and with greater setback from Taylor Street, reducing visual impacts from Taylor Street.	Impacts to Visual Resources would be insignificant. Demolition of the existing power plant represents an aesthetic improvement. Because the project would be closer to Taylor Street and constructed at grade, however, it would have a greater visual profile along Taylor Street.
Hazardous Material Handling	Hazardous materials impacts would be insignificant.	No difference.
Waste Management	There are no significant waste management impacts.	No difference.
Water Resources	Water supply and disposal impacts would be insignificant.	No difference.
Geologic Hazards	No known natural resources occur at the site and the project will be designed and constructed to withstand ground-shaking. Thus, geologic impacts are expected to be less than significant.	No difference.
Paleontological Resources	With mitigation, the impact on paleontological resources is expected to be less than significant.	No difference.

9.4.3.1 Air Quality

The plant's configuration and operation would be essentially the same from an air quality perspective at both locations. The type and quantity of air emissions from the sites would be identical. However, the impacts on the human population and the environment may differ very slightly because of the location of residences and other human uses in the project vicinity. Since the sites are adjacent to each other, they are in the same air basin and offsets acquired by the Applicant would be equally appropriate for both sites. Impacts of the project to air quality are insignificant and are discussed in Subsection 8.1, Air Quality.

9.4.3.2 Biological Resources

As the two sites are urban—developed sites with little biological habitat value—the potential biological impacts associated with the development of a power plant on each of these sites would be similar. Special-status species that are recorded, or that potentially occur in the region, are the same for both sites. Both sites are within the potential habitat range of the Swainson's hawk (a California threatened species), Western burrowing owl (a federal and California species of concern); California horned lark and tricolored blackbird (both California species of concern); Coastal California gnatcatcher (a federally threatened species and California species of concern); and Least Bell's vireo (a California and federally endangered species). As with the Tank Farm Property site, the Generating Station Property is located within an industrial zone (with little to no habitat for special status species), is developed (having the ground covered by either gravel or asphalt), and has no natural biological habitat. Construction of the project on either site will not directly affect threatened or endangered species. Impacts of the project on biological resources are insignificant and are discussed in Subsection 8.2, Biological Resources.

9.4.3.3 Cultural Resources

Both sites have the same cultural sensitivity. They are in an area that has been highly disturbed by past industrial operations. A record search of the area in San Bernardino County was performed by staff of the Archaeological Information Center, which reported four archaeological sites and four isolated finds located within one mile of the plant site. No sites were reported within the plant site area of potential effects. Eleven individual investigation reports have been filed in the CHRIS archives for the portion of the project area lying within San Bernardino County. Impacts of the project on cultural resources are insignificant and are discussed in Subsection 8.3, Cultural Resources.

9.4.3.4 Land Use

Both sites are located in the City of Grand Terrace and zoned industrial (M2). Therefore, development of the project on either parcel would conform to the zoning and general plan requirements. Impacts of the project on land use are insignificant and are discussed in Subsection 8.4, Land Use.

9.4.3.5 Noise

Both sites are located within an urban area with a noise environment influenced by freeway and rail traffic. Noise levels attributable to the project at the Proposed Site are not expected to result in significant impacts to sensitive receptors. Construction of the project on the Generating Station Property would place noise-emitting sources closer to sensitive receptors resulting in predicted noise levels approximately 4 dBA higher at the closest sensitive receptor. Impacts of the project's noise levels are insignificant and are discussed in Subsection 8.5, Noise.

9.4.3.6 Public Health

Both sites are located in an industrial area of Grand Terrace, with nearby industrial, commercial, and residential uses. The sites are considered approximately the same with respect to this environmental resource. Impacts of the project on public health are insignificant and are discussed in Subsection 8.6, Public Health.

9.4.3.7 Agriculture and Soils

The Tank Farm Property and the Generating Station Property are located in urban, developed areas with no agricultural resources. The sites are on land that was previously developed for industrial uses. Furthermore, the soil conditions are expected to be comparable. No agricultural land will be removed from production and best management practices will be employed at either site to reduce soil erosion during construction. Impacts of the project on agriculture and soils are insignificant and are discussed in Subsection 8.9, Agriculture and Soils.

9.4.3.8 Traffic and Transportation

Both sites are located between two railroad lines. They are bounded by two local streets (Main and Taylor), with Interstate 215 (I-215) located to the north and west of the site. Since the sites all use the same system of roads and highways, the impacts due to construction and operation of a power plant at these sites are considered the same. Impacts of the project on traffic and transportation are insignificant and are discussed in Subsection 8.10, Traffic and Transportation.

9.4.3.9 Visual Resources

Since the parcels are adjacent, the potential for visual resource impacts associated with each of the sites would be similar. Construction of the project at the Project Site (below grade and with a greater setback from Taylor Street) would reduce its visual profile. The major features of the facility would be more prominent and more visible from Taylor Street if the project is constructed on the Generating Station Property.

Development of the project at either location would result in the removal of the existing generating station, which is considered an eyesore. The existing generating station would be replaced with a new modern facility and new landscaping. Impacts of the project on visual resources are considered insignificant and are discussed in Subsection 8.11, Visual Resources.

9.4.3.10 Hazardous Materials Handling

The same quantity of hazardous materials would be stored and used at both sites. Since the Project Site and the Generating Station Property are adjacent, the impacts from hazardous materials handling would be insignificant at both sites. An evaluation of the handling and storage of hazardous materials at the Project Site is discussed in Subsection 8.12, Hazardous Materials.

9.4.3.11 Waste Management

The same quantity of waste will be generated at either site. Also, the environmental impact of waste disposal would not differ between locations. The impacts of the project on waste management are considered insignificant and are discussed in Subsection 8.13, Waste Management.

9.4.3.12 Water Resources

Both sites are adjacent to each other and share similar features from a water resources perspective. Water resource impacts would be insignificant at both locations. A discussion of the potential effects of the project on water resources is contained in Subsection 8.14, Water Resources.

9.4.3.13 Geologic Hazards and Resources

Since the sites are adjacent to each other, design of the plant at either location would incorporate features to withstand potential seismic events. The impacts of the project on geologic hazards are considered insignificant and are discussed in Subsection 8.15, Geologic Hazards and Resources.

9.4.3.14 Paleontological Resources

Both sites are located on previously disturbed industrial property. Based on prior detailed geomorphologic investigations on the Perris Plain, the depth below which paleontologically sensitive sediments (if present) have the potential to be disturbed is considered to be the minimal depth of the Holocene overburden, or about 5 feet (1.5 meters) below original ground surface. With mitigation, the impacts to paleontological resources are considered to be insignificant and are discussed in Subsection 8.16, Paleontological Resources.

9.5 Selection of the Proposed Site

As described above, both sites have very similar environmental effects. The Proposed Site is preferred over the Generating Station Property because the plant can be constructed on the Proposed Site below grade and with greater setback from Taylor Street, reducing the project's visual profile and reducing noise levels predicted at sensitive receptors.

9.6 Process Water Supply

The CEC studied use of water for power plant cooling in its 2003 Integrated Energy Report Proceeding. The proceeding produced the following policy:

> Consistent with the Board Policy[1] and the Warren-Alquist Act, the Energy Commission will approve the use of fresh water for cooling purposes by power plants which it licenses only where alternative water supply sources and alternative technologies are shown to be "environmentally undesirable" or "economically unsound". (2003 IEPR, page 41)

The most relevant and primary underpinning of this section of the 2003 IEPR is State Water Resources Control Board Policy 75-58 (Policy 75-58). In order to comply with the 2003 IEPR Policy, an extensive evaluation of all potential water supply sources that are available now or may be available in the future was conducted (see Figure 9.6-1 for locations of water supply sources considered). The following describes the results of the search for available recycled and other potential non-fresh water sources. The use of potable water from Riverside Highlands Water Company was not considered to be a feasible source of supply for the project.

From a cooling water perspective, two features distinguish the proposed project from a typical power plant facility. First, as a peaking facility, operation will occur only during periods of peak demand and will be intermittent; thus, there may be long periods of time during which the facility will not operate. Second, because the peaking facility is only expected to operate 15 to 30 percent on an annual basis, and the cooling water is used for gas turbine intercooling, the water consumption resulting from the cooling process is significantly less than that required by a combined-cycle plant. Thus, the review of water supply alternatives was conducted with the objective of evaluating sources suitable for supplying a peaking facility with a flexible operating profile, which may include long

[1] This reference is to SWRCB Policy 75-58.

periods of time when the plant does not operate. Consideration of the following key factors was used to assess the alternatives:

- Type/source of water (including recycled or "impaired" water)
- Quantity available (peak and average)
- Water quality (i.e., variability, impact on plant metallurgical requirements, impact on discharge limitations, pre-treatment requirements)
- Water provider's commitments to serve others
- Jurisdictional constraints/ability to serve
- Environmental impacts associated with construction of new infrastructure
- Economic considerations

Our evaluation concluded that there is no existing recycled water program to serve recycled water to industrial users by Riverside Highland Water Company (RHWC), the water purveyor that serves Grand Terrace. Further, while there are a number of initiatives underway to expand recycled water service in the larger Santa Ana region, there are no current plans to serve recycled water to the City of Grand Terrace. Therefore, in order for the project to obtain recycled water, it would have to contract separately with an agency that operates a wastewater treatment plant. An evaluation of all wastewater treatment facilities within the area has concluded that there are no plants with existing facilities to serve the site or plans to construct such facilities.

In addition, alternate sources of impaired water were considered. While a potential source of impaired water has been located, the analysis was unable to confirm the viability of this source at this time. A detailed discussion of alternative water sources evaluated is provided below.

9.6.1 Recycled Water

The Highgrove Project is currently in the service territory of the RHWC. RHWC provides potable and non-potable irrigation water for the City of Grand Terrace and unincorporated areas of the County of Riverside through the operation of 13 operating wells. RHWC does not currently provide recycled water service: wastewater treatment and disposal services for the City of Grand Terrace are currently managed through a joint agreement with the City of Colton. A discussion of RHWC's non-potable water system is provided below in Section 9.6.2.1.

9.6.1.1 RIX Facility—City of San Bernardino and City of Colton

The Rapid Infiltration and Extraction (RIX) plant is an experimental process designed to treat effluent from the Colton and San Bernardino Wastewater Treatment Plants and achieve discharge water quality equivalent to conventional tertiary treated facilities. The treated effluent from the RIX facility is currently discharged into the Santa Ana River. A connection to the Santa Ana Regional Interceptor "brine line" is used during periods of high rainfall when the soil is saturated or if effluent quality requirements are not met.

The RIX treatment process uses in-situ native soil filtration by applying the secondary treated wastewater to a series of shallow earthen basins. As the secondary effluent percolates through the unsaturated soil media to the groundwater table, physical, biological and chemical processes take place within the soil structure. Once the wastewater is filtered through the soil, it is pumped and extracted along with some native groundwater underlying the percolation basins. The extracted water is then channeled to ultraviolet disinfection banks prior to being discharged to the Santa Ana River.

The City of San Bernardino Municipal Water Department (SBMWD) has prepared a Programmatic Environmental Impact Report (PEIR) to assess the impacts of developing a recycled water sales program in which up to 18,000 acre-feet per year of RIX effluent would be sold to potential future water suppliers within the Southern California region. The PEIR did not evaluate the specific equipment required to treat the water to standards necessary for industrial use or pipeline and pumping infrastructure required to deliver treated effluent to any user including the City of Grand Terrace.

AES met with the City of San Bernardino Municipal Water District to discuss their interest in selling a portion of the effluent directly to an industrial user. RIX representatives explained they will sell only to wholesale water suppliers, not directly to industrial users. Therefore, involvement by the local water purveyor in the City of Grand Terrace would be required to serve water from the RIX facility to the Highgrove Project. Further, there are currently no pumping facilities, pipelines, or any pre-treatment facilities in place or planned in the near future to support water sales from the RIX plant. According to the City of San Bernardino, discharged water from the RIX facility is considered Title 22 compliant at the RIX facility but is not chlorinated to allow transport via pipeline to a potential user. The City expressed some concern that the chlorination process might lead to the formation of disinfection byproducts which may necessitate further treatment prior to re-use.

Infrastructure required for the AES Highgrove Project to use water from the RIX facility for process needs would likely include the following: easements/ROW from RIX for a storage tank, pump station, remote control interface, and chlorination facilities all to be located at the RIX facility. A pipeline crossing the Santa Ana River as well as Interstate-215 would have to be constructed to serve the plant. The requirements for these types of crossings present significant technical and economic challenges, as well as potential environmental impacts, and are prohibitively expensive for a peaking facility with such low water demand and intermittent use. In addition, there is a concern with the potential for water quality deterioration in the line to occur as a result of the plant’s intermittent operating profile and stagnant water that would remain in the line during times when the plant is not operating.

In conclusion, water from the RIX facility is considered infeasible as a source of water for the Highgrove Project facility at this time because: 1) presently RIX has not instituted a program to sell recycled water to industrial clients; 2) there are concerns with the potential for deterioration of water quality in any future service line due to the intermittent operating profile of a peaking plant; and 3) there is no infrastructure available or planned to deliver water to the Highgrove Project site 4-5 miles across the Santa Ana River and construction of a line to meet the limited cooling water needs of a peaking project is prohibitively expensive.

9.6.1.2 City of San Bernardino Water Reclamation Plant

The San Bernardino Water Reclamation Plant (WRP), located approximately 5 miles northeast of the Highgrove Project site, treats wastewater to secondary quality and then pipes the discharge to the RIX Facility for tertiary treatment. Recycled water is not marketed from this plant nor are there future plans to do so because: (a) additional treatment processes would have to be installed to comply with the Department of Health Services' requirements, (b) the City of San Bernardino constructed the RIX facility to treat this wastewater rather than invest in additional facilities required to treat this discharge, and (c) the discharge is considered a source of supply water to the RIX facility. Thus the use of effluent from the City of San Bernardino Water Reclamation Plant is not a feasible source of supply for the Highgrove Project.

9.6.1.3 Colton Wastewater Treatment Plant

The City of Colton Wastewater Treatment Plant (WWTP) is located approximately 2.25 miles north of the Highgrove Project site. Similar to the San Bernardino WRP, the Colton WWTP produces disinfected secondary water that is piped to the RIX plant for tertiary treatment. Based upon discussions with the City, there are no current or future plans to either establish a recycled water system from the Colton WWTP or invest in additional treatment facilities to produce recycled water. Therefore, the Colton Wastewater Treatment Plant is not a feasible source of supply for the Highgrove Project.

9.6.1.4 Rialto Wastewater Treatment Plant

The City of Rialto operates a wastewater treatment plant that treats wastewater from Rialto, the nearby City of Bloomington, and a portion of the City of Fontana. The Rialto WWTP is designed to treat approximately 10 mgd of wastewater, and is scheduled to be expanded to treat up to 15 mgd by 2010. The Rialto WWTP currently provides tertiary treatment and discharges most treated wastewater to the Santa Ana River. The plant produces some recycled water that meets Title 22 requirements, and this water is currently used by Caltrans for irrigation and maintenance purposes. Because the Highgrove Project site is outside of the Rialto city limits, this source could have jurisdictional issues in terms of inter-agency requirements. The Rialto WWTP is located approximately 4.5 miles northwest of the Highgrove Project site along local roads. As with the RIX facility, it is considered cost-prohibitive to construct a line of this length with the sole purpose of serving the relatively low water demands of the proposed peaking facility.

9.6.1.5 Riverside Regional Water Quality Control Plant

The Riverside Regional Water Quality Control Plant (WQCP) produces approximately 2 million gallons per day (mgd) of recycled water. This plant is located approximately 7.75 miles southwest of the Highgrove Project site. According to City representatives, the City is planning to serve recycled water to local wetlands, streams, local irrigation users, and a peaking power plant. Because the City is also required to discharge some of its water to the Santa Ana River, these additional demands are likely to fully allocate the WQCP's capacity of available recycled water. In addition, the City has indicated that it would likely elect to use any other potential future recycled water supply for its own use in order to offset imported water costs. Therefore, the Riverside WQCP is not considered a feasible source of supply for the project.

9.6.1.6 Inland Empire Utilities Agency

The IEUA currently provides regional wastewater and recycled water services to seven contracting agencies including the Cities of Chino Hills, Chino, Fontana, Montclair, Ontario, Upland, and the Cucamonga County Water District. The member agencies of the IEUA produce water in excess of the safe yield of the Chino Basin such that the IEUA has an extensive water replenishment plan.

The IEUA has the potential to produce up to 70,000 acre-feet of recycled water from four existing and future regional plants and has an ongoing program of developing recycled water service within its service area. Currently, IEUA is not serving recycled water outside the Chino Basin but the personnel at IEUA have indicated that they would be willing to serve recycled water outside their service area if such supply were sought by the public agencies with responsibility for water service in that outside jurisdiction. While IEUA has indicated that it would sell recycled water sale to agencies within San Bernardino Valley in the future from its Regional Plant Number Four, a pipeline in excess of 10 miles would be needed to deliver the water directly to the Highgrove Project. Such a pipeline is considered environmentally undesirable considering the environmental impacts associated with construction of such a long line through highly-developed areas and uneconomical considering the small volume of cooling water needed for a peaking facility.

9.6.1.7 Eastern Municipal Water District

Eastern Municipal Water District (EMWD) serves southwestern Riverside County. While it has an extensive system to provide recycled water to its customers, demand for recycled water within its service territory is twice the volume it can currently produce (EMWD website). In addition to concerns with providing service to users outside the county, the lack of infrastructure to serve users in the vicinity of the Highgrove Project, and the lack of excess water available to serve the project, recycled water from EMWD is not considered to be a feasible source of cooling water for the Highgrove Project.

9.6.1.8 Western Municipal Water District

Western Municipal Water District (WMWD) serves western Riverside County. Representatives of WMWD were contacted to determine their ability to provide recycled water from its existing system to the Highgrove Project. WMWD indicated that the closest possible source of water was over 20 miles from the Project Site. Further, WMWD can not serve a customer located in San Bernardino County. Therefore, WMWD is not a feasible source of recycled water supply for the Highgrove Project.

9.6.2 Impaired Water Sources

9.6.2.1 Riverside Highland Water Company

The RHWC serves drinking water to the City of Grand Terrace and portions of the unincorporated areas of Riverside County. RHWC presently supplies all of its customer demands from wells it owns and operates.

In addition to providing potable water for drinking from its wells, RHWC also provides irrigation water to agricultural users. RHWC recently expanded its non-potable system to provide irrigation and construction water to a new housing development from its Spring

Street Wells (RN#21 and RN #22). These wells produce water that is considered "impaired" due to high nitrate levels which are in excess of drinking water standards. Nitrate contamination can exist in areas which have experienced heavy agricultural use and/or a prevalence of septic systems.

The Spring Street wells are located approximately 0.5 miles southeast of the site. RHWC has indicated that serving water from these wells to the plant would be considered beneficial to RHWC's long-term water supply and management plan. Extraction of nitrate-laden water from the aquifer is considered an economical means of improving the quality of the aquifer such that it can in the future be acceptable as a source of potable water.

AES is supportive of using impaired water if the use results in an overall regional benefit through cleanup of a contaminated aquifer and assisting in the creation of a regional system that could supply non-potable water to surrounding areas. However, AES has been unable to fully assess the impacts of using this water to date as a source of supply. Potential concerns associated with this source include the impact of high nitrates on plant equipment, constraints on meeting discharge specifications due to poorer water quality and high salts, and reliability of supply. AES will continue to evaluate this option as more data is obtained.

9.6.2.2 United States Environmental Protection Agency's Stringfellow Superfund Site

The Stringfellow Superfund cleanup operations, located near the Redlands area, produce a maximum of 180 gpm of impaired water. Only 90 gpm produced during dry years (Allen Wolfenden of DTSC, pers. com.). Because the Highgrove Project will require larger quantities of water, this is not considered a feasible source of water for the project.

9.6.2.3 Muscoy and Newmark Plumes

Two cleanup sites in the San Bernardino (Bunker Hill) groundwater basin exist that are engaged in cleanup of the Muscoy and Newmark plumes; both are USEPA Superfund sites. Both contaminant plumes are being remediated using a pump-and-treat system that strips volatile organic compounds from the groundwater. This produces water that meets drinking water quality standards. Information obtained from the Santa Ana Watershed Project Authority (SAWPA) indicates that the water from these sites is used as drinking water by local potable water suppliers or is recharged back into the groundwater. Therefore, these sites are unlikely sources of water for the Highgrove Project.

9.6.3 Dry Cooling Technology

Dry cooling technology was evaluated as an alternative to the use of well water for cooling purposes. It is important to note that the use of dry cooling technology will not eliminate the use of water at the site, but will only reduce the amount of water used at the site by approximately 60 percent.

Dry cooling technology would replace use of the cooling tower for cooling the gas turbine intercooler, which is a unique feature of the GE LMS100 gas turbine technology. The intercooling system reduces the temperature of the compressed air in the gas turbine compression cycle, increasing cycle efficiency. The cycle efficiency benefit is reduced when the cooling medium to the intercooler exceeds 90°F, with proportionally greater performance impacts at higher temperatures. Because the cooling medium is the ambient air in dry cooling technologies, the cooling medium temperature is limited by the ambient dry bulb temperature. Therefore, dry cooling technologies will necessarily result in performance impacts at ambient temperatures above 90°F compared to wet cooling technologies for which the cooling medium can be designed to never exceed 90°F.

At 97 F, use of dry cooling would result in a performance loss of approximately 4 MW per turbine with a heat rate impact of approximately 0.5%. Since the primary purpose of a peaking plant is to provide electricity during periods of peak electricity demand which typically occur during times of high ambient temperature, these performance impacts are considered significant. Further, use of dry coolers result in a significantly larger cooling structure with a highly visible profile and would likely generate more noise than a conventional cooling tower.

9.7 Alternative Linear Corridors

Linear facilities required for the Highgrove Project include an electric transmission line, natural gas supply line, potable water line, and sanitary sewer line. The proposed linear facilities are presented in Section 2.0, Project Description. This section compares the alternative routes. The comparison is made among the following categories:

- **Institutional Factors.** Institutional factors are an assessment of the ease of obtaining rights-of-way, public agency support, required permits, etc.
- **Engineering/Construction Feasibility.** Engineering/construction feasibility is an assessment of how the pipeline can be physically placed along a given route.
- **Length of Linear Feature.** Length of the gas line is important because cost and potential environmental impacts are usually functions of length.
- **Environmental Factors.** Environmental factors are an initial assessment of which routes would have the least impact on the environment. Environmental impacts must be either not significant or mitigatable to a less-than-significant level.

9.7.1 Potable Water Supply

Potable water will be provided from the Riverside Highland Water Company's potable water system using an existing water main in Main Street, about 1,300 feet from the project site. Because of its proximity to the site, extension in an existing public right of way, and use of a direct route to the site, no alternative routes were analyzed.

9.7.2 Sanitary Sewer Line

All sanitary wastewater will be discharged to the City of Grand Terrace's sewer system. Grand Terrace's sewer system is served by the City of Colton under a joint powers agreement. Because the sewer line is located adjacent to the project in Taylor Street, no alternative alignments were analyzed.

9.7.3 Electric Transmission Lines

The plant's 115-kV transmission lines will connect to SCE's Highgrove Substation adjacent to the site. Because the substation is adjacent to the site, and the lines will not cross any property owned by third-parties, no alternative routes were considered.

9.7.4 Natural Gas Supply Line

A new 7-mile-long, 12-inch-diameter natural gas line will be needed from the Highgrove Project power plant to SoCalGas' Line 2001. Because of the distance and potential environmental impacts, three routes were considered (see Figure 9.7-1). Construction will primarily be by open trench.

9.7.4.1 Route Descriptions

Proposed Route: The proposed route would exit the west side of the power plant and follow the Riverside Canal southwest to Main Street. It would turn west on Main Street to Iowa Street and head south on Iowa Street, cross over I-215/Highway 60 inside the Iowa Street overcrossing, then continue on to Martin Luther King Boulevard. It would turn east on Martin Luther King Boulevard to Canyon Crest Drive. On Canyon Crest Drive, the line would head south and end at Via Vista Drive where it would connect into Line 2001.

West Route: The west route would exit the west side of the power plant and follow the Riverside Canal southwest to when it intersects with Iowa Street. It would then travel south on Iowa Street to Marlborough Avenue. On Marlborough Avenue the line would head west to Chicago Avenue, head south on Chicago Avenue, cross under I-215/Highway 60, then continue on Chicago Avenue until it turns south on Alessandro Boulevard. At the intersection of Chicago Avenue and Alessandro Boulevard, the line would turn south until it intersects with Line 2001.

East Route: The east route would exit the west side of the power plant and follow the Riverside Canal southwest to Main Street. At Main Street, it would travel east for a block and turn south on Transit Avenue. It would follow Transit Avenue south, take a quick jog east on Center Street, then continue south again on Prospect Avenue, which turns into Northgate Street. At Marlborough Avenue, the line would head west to Rustin Avenue, where it would head south to Spruce Street. At Spruce Street, the line would go east to Watkins Drive, turn southeast on Watkins Drive then south on Canyon Crest Drive. It would follow Canyon Crest Drive, crossing under I-215/Highway 60, until the point where Canyon Crest Drive intersects with Line 2001.

9.7.4.2 Summary Comparison of Proposed and Alternative Gas Line Routes

Table 9.7-1 provides a brief comparison between the Proposed Gas Line route and the alternative routes considered. A discussion of the impacts for each environmental discipline follows.

TABLE 9.7-1
Comparison Summary of the Proposed Gas Line Route and Alternate Routes

Resource	Proposed Route	West Route	East Route
Route Length	7.0 miles	6.8 miles	7.0 miles
Air Quality	Air quality from construction is primarily a function of distance and surface material. Since the distance of the proposed route and the east route are the same and the routes are primarily asphalt, air emissions would be insignificant.	Since distance is less and the route follows the Riverside Canal longer (dirt surface) air emissions would be slightly less. However, the difference would be insignificant.	Same length as the proposed route. Will require the use of HDD to cross I-215/Hwy 60.Therefore, slightly more impacts than the other two alternatives, yet still insignificant.
Biological Resources	Insignificant impact.	No difference.	No difference.
Cultural Resources	Insignificant impact.	No difference.	No difference.
Land Use	No land use entitlements. Insignificant impacts.	No difference.	No difference.
Noise	Construction noise sensitivity would be a function of the surface material, the duration of any trenchless crossings, and proximity to residential areas. This route would not require HDD crossing of I-215	This route would not require HDD crossing of I-215	This route would require HDD crossing of I-215.
Public Health	This is a function of air quality emissions associated with construction equipment and fugitive dust.. Since these emissions are low and intermittent, potential public health impacts are insignificant.	Insignificant difference.	Same as proposed route.
Agriculture and Soils	No direct agricultural land impacts or significant soil erosion impacts.	.No difference	No difference

TABLE 9.7-1
Comparison Summary of the Proposed Gas Line Route and Alternate Routes

Resource	Proposed Route	West Route	East Route
Traffic and Transportation	Function of the number and type of intersections crossed, street traffic, and width of right-of-way. Would travel down major collector street (Iowa Avenue). With mitigation measures the impacts to traffic would be temporary and insignificant.	Would travel down major collector streets (Iowa Avenue and Chicago Avenue) and therefore any potential impacts would similar to those of the proposed route. However with the mitigation measures the impacts to traffic would be temporary and insignificant.	Would travel down smaller roads and require more turns (which slow down construction and therefore may prolong work in the roadway). However, even with the potential delays with the mitigation measures the impacts to traffic would be temporary and insignificant.
Visual Resources	All features would be below ground with the ground surface restored to pre-construction conditions. No difference.	No difference	No difference
Hazardous Material Handling	Potential hazardous material impacts would be from disposal of water used to pressure test line. Longer lines would have more potential for hazardous material impacts. However, since in all cases the test water would be contained, tested and disposed of in accordance with any permit that may be required, there will be no significant impacts to the environment from the use or disposal of hazardous materials during construction of the proposed route.	Since line is shorter, the amount of test water would be slightly less. However, difference is not significant.	The amount of test water would be greater than Proposed Route. However the difference is not significant.
Waste Management	Waste impacts would be from disposal of pressure test water. Same as discussion above for Hazardous Material Handling.	Same as discussion above for Hazardous Material Handling.	Same as discussion above for Hazardous Material Handling.

TABLE 9.7-1
Comparison Summary of the Proposed Gas Line Route and Alternate Routes

Resource	Proposed Route	West Route	East Route
Water Resources	The amount of water used for construction (wetting for soil compaction, dust suppression, and hydrostatic testing) is directly related to the length of the proposed pipeline. The total amount of water used will not result in a significant impact on water supply. In addition implementation of BMPs during construction will ensure no impacts to surface water resources	Slightly less amount of water used. However, no difference in impact evaluation as proposed route.	No difference.
Geologic Hazards	No difference. Lines would be designed for proper seismic code and therefore no significant impacts relating to geologic hazards.	No difference.	No difference.
Paleontological Resources	No impacts to paleontological resources	No difference	No difference

9.7.4.2.1 Air Quality

Both the East and West routes will require the use of horizontal directional drilling (HDD) under I-215/ Highway 60. The use of HDD may offset the small benefit of the West Route being shorter. Because the proposed route will not require HDD to cross the freeway (it will cross in a 24-inch casing that exists in the bridge), it would be preferred over the East Route.

Emissions from construction equipment and fugitive dust will occur during construction at any of the pipeline routes. Generally, air emissions will be slightly less for shorter routes although the differences between these routes are insignificant. Therefore, with mitigation (for example, water to suppress fugitive dust and low emissions construction equipment), the air emissions impacts would be insignificant for construction of all routes.

9.7.4.2.2 Biological Resources

All routes generally follow roads and rights-of-way that are partly disturbed. Significant site-specific natural habitats or resources have not been identified. Each route will cross several streams/waterways. These crossings may be done in the dry season with standard trenching or with trenchless technology (HDD, or jack and bore) during the wet season. The proposed route would require 6 water crossings, the West Route 6 water crossings, and the East Route 5 water crossings. With implementation of mitigation measures, however, none of the routes would create significant impacts to Biological Resources.

9.7.4.2.3 Cultural Resources

A total of 23 historic sites are located within the project Area of Potential Effect (APE), that is, within 50 feet of the plant site and gas pipeline alignments. Of these, four linear historic sites, CA-RIV-4768H/CA-SBR-7168H, CA-RIV-4787H/CA-SBR-7169H, CA-SBR-6847H, and CA-RIV-9774, will be crossed by construction of the gas pipeline along the preferred and alternate routes. Three of these sites, CA-RIV-4768H/CA-SBR-7168H, CA-RIV-4787H/CA-SBR-7169H, and CA-SBR-6847H have been previously determined to be eligible for nomination to the National Register of Historic Places (NRHP) and/or California Register of Historical Resources (CRHR). Impacts to all four of these sites will be completely avoided by directional drilling or jack-and-bore construction for both the preferred and alternative routes.

The rest of the sites are late 19th and early 20th century homes. None of these sites are considered significant, and none will be directly or indirectly impacted by construction of any of the gas pipeline routes, as the pipeline will be located in a buried trench and construction activities will take place entirely within existing disturbed roadway rights-of-way or previously disturbed property. Therefore, all alignments were considered equal for cultural resources.

9.7.4.2.4 Land Use

All routes would follow existing roads, established rights-of-way or be within previously disturbed property. None of the routes would require additional land use entitlements or have significant impacts on land use.

9.7.4.2.5 Noise

Construction noise will be short-term and will be limited to daytime hours with the exception of HDD, which needs to be continuous until the feature is crossed. The only major feature that would require a substantial HDD crossing is the I-216/Highway 60 freeway. With the West Route, an HDD crossing is not required because the freeway crosses over Chicago Avenue. In the proposed route, the gas line would cross the freeway inside a 24-inch casing in the Iowa Bridge. With the East Route, HDD would be needed to cross the freeway. Therefore, there would be a slight preference for the West and Proposed routes over the East Route.

9.7.4.2.6 Public Health

Public health is a function of air quality emissions from construction equipment and fugitive dust. For all routes, the potential public health impacts associated with construction of the pipelines would be insiginificant.

9.7.4.2.7 Agriculture and Soils

None of the routes have direct agricultural impacts. The West Route has a lower proportion of soil units with shallow to medium depths to bedrock or hardpan than other two routes. The East Route has the highest proportion of soil units with shallow to medium depths to bedrock or hardpan; with the Proposed Route falling in-between. Although the routes may encounter different soil units, since the construction and backfill of pipeline segments is fairly continuous, the potential for soil erosion during construction is insignificant for all routes.

9.7.4.2.8 Traffic and Transportation

Since all routes travel primarily down existing roadways, mitigation measures will be required to minimize impacts below the level of significance on all three routes. The West Route and the Proposed Route would travel down major collector streets (Iowa Avenue and Chicago Avenue); whereas, the East Route would be located in smaller roads and require more turns (which may slow down construction). However, in all cases, with the mitigation measures proposed the impacts to traffic will be temporary and insignificant.

9.7.4.2.9 Visual Resources

All features would be below ground with the ground surface restored to pre-construction conditions. Therefore, there would be no visual impacts from any of the routes.

9.7.4.2.10 Hazardous Material Handling

Potential hazardous material impacts would be from disposal of water used to pressure test the gas line. Longer lines would have more potential for hazardous material impacts; therefore, the West Route would have less test water to dispose of. The East and Proposed routes would have about the same amount of test water, but the East Route also would have HDD spoils to dispose of. However, since in all cases the test water would be contained, tested and disposed of in accordance with any permit that may be required, there will be no significant impacts to the environment from the use or disposal of hazardous materials during construction of any of the pipeline routes.

9.7.4.2.11 Waste Management

Waste impacts would be from disposal of pressure test water. See description in Section 9.7.5.2.10 Hazardous Materials Handling

9.7.4.2.12 Water Resources

Water would be required for wetting the soil for recompaction, dust suppression and for pressure testing the gas lines. Therefore, the difference in the amount of water used during construction of the pipeline is directly related to the length of the pipeline route. Since the Proposed Route and East Route are roughly the same length, the amount of water used for construction would be approximately the same for each. The West Route is slightly shorter in length and would likely require a slightly smaller of water for construction. However, in all cases, the amount of water is insignificant. In addition, a Construction Storm Water Pollution Prevention Plan (SWPPP) would be required for construction of any of the routes. Implementation of the Best Management Practices (BMPs) contained in the SWPPP would ensure not impacts from construction of the pipeline on surrounding surface water resources.

9.7.4.2.13 Geologic Hazards

The gas line would be designed to meet stringent seismic safety codes. Therefore, there would be no difference between the routes.

9.7.4.2.14 Paleontological Resources

No previously recorded fossil sites have been documented within the footprint of the gas pipeline routes. No previously recorded fossil sites occur within 4 miles of the project area. The gas lines will be located in streets and established rights-of-way where the soils have been disturbed. In addition, the pipeline will generally be between less than 7 feet deep. Therefore, there is no substantial difference between alternative routes and impacts are insignificant.

9.7.4.3 Conclusion

The differences between the alternatives are generally minor. With any route, the potential impacts from the gas line would be less than significant. If all potential impacts were weighted equally, there would be a slight preference for the West Route because of its shorter length. However, when all potential impacts are considered, the proposed route is preferable because it would cross the freeway though an existing 24-inch casing that is available within the Iowa Street overcrossing, thus eliminating the need for an HDD crossing or additional trenching.

9.8 Alternative Air Pollution Emission Control Analysis

The proposed project is required to comply with the requirements of the South Coast Air Quality Management District's (SCAQMD's) permit regulations requiring the application of the Best Available Control Technology (BACT) to control air emissions. To comply with the SCAQMD's BACT requirements for oxides of nitrogen (NO_x), the project's design includes water injection and selective catalytic reduction (SCR) to control NO_x emissions. The SCR technology proposed for the Highgrove Project uses a 19 percent solution of ammonia to reduce NO_x emissions to elemental nitrogen, water, and a small quantity of unreacted ammonia. However, the use and storage of ammonia—even the less toxic 19 percent aqueous ammonia proposed for the Highgrove Project —represents a potential risk to the public in the event of a catastrophic breach of the storage tank. The offsite consequence analysis (presented in Subsection 8.12, Hazardous Materials Handling) shows that if the Highgrove Project's ammonia storage tank were breached, the resulting ammonia concentrations at publicly accessible areas along the project's eastern and northern fence lines would be below the CEC significance criteria (less than 75 parts per million). Therefore, the potential impacts associated with the project's use and storage of ammonia does not result in a significant public health impact.

Potential NO_x control technologies for combustion gas turbines include the following:

- **Combustion controls**
  - Water/Steam injection
  - Dry combustion controls
  - Dry low-NO_x combustor design
  - Catalytic combustors (e.g., XONON)
- **Post-combustion controls**
  - Selective non-catalytic reduction (SNCR)
  - Non-selective catalytic reduction (NSCR)
  - SCONO$_x$™

The technical feasibility of available NO_x control technologies are presented below.

9.8.1 Combustion Modifications

9.8.1.1 Wet Combustion Controls

Steam or water injection directly into the turbine combustor is one of the most common NO_x control techniques. These wet injection techniques lower the peak flame temperature in the combustor, reducing the formation of thermal NO_x. The injected water or steam exits the turbine as part of the exhaust. Although the lower peak flame temperature has a beneficial effect on NO_x emissions, it can also reduce combustion efficiency and prevent complete combustion. As a result, carbon monoxide (CO) and volatile organic compounds (VOCs) emissions increase as water/steam injection rates increase.

Water and steam injection have been in use on both oil- and gas-fired combustion turbines in all size ranges for many years, so these NO_x control technologies are generally considered technologically feasible and widely available. Since a steam injection combustion system is not yet available for the new LMS100 technology, water injection will be employed instead of steam to reduce NOx emissions. 9.8.1.2 Dry Combustion Controls

Combustion modifications that lower NO_x emissions without wet injection include lean combustion, reduced combustor residence time, lean premixed combustion, and two-stage rich/lean combustion. Lean combustion uses excess air (greater than stoichiometric air-to-fuel ratio) in the combustor primary combustion zone to cool the flame; thereby, reducing the rate of thermal NO_x formation. Reduced combustor residence times are achieved by introducing dilution air between the combustor and the turbine sooner than with standard combustors. The combustion gases are at high temperatures for a shorter time, which also has the effect of reducing the rate of thermal NO_x formation.

The most advanced combination of combustion controls for NO_x is referred to as dry low-NO_x (DLN) combustors. DLN technology uses lean, premixed combustion air to keep peak combustion temperatures low, thus reducing the formation of thermal NO_x. This technology is effective in achieving NO_x emission levels comparable to levels achieved using wet injection without the need for large volumes of purified water and without the increases in CO and VOC emissions that result from wet injection. However, this control technology does not result in lower NO_x emissions than can be achieved using water injection on the LMS-100 combustion turbine.

Catalytic combustors use a catalytic reactor bed mounted within the combustor to burn a very lean fuel-air mixture. This technology has been commercially demonstrated under the trade name XONON in a 1.5-MW natural gas-fired combustion turbine in Santa Clara, California. The technology has not been announced commercially for the engines used at the Highgrove Project. No turbine vendor, other than Kawasaki, has indicated the commercial availability of catalytic combustion systems at the present time; therefore, catalytic combustion controls are not available for this specific project and are not discussed further.

9.8.1.2 Post-combustion Controls

Selective catalytic reduction is a post-combustion technique that controls both thermal and fuel-bound NO_x emissions by reducing NO_x with a reagent (generally ammonia or urea) in the presence of a catalyst to form water and nitrogen. NO_x conversion is sensitive to exhaust gas temperature, and performance can be limited by contaminants in the exhaust gas that may mask the catalyst (sulfur compounds, particulates, heavy metals, and silica). SCR is used in numerous gas turbine installations throughout the United States, almost exclusively in conjunction with other wet or dry NO_x combustion controls. SCR requires the consumption of a reagent (ammonia or urea) and requires periodic catalyst replacement. Estimated levels of NO_x control are in excess of 90 percent.

SNCR involves injection of ammonia or urea with proprietary conditioners into the exhaust gas stream without a catalyst. SNCR technology requires gas temperatures in the range of 1,200 to 2,000°F and is most commonly used in boilers. The exhaust temperatures for the Highgrove Project gas turbines are in the 900°F range, which is well below the minimum SNCR operating temperature. Some method of exhaust gas reheat, such as additional fuel combustion, would be required to achieve exhaust temperatures compatible with SNCR operations, and this requirement makes SNCR technologically infeasible for the Highgrove Project.

NSCR uses a catalyst without injected reagents to reduce NO_x emissions in an exhaust gas stream. NSCR is typically used in automobile exhaust and rich-burn stationary internal combustion engines, and employs a platinum/rhodium catalyst. NSCR is effective only in a stoichiometric or fuel-rich environment where the combustion gas is nearly depleted of oxygen, and this condition does not occur in turbine exhaust where the oxygen concentrations are typically between 14 and 16 percent. For this reason, NSCR is not technologically feasible for the Highgrove Project.

$SCONO_x$™ is a proprietary catalytic oxidation and adsorption technology that uses a single catalyst for the control of NO_x, CO, and VOC emissions. The catalyst is a monolithic design, made from a ceramic substrate with both a proprietary platinum-based oxidation catalyst and a potassium carbonate adsorption coating. The catalyst simultaneously oxidizes NO to NO_2, CO to CO_2, and VOCs to CO_2 and water, while NO_2 is adsorbed onto the catalyst surface where it is chemically converted to and stored as potassium nitrates and nitrites. The $SCONO_x$ potassium carbonate layer has a limited adsorption capability and requires regeneration approximately every 12 to 15 minutes in normal service. Each regeneration cycle requires approximately 3 to 5 minutes. At any point in time, approximately 20 percent of the compartments in a $SCONO_x$ system would be in regeneration mode, and the remaining 80 percent of the compartments would be in oxidation/absorption mode.

There are serious questions about the probability of a successful application of the $SCONO_x$ technology for application to the Highgrove Project, as well as the levels of emission control that can be consistently achieved. Therefore, this technology is not considered feasible for the Highgrove Project.

9.8.2 Alternatives to Ammonia-based Emission Control Systems

Over the last few years, several vendors have designed urea-based systems to generate ammonia onsite; thereby eliminating the need to transport and store ammonia. These units are referred to as Ammonia on Demand (Environmental Elements Corporation) and Urea to Ammonia (EC&C Technologies Incorporated). However, on September 9, 2003, a permanent injunction was issued against Environmental Elements Corporation, barring the company from selling or manufacturing the Ammonia on Demand system due to patent infringement on EC&C Technologies Inc. Therefore, only EC&C's Urea to Ammonia (U2A) system is commercially available.

The U2A system generates ammonia from solid dry urea. The process starts by dissolving urea in deionized water to produce an aqueous urea solution. Steam is used in the U2A reactor to convert the urea solution into a gaseous mixture of ammonia, carbon dioxide, and water for use in the SCR system.

The U2A technology was first commercially installed on AES's Alamitos Generating Station (AGS) Unit 6, in Long Beach California, as a demonstration project. Unit 6 is a utility boiler that had an existing SCR system that used and stored ammonia. The U2A technology replaced the ammonia storage tank. Based on a successful demonstration of the U2A at AGS, AES contracted for the permanent installation of two U2A systems at its Huntington Beach Generating Station (HBGS) in Huntington Beach, California.

Based on the success of these projects, the U2A technology has been selected for a number of utility retrofit projects. However, as stated above, the U2A technology requires steam for the process to work and the Highgrove Project will not be generating steam. Therefore, this technology is not feasible for the Highgrove Project. Furthermore, there is some concern regarding the applicability of the U2A technology for use on a peaking combustion turbine that is not expected to operate continuously.

9.9 Alternative Technologies

Other generation technologies considered for the project are grouped according to the fuel used:

- Oil
- Coal
- Nuclear
- Hydroelectric
- Biomass
- Solar
- Wind

Alternative technologies were evaluated with respect to commercial availability, implementability and cost-effectiveness.

9.9.1 Oil; Coal; Conventional and Supercritical Boiler/Steam Turbine

These technologies are commercially available and could be implemented. However, because of relatively low efficiency, some of these fuels or technologies may emit a greater quantity of air pollutants per kilowatt-hour generated than technologies that are more efficient. Space requirements, water usage, and the cost of generation for these alternative technologies is relatively high compared to simple-cycle/natural gas-fired technologies.

9.9.2 Nuclear

California law prohibits new nuclear plants until the scientific and engineering feasibility of disposal of high-level radioactive waste has been demonstrated. To date, the California Energy Commission (CEC) is unable to make the findings of disposal feasibility required by law for this technology to be viable in California. This technology, therefore, is not implementable.

9.9.3 Water

These technologies use water as "fuel," and include hydroelectric, geothermal, and ocean energy conversion.

9.9.3.1 Hydroelectric

Most of the sites for hydroelectric facilities have already been developed in California, and remaining potential sites face lengthy environmental licensing periods. It is doubtful that this technology could be implemented within 3 to 5 years, and the cost would probably be higher than the cost of a conventional simple-cycle. There are no hydroelectric sites within the project area.

9.9.3.2 Geothermal

Geothermal development is not viable at the project location because suitable thermal resources and strata are not present. Therefore, it was eliminated from consideration.

9.9.4 Biomass

Major biomass fuels include forestry and mill wastes, agricultural field crop and food processing waste, and construction and urban wood wastes. Their cost tends to be high relative to conventional simple-cycle units burning natural gas.

9.9.5 Solar

Most of these technologies collect solar radiation, heat water to create steam, and use the steam to power a steam turbine/generator. Power is only available while the sun shines so the units do not supply power that can be cycled up or down to follow demand. The cost of solar power is relatively high when compared to simple-cycle units burning natural gas.

9.9.6 Wind Generation

In California, the average wind generation capacity factor has been 25 to 30 percent and, like solar, cannot be cycled up and down to track demand. The cost of generation is generally above the cost of simple-cycle units burning natural gas. There are no wind generation sites within the project area. In addition, the Highgrove Project is configured specifically to operate during periods of high electricity demand whereas wind generation facilities rely on the presence of wind to produce electricity at any given time. In addition, wind turbines are significantly smaller in size than thermal power producing technologies; therefore, an extensive amount of real estate would be required to generate an equivalent amount of energy to that produced by the proposed Highgrove Project.

9.10 References

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Mains, Steve. 2006. Watermaster Services, Inc. Personal communication with Tom Parina and Yueh Chuang. March 7 and 9.

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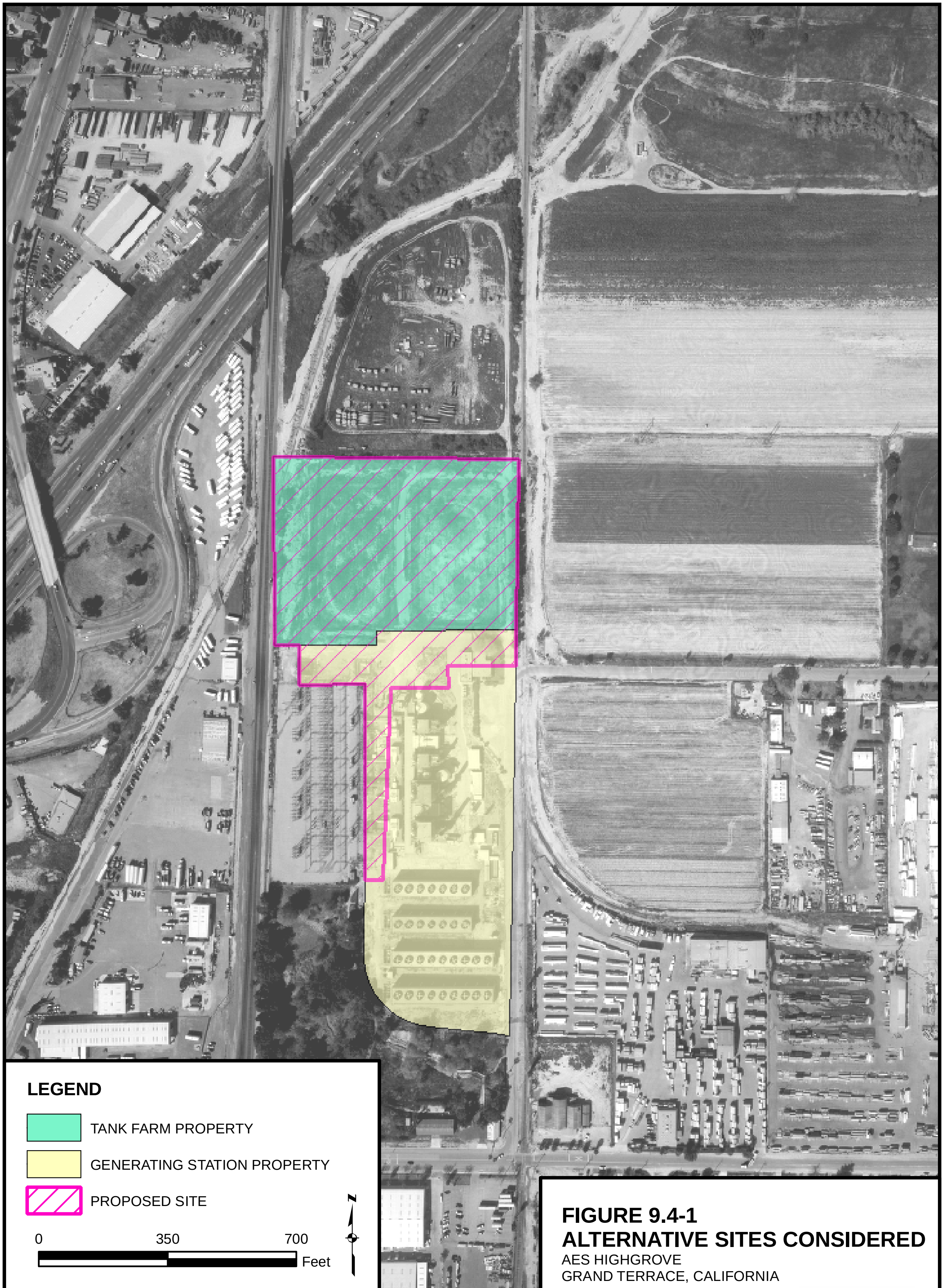

FIGURE 9.4-1
ALTERNATIVE SITES CONSIDERED
AES HIGHGROVE
GRAND TERRACE, CALIFORNIA

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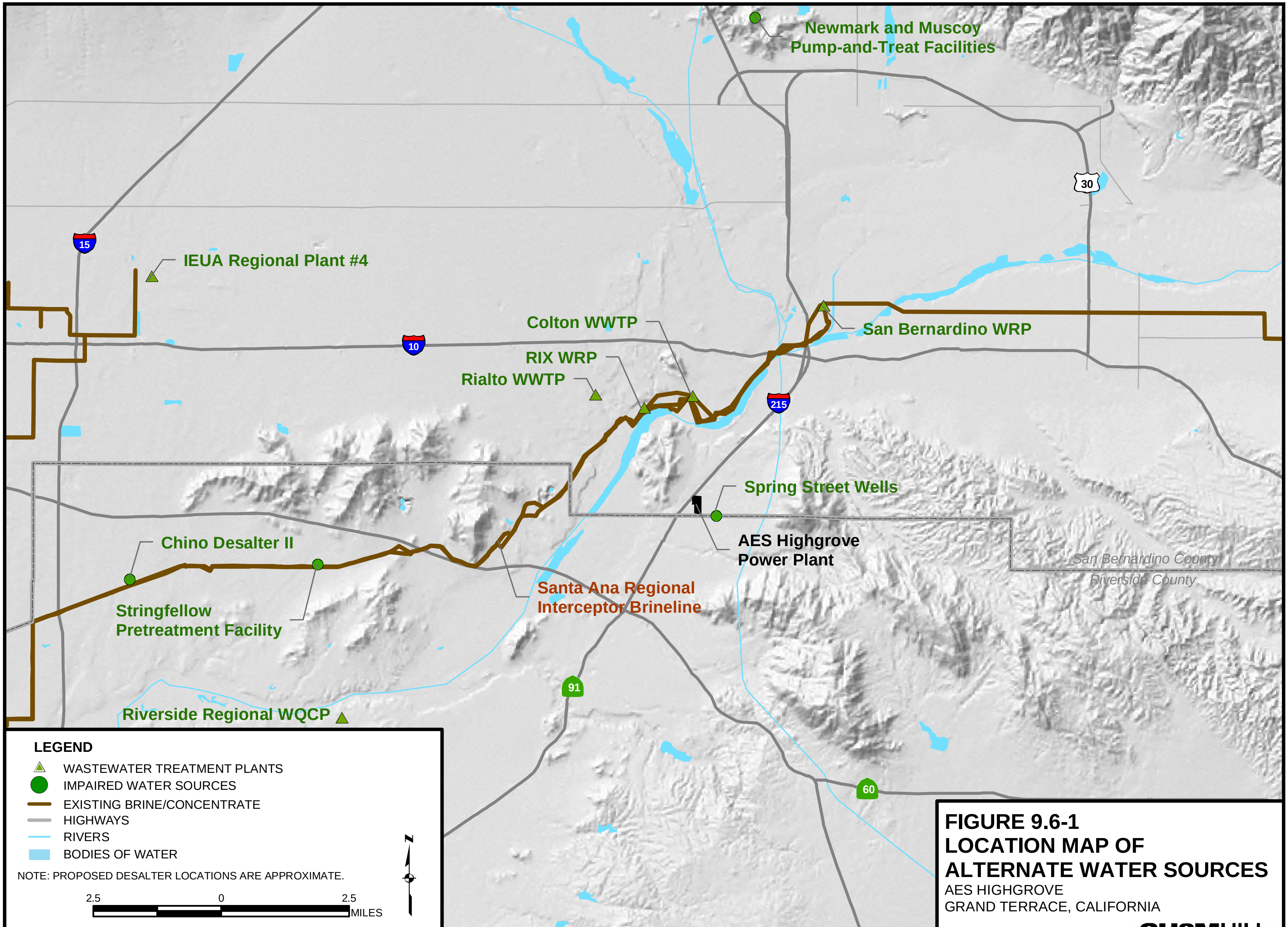

FIGURE 9.6-1
LOCATION MAP OF ALTERNATE WATER SOURCES
AES HIGHGROVE
GRAND TERRACE, CALIFORNIA

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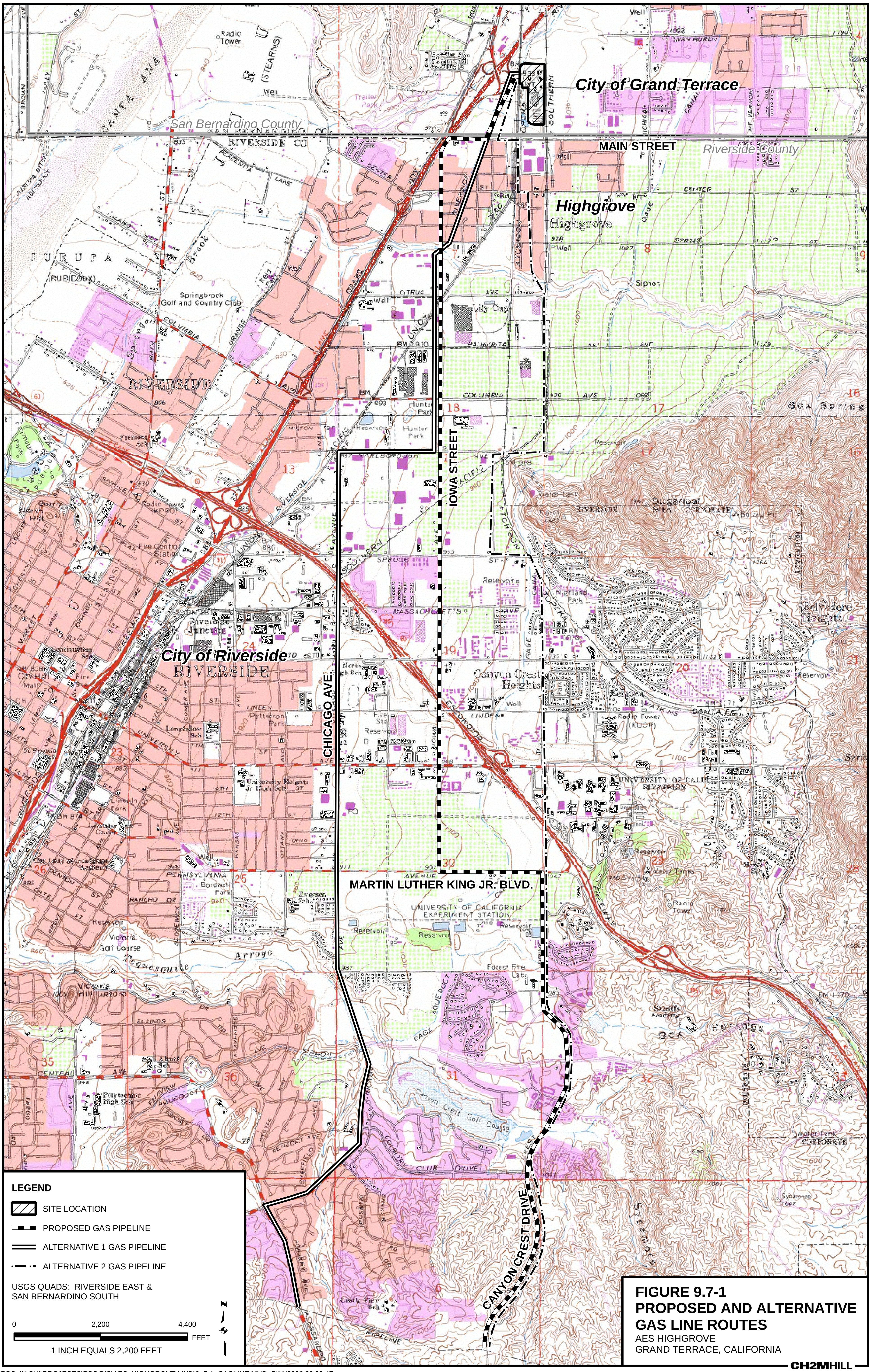

FIGURE 9.7-1
PROPOSED AND ALTERNATIVE
GAS LINE ROUTES
AES HIGHGROVE
GRAND TERRACE, CALIFORNIA

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SECTION 10.0

Engineering

10.1 Introduction

In accordance with California Energy Commission (CEC) regulations, this section, together with the engineering appendixes and Sections 6.0 and 7.0 (Gas Supply and Water Supply, respectively), presents information concerning the design and engineering of the AES Highgrove Project. Subsection 10.2 describes the design of the facility with reference to Section 2.0, Project Description. Subsection 10.3 discusses the reliability of the facility. Subsection 10.4 presents the estimated thermal efficiency of the facility. Subsection 10.5 describes the laws, ordinances, regulations, and standards (LORS) applicable to the engineering of the Highgrove Project. Subsection 10.6 identifies agencies that have jurisdiction and the contact persons within those agencies. Subsection 10.7 lists the permits that will be required.

10.2 Facility Design

A detailed description of the Highgrove Project is provided in Subsection 2.2, Generating Facility Description, Design, and Operation. Design for safety is provided in Subsection 2.3, Facility Safety Design.

Summary descriptions of the design criteria are included in the following appendices:

- Appendix 10A, Civil Engineering Design Criteria
- Appendix 10B, Structural Engineering Design Criteria
- Appendix 10C, Mechanical Engineering Design Criteria
- Appendix 10D, Electrical Engineering Design Criteria
- Appendix 10E, Control Engineering Design Criteria
- Appendix 10F, Chemical Engineering Design Criteria
- Appendix 10G, Geologic and Foundation Design Criteria

Design and engineering information and data for the following systems are found in the following sections of this AFC:

- **Power Generation**—See Subsection 2.2.4, Combustion Turbine Generators (CTGs). Also see Appendix 10C and Subsections 2.2.5 through 2.2.9, which describe plant auxiliaries.
- **Heat Dissipation**—See Subsection 2.2.8, Plant Cooling Systems, and Appendix 10C.
- **Air Emission Control System**—See Subsection 2.2.11, Emission Control and Monitoring, and Subsection 8.1, Air Quality.
- **Waste Disposal System**—See Subsection 2.2.9 and Subsection 8.13, Waste Management.
- **Noise Abatement System**—See Subsection 8.5, Noise.

- **Switchyards/Transformer Systems**—See Subsection 2.2.5, Major Electrical Equipment and Systems; Subsection 2.2.13.2, Grounding; Subsection 2.2.5.1, AC Power-Transmission; Subsection 2.2.14, Interconnect to Electrical Grid; Section 5.0, Electric Transmission; and Appendix 10D.

10.3 Facility Reliability

This subsection discusses the availability of fuel, the expected service life of the plant, and the degree of reliability to be achieved by the Highgrove Project.

10.3.1 Fuel Availability

The Highgrove Project will be connected to Southern California Gas Company's (SoCalGas's) existing high-pressure pipeline (Line 2001) located approximately 7 miles south of the Project Site. There is sufficient capacity in SoCalGas' existing line to deliver the required quantity of gas to the project. It is conceivable that SoCalGas' pipeline could become temporarily inoperable if there is a breach in the pipeline upstream or from other causes such as a compressor failure, resulting in fuel being unavailable at the plant. Because the project has no backup supply of natural gas or other fuel, it would have to be shut down until the situation was corrected.

10.3.2 Plant Availability

Due to the Highgrove Project's predicted high efficiency relative to other units traditionally used for peaking service, it is anticipated that the facility will be called upon to operate at annual capacity factors between 20 and 40 percent. The facility will be designed to operate between approximately 50 to 100 percent of baseload to support dispatch service and automatic generation control in response to customer demands for electricity.

The Highgrove Project will be designed for an operating life of 30 years. Reliability and availability projections are based on this operating life. Operations and maintenance procedures will be consistent with industry standard practices to maintain the useful life of plant components.

The percent of time that the power plant is projected to be operated is defined as the "service factor." The service factor considers the amount of time that a unit is operating and generating power, whether at full or partial load. The projected service factor for the simple-cycle power block, which is based on the percentage of time a unit or plant is operated, differs from the "equivalent availability factor" (EAF), which is based on the projected percentage of energy production capacity achievable at any point in time. The EAF may be defined as a weighted average of the percent of full energy production capacity achievable. The projected EAF for the Highgrove Project is estimated to be in the range of 92 to 98 percent. The EAF differs from the "availability of a unit," which is the percentage of time that a unit is available for operation, whether at full load, partial load, or standby.

There are no known geologic hazards other than the possibility of a major earthquake (see Subsection 8.15, Geologic Hazards and Resources).

The Highgrove Project will be designed to ensure high plant reliability, including the redundancy of critical components (see Subsection 2.4.2, Redundancy of Critical Components).

Deterioration of output capacity and efficiency of the project over time, called performance degradation, is expected to be on the order of 2 to 3 percent over a 3-year period, depending on the amount of time the unit is operated. Cleaning, maintenance, or overhaul will recapture most of the loss. Over the expected 30-year life of the facility, the estimated total, non-recoverable loss in output and efficiency is anticipated to be on the order of 1 to 2 percent.

10.4 Efficiency

The maximum thermal efficiency that can be expected from each individual CTG is approximately 44 to 47 percent on a higher heating value (HHV) basis. This level of efficiency will be achieved when the CTGs are operating at 100 percent of baseload. The Highgrove Project will be designed as a peaking facility to serve load during periods of high demand and is therefore expected to typically operate at no more than a 30 percent annual capacity factor. Because the capacity will be sold through contract and the prices that will be offered for spot market purchases are unknown at this time, the exact mode of operation cannot be prescribed. The maximum annual generation possible from the facility, based on the expected permitted operating limits, is estimated to be between 365 and 750 gigawatt hours (GWh).

10.5 Laws, Ordinances, Regulations, and Standards (LORS)

10.5.1 General LORS

The following LORS are generally applicable to the project.

TABLE 10.5-1
Applicable Laws, Ordinances, Regulations, and Standards

LORS	Location in AFC for Facility Design Compliance	Conformance
Federal		
Occupational Safety and Health Act—29CFR1910 and 29CFR126	Section 10	Meet Requirements
Environmental Protection Agency— 40CFR60, 40CFR75, 40CFR112, 40CFR302, 40CFR423, 40CFR50, 40CFR100, 40CFR260, 40CFR300, and 40CFR400	Section 8 & 10	Meet Requirements
Federal Aviation Administration—Obstruction Marking and Lighting AC No. 70/74601H	Section 6 & 10	Meet Requirements
California		
California Code of Regulations— Title 8, Sections 450 and 750 and Title 24, 1995, Titles 14, 17, 19, 20, 22, 23, and 26.	Section 10	Meet Requirements
California Department of Transportation—Standard Specifications	Section 10	Meet Requirements

TABLE 10.5-1
Applicable Laws, Ordinances, Regulations, and Standards

LORS	Location in AFC for Facility Design Compliance	Conformance
California Occupational Safety and Health Administration—Regulations and Standards	Section 10	Meet Requirement
California Business and Professions Code—Sections 6704, 5730, and 6736	Section 10	Meet Requirements
California Vehicle Code—Section 35780	Section 10	Meet Requirements
California Labor Code—Section 6500	Section 10	Meet Requirements
Local		
City of Grand Terrace—Regulations and Ordinances	Section 10	Meet Requirements
Industrial		
Civil Engineering Design Criteria	Appendix 10A	Meet Design Criteria
Structural Engineering Design Criteria	Appendix 10B	Meet Design Criteria
Mechanical Engineering Design Criteria	Appendix 10C	Meet Design Criteria
Control Engineering Design Criteria	Appendix 10E	Meet Design Criteria
Chemical Engineering Design Criteria	Appendix 10F	Meet Design Criteria
Geologic and Foundation Design Criteria	Appendix 10G	Meet Design Criteria

Codes and standards pertinent to the generating facility are presented in Engineering Appendices 10A through 10F. The applicable local LORS and local agency contacts involved in administration and enforcement are described below.

10.5.2 Local LORS

Zoning for the Highgrove Project site is consistent with the development of a generating facility (see Section 8.4, Land Use).

The Highgrove Project site is located within the city limits of the City of Grand Terrace, in an area zoned for industrial use, and will therefore be subject to applicable regulations of the City of Grand Terrace. The project will conform to all of these LORS, as shown in Table 10.5-1.

10.6 Local Agency Contacts

Table 10.6-1 lists local agency contacts.

TABLE 10.6-1
Local Agency Contacts

Agency	Contact	Title	Telephone
San Bernardino County Fire Department	Carmen Conti	Fire Marshall	(909) 368-8465
City of Grand Terrace	Gary Koontz	Community Development Director	(909) 824-6621
San Bernardino County Fire Department	Doug Snyder	Supervisor, Hazardous Materials Division CUPA Program	(909) 386-8401

10.7 Local Permits Required and Permit Schedule

After the receipt of the approval of project design, several permits will be required. These include a Building Permit, a Grading Permit, and a Certificate of Occupancy. These three permits are described in the City of Grand Terrace's Municipal Ordinance.

8.9 Agriculture and Soils

8.9.1 Introduction

This subsection describes the potential environmental effects on agriculture and soils from the proposed AES Highgrove Project. Potential impacts are assessed for the site construction and operation. Existing onsite groundwater wells will be used to provide process and cooling water. Process water will be disposed of offsite. A potable water line exists within Taylor Street on the eastern boundary of the site and connection to that line would serve as a backup water source. Connections for overhead power transmission lines would require approximately 600 feet of new 115-kV transmission line with the new towers being constructed onsite. Natural gas service would be supplied by a proposed 7-mile natural gas supply pipeline extending from the western side of the power plant site southward into Riverside County.

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

8.9.2 Applicable Laws, Ordinances, Regulations, and Standards

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

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

Jurisdiction	LORS	Purpose	Regulating Agency	Applicability (AFC Section Explaining Conformance)
Federal	Federal Water Pollution Control Act of 1972: Clean Water Act of 1977 (including 1987 amendments).	Regulates stormwater discharge from construction and industrial activities	RWQCB – Central Valley Region under State Water Resources Control Board	Subsections 8.9.2.1 and 8.9.4.2.
Federal	Natural Resources Conservation Service (1983), *National Engineering Handbook*, Sections 2 and 3.	Standards for soil conservation	Natural Resources Conservation Service	Subsections 8.9.2.1 and 8.9.5.
State	Porter-Cologne Water Quality Control Act of 1972; Cal. Water Code 13260-13269: 23 CCR Chapter 9.	Regulates stormwater discharge	California Energy Commission (CEC) and the Central Valley Region under State Water Resources Control Board	Subsections 8.9.2.2 and 8.9.4.2.

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

Jurisdiction	LORS	Purpose	Regulating Agency	Applicability (AFC Section Explaining Conformance)
Local	Zoning Code, Title 18 of the City of Grand Terrace Municipal Code, August 2001.	Describes land use designations and associated municipal codes including Agricultural Overlay Districts	City of Grand Terrace Planning and Community Development	Subsection 8.9.2.3.
Local	City of Grand Terrace Municipal Code	Regulates grading, erosion and sediment control for construction projects within City limits	City of Grand Terrace Planning and Community Development; Building and Safety; Engineering	Subsection 8.9.2.3.
Local	San Bernardino County Development Code, 1990	Describes local policies for agricultural and soil resources in unincorporated portions of county	Planning Commission Board of Supervisors Planning Department Agricultural Commissioner	Subsection 8.9.2.3.
Local	California Land Conservation (Williamson) Act of 1965	Provides financial incentives for conservation of agricultural lands	County Assessor Planning Department Planning Commission Board of Supervisors	Subsection 8.9.2.3.
Local	Riverside County Ordinance 457	Describes requirements for grading and encroachment permits	Building and Safety Department	Subsection 8.9.2.3.
Local	City of Riverside Municipal Code: Title 13 (Streets and Sidewalks); Title 14 (Public Utilities); and Title 17 (Grading)	Describes requirements for encroachment and utility easements, street opening permits, and general and specific permits	Planning Department and Public Works Department	Subsection 8.9.2.3.

8.9.2.1 Federal

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

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

8.9.2.2 State

8.9.2.2.1 California Porter-Cologne Water Quality Control Act The California Water Code requires protection of water quality by appropriate design, sizing, and construction of erosion and sediment controls. The discharge of soil into surface waters resulting from land disturbance may require filing a report of waste discharge (see Water Code Section 13260a).

8.9.2.3 Local

The City of Grand Terrace has established an ordinance for grading, erosion, and sediment control. This ordinance establishes permitting requirements and exemptions for general earthwork operations, sediment transport, and erosion control activities that can cause the discharge of pollutants into stormwater systems or watercourses.

The San Bernardino County General Plan and Development Code include elements describing policies and goals pertaining to agricultural land and conversion issues. These regulations do not apply to the Highgrove Project because the site and linear facilities (except the gas line) are within the incorporated portions of the City of Grand Terrace. Furthermore, the existing site is a former power plant and the proposed offsite linear features would not require any conversion of agricultural lands that would affect properties currently under a Williamson Act agreement.

The Riverside County Building and Safety Department is the lead agency for grading permits and for encroachment permits within Riverside County. Project plans are reviewed within the Building and Safety Department for approval of the grading permit (Yonos, 2005; Chan, 2005). When the projects may affect public rights-of-way, the project plans are forwarded to the Transportation and Land Management Department for review and approval of the encroachment permit (Yonos, 2005; Fletcher, 2005).

The City of Riverside Planning Department and Public Works Departments are the lead agencies for grading, street opening, and encroachment permits within the city. Project plans are reviewed within both of these departments, which are responsible for permit approvals. Decisions about whether a General Permit or Specific Permit are required are based on a review of the plans by the City Surveyor, who determines which city-owned facilities might be impacted (Young, 2005).

8.9.3 Environmental Setting

The Project Site is located within the City of Grand Terrace in an urban area that is zoned for Industrial use [M2] and has been mostly developed for commercial/light industrial uses. The Project Site is located between two rail lines, the Burlington Northern Santa Fe Railway (BNSF) to the west and the Union Pacific Railroad (UPRR) to the east. The property is bounded on the south by the Cage Park Property (a private park owned by AES Highgrove, LLC); on the west by theBNSF RR; on the east by Taylor Street, and on the north by land adjacent to Interstate 215 (I-215). The Project Site is the site of Southern California Edison’s (SCE’s) former Highgrove Generating Station, and consists of approximately 17.7 acres, as further described in Section 2, Project Description. The project will include demolition of the existing generation equipment and construction of the new facility. The new facility will be constructed on a parcel north of the generating equipment that once contained fuel oil tanks used for storage of fuel (“Tank Farm Property”). The 9.8 acre parcel on which the new facility will be constructed will comprise the Tank Farm Property and a small portion of land from the Generating Station Property (upon completion of a parcel split and lot-line adjustment).

An open drainage ditch located near the northern boundary of the Tank Farm Property conveys ephemeral or seasonal water flows from a culvert beneath Taylor Street and discharges to manhole #6, which drains to a tributary of the Santa Ana River.

The Highgrove Generating Station site includes four existing operational water supply wells. SCE owns a 3.1-acre electrical switchyard adjacent to the Project Site to which the new power plant would connect through approximately 600 feet of new 115-kV overhead transmission line. A potable water main is located about 1,300 feet south of the site in Main Street and would serve as a backup water source in addition to supplying domestic water needs and fire suppression. Natural gas will be supplied by an approximately 7-mile-long, 12-inch-diameter natural gas pipeline that would extend from the west side of the plant south into Riverside County. Because the gas line route will following existing roadways or other developed rights-of-way, the proposed project will not affect agricultural lands in the project area.

Agricultural land currently exists just east and northeast of the proposed site and extends approximately 800 feet north of the site to Van Buren Street and approximately 1,500 feet eastward to developed urban areas of Grand Terrace. These agricultural fields, currently used for row crop production, are not zoned as part of the Agricultural Overlay District of San Bernardino County and will be part of a proposed high school development plan for the properties along the east side of Taylor Street across from the Project Site. More information on the proposed high school is provided in Subsection 8.4, Land Use. Soil survey mapping units characterizing the types and distribution of soils within the project area, as shown on Figure 8.9-1, are taken from the Soil Survey of San Bernardino County, Southwestern Part, California (NRCS, 1980) and Soil Survey of Western Riverside Area, California (NRCS, 1971). The electronic shape files for these mapping units were downloaded from the NRCS web site. Detailed soil descriptions were developed from the soil survey publications (NRCS, 1971, 1980) and from the Official Soil Descriptions (OSD) web page (NRCS, 2005). Important farmland designations for the soil mapping units were taken from the Soil Candidate Listings for San Bernardino and Riverside counties from the Farmland Mapping and Monitoring Program (California Department of Conservation [CDC] 2005a, 2005b, 1995).

Data for the affected environment are summarized and presented below:

- Soil types within 1 mile of the site boundaries are identified in Figure 8.9-1. Soil types along the proposed natural gas supply pipeline are identified in Figure 8.9-2.
- Table 8.9-2 summarizes the characteristics of each of the individual soil mapping units identified on Figures 8.9-1 and 8.9-2. The table summarizes depth, texture, drainage, permeability, erosion hazard rating, land capability classification, and fertility as an indicator of its revegetation potential.
- Figures 8.9-3 and 8.9-4 show "Important Farmlands" as defined by the CDC (CDC, 2002) within 1mile of the site boundaries and along the proposed natural gas supply pipeline. The farmland mapping designated specific areas as follows: Prime Farmland; Farmland of Statewide Importance; Unique Farmland, Farmlands of Local Importance, Grazing Land, Urban and Built-Up Land, and Other Land.
- Soil series designated as "Prime Farmland" (or Farmland of Statewide Importance) are also listed in Table 8.9-2.

TABLE 8.9-2
Soil Mapping Unit Descriptions and Characteristics

Map Unit	Description
San Bernardino County Soil Mapping Units (NRCS, 1980)	
GtC	**Greenfield sandy loam – slope class (2 to 9%)** • Prime Farmland • Well drained • Deep soils, gently sloping to moderately sloping • Formed on alluvial fans in moderately coarse textured granitic alluvium • Sandy loam surface, subsoil, and substratum • Permeability is moderately rapid (2.0 to 6.0 inches/hour) • Runoff is medium • Water erosion hazard is moderate if soil is unprotected • Soils are slightly acidic in surface and subsoil and neutral in substratum • Low shrink-swell potential • Capability Class IIe-1 irrigated • Taxonomic class: Coarse-loamy, mixed, thermic Typic Haploxeralfs • Elevation range from 1,200 to 3,400 feet

TABLE 8.9-2
Soil Mapping Unit Descriptions and Characteristics

Map Unit	Description
HaC	**Hanford coarse sandy loam – slope class (2 to 9%)** • Prime Farmland • Well drained • Deep soils, gently sloping to moderately sloping • Formed on alluvial fans in recent granitic alluvium • Sandy loam surface, subsurface, and substratum • Permeability is moderately rapid (2.0 to 6.0 inches/hour) • Runoff is slow • Water erosion hazard is slight if soil is unprotected • Soils are slightly acidic to neutral throughout • Low shrink-swell potential • Capability Class IIe-1 irrigated • Taxonomic class: Coarse-loamy, mixed, non-acid, thermic Typic Xerorthents • Elevation range from 1,000 to 1,800 feet
HaD	**Hanford coarse sandy loam – slope class (9 to 15%)** Similar characteristics as noted above with the following differences: • Farmland of Statewide Importance • Strongly sloping soils on fans and terraces with short side slopes • Runoff is medium • Water erosion hazard is medium to high if soil is unprotected • Capability Class IIIe-1 irrigated
MoC	**Monserate sandy loam – slope class (2 to 9%)** The Project Site is located entirely within this soil mapping unit. • Farmland of Statewide Importance • Moderately well drained • Deep soils, gently sloping to moderately sloping • Formed in granitic alluvium on alluvial fans and terraces • Sandy loam surface and clay subsoil over indurated hardpan underlain by a coarse sandy loam substratum • Permeability is moderately slow in surface and substratum (2.0 to 6.0 inches/hour), slow in subsoil (0.2 to 0.6 inch/hour); very slow in hardpan (<0.06 inch/hour) • Runoff is medium • Water erosion hazard is slight to moderate if soil is unprotected • Soils are slightly acidic in surface, neutral in subsoil, and slightly alkaline below • Low shrink-swell potential in surface and substratum; moderate in subsoil • Capability Class IIIe-8 irrigated • Taxonomic class: Fine loamy, mixed, thermic Typic Durixeralfs • Elevation range from 800 to 1,200 feet

TABLE 8.9-2
Soil Mapping Unit Descriptions and Characteristics

Map Unit	Description
RmC	**Ramona sandy loam - slope class (2 to 9%)** • Prime Farmland • Well drained • Deep soils, gently sloping to moderately sloping • Formed in granitic alluvium on alluvial fans and terraces • Sandy loam surface over loam/clay loam subsoil and sandy loam substratum • Permeability is moderately slow (2.0 to 6.0 inches/hour in surface and substratum and 0.2 to 0.6 inch/hour in subsoil) • Runoff is medium • Water erosion hazard is moderate if soil is unprotected • Soils are slightly acidic in surface and neutral below • Low shrink-swell potential in surface and substratum; moderate in subsoil • Capability Class IIe-1 irrigated • Taxonomic class: Fine loamy, mixed, thermic Typic Haploxeralfs • Elevation range from 1,000 to 3,000 feet
ShF	**Saugus sandy loam – slope class (30 to 50%)** The gas supply pipeline within Grand Terrace passes through this soil mapping unit. • Not listed as an Important Farmland soil • Well drained • Deep soils, steeply sloped • Formed on uplands in weakly consolidated sediment • Sandy loam surface and loam subsurface over weakly consolidated sediment in substratum • Permeability is moderate in surface (2.0 to 6.0 inches/hour) and slow in subsoil (0.6 to 2.0 inches/hour) • Runoff is rapid • Water erosion hazard is moderate to high if soil is unprotected • Soils are neutral in surface and slightly acidic below • Low shrink-swell potential in surface and moderate in subsoil • Capability Class VIIe-1 dryland • Taxonomic class: Coarse-loamy, mixed, non-acid, thermic Typic Xerorthents • Elevation range from 1,200 to 2,500 feet
Vr	**Vista-Rock outcrop complex – slope class (30 to 50%)** Soil properties given below pertain to the Vista series • Not listed as an Important Farmland soil • Well drained • Shallow to moderately deep soils over granitic rock, steeply sloped • Formed on upland foothills in material weathered from granitic rock • Sandy loam surface and subsoil over decomposed granitic subsurface • Permeability is moderately rapid (2.0 to 6.0 inches/hours) • Runoff is medium to rapid • Water erosion hazard is moderate • Slightly acidic surface soils becoming neutral with increasing depth • Low shrink-swell potential • Capability class VIIe-1 dryland • Taxonomic class: Coarse-loamy, mixed, superactive, thermic, Typic Haploxerepts • Elevation range from 1,200 to 3,500 feet

TABLE 8.9-2
Soil Mapping Unit Descriptions and Characteristics

Map Unit	Description
Riverside County Soil Mapping Units (NRCS, 1971)	
Note: All the following soil mapping units are along the proposed natural gas supply pipeline route.	
AoA	**Arlington fine sandy loam, deep – slope class (0 to 2%)** • Prime Farmland • Well drained • Deep soils over a weakly cemented layer • Formed on alluvial fans and terraces in alluvium dominantly from granitic rocks • Fine sandy loam surface and subsurface over weakly cemented alluvium substratum • Permeability is slow • Runoff is slow • Water erosion hazard is slight • Natural fertility is moderate • Slightly acidic to mildly alkaline surface; neutral to mildly alkaline subsoil and substratum • Capability Class IIs-8 irrigated • Taxonomic class: Coarse-loamy, mixed, thermic Haplic Durixeralfs • Elevation range from 500 to 2,000 feet
AoC	**Arlington fine sandy loam, deep – slope class (2 to 8%)** Similar characteristics as noted above with the following differences: • Also a Prime Farmland soil • Runoff is medium • Water erosion hazard is moderate • Capability Class IIIe-1 irrigated
ApB	**Arlington loam, deep, slope class (0 to 5%)** Similar characteristics as noted above with the following differences: • Farmland of Statewide Importance • Loamy surface texture • Runoff is slow to medium • Water erosion hazard is slight to moderate • Capability Class IIIe-8 irrigated
ArB	**Arlington loam, deep, slope class (5 to 15%)** Similar characteristics as noted above with the following differences: • Prime Farmland • Capability Class IIe-1 irrigated • Water erosion hazard is slight to moderate
ArD	**Arlington loam, deep, slope class (5 to 15%)** Similar characteristics as noted above with the following differences: • Not listed as an Important Farmland soil • Runoff is medium • Water erosion hazard is moderate

TABLE 8.9-2
Soil Mapping Unit Descriptions and Characteristics

Map Unit	Description
BuC2	**Buren fine sandy loam, eroded – slope class (2 to 8%)** • Farmland of Statewide Importance • Moderately well drained • Moderately deep soils over a weakly cemented pan layer • Formed on alluvial fans and terraces in alluvium from mixed sources • Sandy loam surface and loam subsurface over weakly cemented loam substratum • Permeability is moderately slow • Runoff is medium • Water erosion hazard is moderate • Natural fertility is moderately high • Slightly acidic to moderately alkaline surface; neutral to moderately alkaline subsoil; moderately alkaline substratum • Capability Class IIIe-8 irrigated • Taxonomic class: Fine-loamy, mixed, thermic Haplic Durixeralfs • Elevation range from 700 to 3,000 feet
BuD2	**Buren fine sandy loam, eroded, slope class (8 to 15%)** Similar characteristics as noted above with the following differences: • Not listed as an Important Farmland soil • Loamy surface texture • Runoff is medium • Water erosion hazard is high • Capability Class IIIe-1 irrigated
FaD2	**Fallbrook sandy loam, eroded, slope class (8 to 15%)** • Farmland of Statewide Importance • Well drained • Shallow soils (approximately 2 feet) over a weathered bedrock • Formed in uplands on soils developed from granodiorite and tonalite • Sandy loam surface and loam to clay loam or sandy clay loam subsurface over weathered granodiorite or tonalite • Permeability is moderate • Runoff is medium • Water erosion hazard is moderate • Natural fertility is moderate • Slightly acidic to neutral surface; neutral subsoil; slightly acidic to neutral substratum • Capability Class IVe-1 irrigated • Taxonomic class: Fine-loamy, mixed, thermic Typic Haploxeralfs • Elevation range from 700 to 3,500 feet
FaE2	**Fallbrook sandy loam, eroded, slope class (15 to 25%)** Similar characteristics as noted above with the following differences: • Not listed as an Important Farmland soil • Runoff is rapid • Water erosion hazard is high

TABLE 8.9-2
Soil Mapping Unit Descriptions and Characteristics

Map Unit	Description
GyC2	**Greenfield sandy loam, eroded – slope class (2 to 8%)** • Prime Farmland • Well drained • Deep soils • Formed on alluvial fans and terraces in alluvium dominantly from granitic materials • Sandy loam surface and subsurface over loam substratum • Permeability is moderate • Runoff is slow to medium • Water erosion hazard is slight to moderate • Natural fertility is high • Neutral surface, slightly acidic to mildly alkaline subsoil • Capability Class IIe-1 irrigated • Taxonomic class: Coarse-loamy, mixed, thermic Typic Haploxeralfs • Elevation range from 600 to 3,500 feet
HcA	**Hanford coarse sandy loam, slope class (0 to 2%)** • Prime Farmland • Well drained and somewhat excessively drained • Deep soils • Formed on alluvial fans in alluvium dominantly from granitic materials • Coarse or fine sandy loam surface over loamy sand subsurface • Permeability is moderately rapid • Runoff is slow • Water erosion hazard is slight • Natural fertility is moderate • Slightly acidic surface and slightly acidic to neutral substratum • Capability Class IIs-4 irrigated • Taxonomic class: Coarse-loamy, mixed, nonacid, thermic Typic Xerorthents • Elevation range from 700 to 2,500 feet
HcC	**Hanford coarse sandy loam – slope class (2 to 8%)** Similar characteristics as noted above with the following differences: • Also a Prime Farmland soil • Runoff is slow to medium • Water erosion hazard is slight to moderate • Capability Class IIe-1 irrigated
HgA	**Hanford fine sandy loam, slope class (0 to 2%)** Similar characteristics as noted above with the following differences: • Also a Prime Farmland soil • Fine sandy loam surface texture • Runoff is slow • Capability Class I-1 irrigated

TABLE 8.9-2
Soil Mapping Unit Descriptions and Characteristics

Map Unit	Description
MaB2	**Madera fine sandy loam, eroded, slope class (2 to 5%)** • Farmland of Statewide Importance • Well drained • Shallow soil over a cemented hardpan layer with cementation decreasing with depth • Formed on dissected terraces and old alluvial fans in alluvium dominantly from granitic materials • Sandy loam surface and clay subsoil over indurated hardpan • Permeability is very slow • Runoff is slow to medium • Water erosion hazard is slight to moderate • Natural fertility is moderate • Slightly acidic to neutral surface over strongly alkaline subsurface • Capability Class IIIe-3 irrigated • Taxonomic class: Fine, montmorillonitic, thermic Typic Durixeralfs • Elevation range from 600 to 1,600 feet
MmB	**Monserate sandy loam – slope class (0 to 5%)** • Farmland of Statewide Importance • Well drained • Shallow soil over a cemented hardpan layer with cementation decreasing with depth • Formed on terraces and old alluvial fans in alluvium dominantly from granitic materials • Sandy loam surface and sandy clay loam subsoil over hardpan underlain by loamy sand substratum • Permeability is moderately slow above the nearly impervious pan layer • Runoff is slow • Water erosion hazard is slight • Natural fertility is moderate • Slightly acidic to neutral surface and subsurface over a mildly alkaline subsoil • Capability Class IIIe-8 irrigated • Taxonomic class: Fine loamy, mixed, thermic Typic Durixeralfs • Elevation range from 700 to 2,500 feet
MoC	**Mottsville loamy sand – slope class (0 to 5%)** • Prime Farmland • Excessively drained • Shallow soil over a cemented hardpan layer with cementation decreasing with depth • Formed on alluvial fans and valley fills in alluvium dominantly from igneous materials • Loamy sand surface and subsoil over loamy coarse sand substratum • Permeability is rapid • Runoff is medium • Water erosion hazard is moderate • Natural fertility is moderate • Slightly acidic to neutral throughout profile • Capability Class IIIs-4 irrigated • Taxonomic class: Sandy, mixed, mesic Torriorthentic Haploxeralfs • Elevation range from 3,500 to 6,000 feet
RsC	**Riverwash** • Not listed as an Important Farmland soil • Slopes of 0 to 8 percent in valley fills and on alluvial fans • Variable drainage • Depth is variable but generally 20 to 60 inches or more • Formed in the beds of the major streams or larger creeks • Sandy, gravelly, or cobbly textures • Slightly acidic to neutral throughout profile • Capability Class VIIIw-4 dryland

TABLE 8.9-2
Soil Mapping Unit Descriptions and Characteristics

Map Unit	Description
TeG	**Terrrace escarpments** • Not listed as an Important Farmland soil • Slopes of 30 to 75 percent • Formed in variable alluvium on terraces or barrancas • Unaltered alluvial outwash from granite, gabbro, metamorphosed sandstone, sandstone, or mica-schists • Variable drainage with soil profiles that are commonly truncated • May have exposed ‘rim-pan’, gravel, cobblestones, stones, or large boulders in variable quantities • Slightly acidic to neutral throughout profile • Capability Class VIIe-1 dryland
VsF2	**Vista coarse sandy loam, eroded, slope class (15 to 35%)** • Not listed as an Important Farmland soil • Well drained • Shallow soil over a cemented hardpan layer with cementation decreasing with depth • Formed on uplands from weathered granite and granodiorite • Coarse sandy loam surface and gravelly coarse sandy loam subsurface over weathered granite or granodiorite • Permeability is moderately rapid • Runoff is medium • Water erosion hazard is moderate • Natural fertility is moderate • Medium to slightly acidic surface and slightly acidic to neutral subsurface over weathered bedrock subsoil • Capability Class VIe-1 dryland • Taxonomic class: Coarse loamy, mixed, thermic Typic Xerochrepts • Elevation range from 1,000 to 3,500 feet

Notes:

Soil characteristics are based on soil mapping provided in the published soil surveys (NRCS, 1971, 1980) and a review of corresponding OSDs.

Soil map units described above are limited to those mapped by the NRCS in the vicinity (i.e., within 1 mile) of the project property boundaries or directly on the proposed natural gas supply pipeline route.

Important Farmland soils taken from the Farmland Mapping and Monitoring Program (FMMP) Soil Candidate Listing for Prime Farmland and Farmland of Statewide Importance for San Bernardino County and for Riverside County (both updated August 23, 2005).

8.9.3.1 Agricultural Land Uses within the Study Area

As previously mentioned, there are some agricultural fields on the east side of Taylor Street across from the Highgrove property that are currently farmed for row crops. These fields extend eastward toward the proposed alignment for Commerce Way beyond which are dense urban (industrial and residential) developments. The fields extend northward from existing industrial properties on the north side of Main Street and are bounded on the north by Van Buren Street. These agricultural fields are not mapped within the San Bernardino County Agricultural Overlay District (City of Grand Terrace, 1988, 2001) but are planned for conversion to a sports complex/playing fields associated with a proposed high school development for the properties along the east side of Taylor Street and the proposed Outdoor Adventure Center.

Other lands associated with agricultural use include orchards that are found along the natural gas supply pipeline route. One orchard property is found in Riverside on the east side of Iowa Avenue between Columbia Avenue and Marlborough Avenue, and runs beside the proposed pipeline route for approximately 600 feet. Other orchards, associated with the University of California at Riverside (UCR), are found along both sides of Iowa Street (extending south about 0.38 mile from Everton Place to Martin Luther King Boulevard), then west about 0.5 mile along Martin Luther King Boulevard, then south about 0.22 mile along Canyon Crest Drive. The 7-mile-long natural gas supply pipeline will follow existing roadways or other rights-of-way. For these reasons, there will be no direct impacts to agricultural lands resulting from the proposed Highgrove Project.

8.9.3.2 Soil Types within the Study Area

Table 8.9-2 provides the physical and chemical properties of the soil mapping units that are found in the vicinity of the proposed Project Site (i.e., within 1 mile of the property boundaries) and along the 7-mile natural gas supply pipeline. As shown on Figure 8.9-1, the entire Project Site is within a single soil mapping unit [**MoC**] Monserate sandy loam (2 to 9 percent slopes).

As shown on Figures 8.9-1 and 8.9-2, the natural gas supply pipeline would extend through to 50 percent slopes) within San Bernardino County. In Riverside County, the 19 soil mapping units traversed by the natural gas pipeline include 5 phases of the Arlington sandy loam/loam series (**AoA, AoC, ApB, ArB,** and **ArC**); 2 phases of the Buren fine sandy loam series (**BuC2** and **BuD2**); 2 phases of the Fallbrook sandy loam series (**FaD2** and **FaE2**); and 3 phases of the Hanford sandy loam series (**HcA, HcC,** and **HgA**), in addition to the following single soil series mapping units:

- [**GyC2**] Greenfield sandy loam, eroded (2 to 8 percent slopes);
- [**MaB2**] Madera fine sandy loam, eroded (2 to 8 percent slopes);
- [**MmB**] Monserate sandy loam (0 to 5 percent slopes);
- [**MoC**] Mottsville loamy sand (0 to 5 percent slopes);
- [**RsC**] Riverwash (0 to 8 percent slopes);
- [**TeG**] Terrace Escarpments (30 to 50 percent slopes); and
- [**VsF2**] Vista coarse sandy loam, eroded (15 to 35 percent slopes)

8.9.3.3 Important Farmlands within the Study Area

The designations of Important Farmlands in the project vicinity and along the 7-mile natural gas supply pipeline are shown on Figures 8.9-3 and 8.9-4 (CDC, 2002) and are also summarized in Table 8.9-2. These maps are derived from information provided from the Farmland Mapping and Monitoring Program administered by the Division of Land Resource Protection in the CDC.

The Important Farmlands Map (Figure 8.9-2) shows that the Project Site and most of the area within the 1-mile buffer is mapped as [D] Urban and Built Up Land. The next largest area within this buffer is the Loma Hills to the west that are mapped as [G] Grazing Land. An area mapped as [X] Other Land is located north and northeast of the Project Site along the southeast side of Interstate 395.

There are 3 types of Important Farmlands mapped within the 1-mile buffer that represent a relatively small proportion of the total area. The largest part of these Important Farmlands occurs to the south in Riverside County and include (in decreasing order): Prime Farmlands; Farmland of Local Importance; and Farmland of Statewide Importance. The agricultural fields just east of the Project Site are mapped as Prime Farmlands and Farmland of Statewide Importance. The other Important Farmlands are located well away from the Project Site west of Interstate 395 in San Bernardino County, or along the southern boundary of the nearby City of Highgrove, in Riverside County.

Along the proposed natural gas supply pipeline route, the majority of land (74 percent) is classified as [D] Urban and Built-up Land. The orchards associated with the UCR campus are classified as [P] Prime Farmland and constitute approximately 13 percent of the total pipeline length. The remaining 13 percent of the pipeline length is comprised of [X] Other Land and is found to the south of the UCR orchards and near the southern end of the proposed pipeline route.

Statistics from inventories of important farmlands in San Bernardino and Riverside counties in 2004 indicate that there were approximately 501,142 total acres of land classified as Prime Farmland, Farmlands of Statewide Importance, Unique Farmlands, or Farmlands of Local Significance (CDC, 2005c. Of these, San Bernardino County had 34,674 acres compared to 466,468 acres for Riverside County. There were net declines in important farmlands from the year 2002 to 2004 with an 8.9 percent decline (3,406 acres) in San Bernardino County and a 2.7 percent decline (12,810 acres) in Riverside County. Increases during the same time period in lands classified as Urban and Built-up Land were larger than the net losses in all agricultural lands (important farmlands plus grazing lands) for both counties during the 2002 to 2004 period.

As previously noted, the proposed project will not result in the conversion of any agricultural land because the pipeline will follow existing roadways and rights-of-way.

8.9.3.4 Soil Loss and Erosion

The factors that have the largest effect on soil loss include steep slopes, lack of vegetation, and erodible soils composed of large proportions of fine sands. The soils found in the Project Site and along the gas supply pipeline features are mostly level or follow roadways that are currently paved or otherwise covered by existing facilities.

In general, the soil types at the Project Site and along most of the gas supply pipeline, as indicated by the NRCS mapping (1971, 1980), have surface soil conditions that are relatively coarse grained (loamy sand, sandy loam, very fine sandy loam, or loam). The soil types and the slopes could have a relatively high potential for water and wind erosion. However, the erosion potential is lowered by the fact that the proposed areas where construction activities will occur is surrounded by other developed properties and buildings that will limit locally-significant ground-level winds that could lead to excessive wind erosion, and steep slopes are generally not present.

The majority of the Project Site will be located in an area that was formerly occupied by large oil tanks. Because the tanks were below grade to provide separate retention basins, the site is about 3 to 6 feet below the surrounding grade and includes a separating berm that will be removed. The southern portion of the site (the area where the former power plant is located) is nearly level due to previous grading associated with the former facility. Site grading will be required to allow the transition from the current ground surface to the lower tank basin grades. It is also expected that the previous site grading and construction activities has likely removed much of the original native surface soils and replaced them with compacted, structural fill to create suitable bearing surfaces for the former electrical facilities. Compacted structural fill would be expected to have lower susceptibility to wind and water erosion than the original native soils. Given the previous site development, nearly level topography, and the planned use of construction best management practices (BMPs), the overall potential for soil loss at the Project Site is slight. Despite the relatively low potential for soil loss with the use of BMPs, estimates for soil losses by water and wind erosion are provided in the following subsections.

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

8.9.3.4.1 Water Erosion The water erosion hazard designations for soils in the project area are listed in Table 8.9-2. The water erosion hazard level ascribed to the Monserate sandy loam soil mapping unit on which the project is located is slight to moderate, indicating that water erosion hazard is likely to be minimal. This erosion hazard rating is associated with the sandy loam surface soils (if they are left exposed) and not the clay subsoil or indurated hardpan that underlies them. The moderate erosion hazard is also likely to be associated with unprotected natural soils with slopes near the high end of the 2 to 9 percent slope class.

The potential soil loss by water erosion for the project was estimated using the Revised Universal Soil Loss Equation (RUSLE2) software downloaded from the web site at [http://fargo.nserl.purdue.edu/rusle2_dataweb/RUSLE2_index.htm]. Soil loss was calculated as tons/acre/year by the program and then multiplied by the site acreage and assumed construction period to get total soil loss in tons for the project duration. The estimated potential soil loss by water erosion is summarized in Table 8.9-3.

The estimate of soil loss by water erosion using the RUSLE2 software is based upon the rainfall erosivity (R-factors) developed from the 2-year, 6-hour point precipitation frequency data (upper limit of the 90 percent confidence interval) from the nearest National Weather Service station to the Project Site[1]. Area-specific soil mapping information was downloaded for both San Bernardino and Riverside counties.

[1] On line at: http://hdsc.nws.noaa.gov/hdsc/pfds/sa/sca_pfds.html

TABLE 8.9-3
Estimated Soil Loss from Water Erosion [WPSAC please reformat for landscape to avoid truncation]

			Estimates Using Revised Universal Soil Loss Equation[a]		
Feature	**Activity**	**Duration (months)[b]**	**Soil Loss (tons) without BMPs**	**Soil Loss (tons) with BMPs**	**Soil Loss (tons/yr) No Project**
Site (18 acres)	Demolition	5	97.5	2.8	0.44
	Grading	2	84.0	1.1	0.17
	Construction	10	195.0	5.6	0.87
Gas Pipeline (4.34 acres)	Grading/excavation	6	2012	25.7	3.25
Total Project (site and pipeline corridor, 22.34 acres)	All activities listed above	14	2389	35.2	4.73

Notes:

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

- The soil mapping unit data specific to each county were downloaded directly from the above-cited on line source.
- Soil loss (R-factors) were estimated using 2-year, 6-hour point precipitation frequency amount for the nearest National Weather Service station to the Project Site [on line at http://hdsc.nws.noaa.gov/hdsc/pfds/sa/sca_pfds.html].
- Estimates of actual soil losses use the RUSLE2 soil loss times the duration and the affected area. The No Project Alternative estimate does not have a specific duration so loss is given as tons/year.

b. The estimate of total project time is derived from the construction schedule shown in Table 8.8-8 and includes a 2-month overlap of the demolition, construction, and grading phases.

Project Assumptions as follows:

- The portion of the site that will be disturbed is 18 acres which includes the Project Site, laydown area, and grading in former tanks storage area.
- The pipeline trench is estimated at 5-foot width over its entire length and the estimate of soil loss along pipeline is integrated over entire 7.16-mile length.

RUSLE2 Assumptions as follows:

100-ft slope length. Estimated soil unit slope is the midpoint of the minimum and maximum of the unit slope class. Rock cover percent estimated to be zero throughout project area.

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

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

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

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

It was assumed that 18 acres of the Project Site would be disturbed for demolition, re-grading, laydown area, and plant construction. For the gas pipeline, it was assumed that a 5-foot-wide trench would be needed for the 12-inch-diameter pipeline over the entire 7-mile length.

For the various activities, the following RUSLE2 assumptions were used:

- A 100-foot slope length was used with the slope estimates as the mid-point between the highest and lowest values of the slope class.
- Rock cover percent was assumed to be zero throughout the project area.
- For **Construction/Demolition** activities, the Management input was considered to be 'Bare ground;' the Contouring input was considered to be 'None, rows up and down hill;' the Diversion/terracing input was 'None;' and the Strips and Barriers input was 'None.'
- For **Grading** activities, the Management input was considered to be 'Bare ground/rough surface;' the Contouring input was considered to be 'None, rows up and down hill;' the Diversion/terracing input was 'None;' and the Strips and Barriers input was 'None.'
- For **Construction with BMPs**, the Management input was considered to be 'Silt fence;' the Contouring input was considered to be 'Perfect, no row grade;' the Diversion/terracing input was 'None;' and the Strips and Barriers input was '2 fences, 1 and the end of the RUSLE2 slope.'
- For the **No Project** soil loss estimate, the Management input was considered to be 'Dense grass, not harvested;' the Contouring input was considered to be 'None, rows up and down hill;' the Diversion/terracing input was 'None;' and the Strips and Barriers input was 'None.'

As shown in Table 8.9-3, if no construction BMPs were employed, the soil losses by water erosion during the project construction phases are estimated to be approximately 376.5 tons at the Project Site and 2,012 tons along the gas supply pipeline. Employing the basic soil erosion control BMP of silt fencing reduces these estimates by 97.5 percent to 9.5 tons at the Project Site and 99 percent to 25.7 tons along the gas supply pipeline, respectively. Additional use of BMPs would be expected to further reduce soil losses by water erosion to near insignificant levels. Some of the BMPs are described in the Draft Construction Stormwater Pollution Prevent Plan, contained in Appendix 8.14xx.

8.9.3.4.2 Wind Erosion The wind erosion hazard rating was not provided for the soil mapping units described in the soil surveys (NRCS 1971, 1980), and so, are not included in Table 8.9-2. The potential for wind erosion of surface material for the project was estimated by calculating the total suspended particulates that could be emitted from active grading activities and the wind erosion of exposed soil. The total site area and grading duration were multiplied by emission factors to estimate the total suspended particulate matter (TSP) 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 Jones and Stokes (2003) and the ratio of fugitive TSP to PM_{10} published by the Bay Area Air Quality Management

District (BAAQMD, 2005). Fugitive dust resulting from the wind erosion of exposed soil was calculated using the emission factor in AP-42 (Table 11.9-4 in BAAQMD, 2005).

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 Management District (SCAQMD) CEQA Handbook (1993) and were used to estimate the effectiveness of the mitigation measures. Table 8.9-4 summarizes the mitigation measures and PM_{10} efficiencies applied to the emission calculations.

TABLE 8.9-4
Mitigation Measures for Fugitive Dust Emissions

Mitigation Measure	PM_{10} Emission Reduction Efficiency	Efficiency Applied
Water active sites at least twice daily	34-68%	50%
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%	50%

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

Table 8.9-5 summarizes the estimated unmitigated and mitigated TSP emissions from the site and along the gas pipeline from grading and the wind erosion of exposed soil. Without mitigation, the maximum predicted erosion of material from the site with implementation of mitigation measures is estimated at 8.64 tons over the course of the project construction cycle. This estimate is reduced to approximately 4.32 tons by implementing basic mitigation measures (i.e., silt fences). These estimates are extremely conservative because they make use of emission rates for a generalized soil rather than for specific soil properties and assume the worse-case for blowing conditions.

TABLE 8.9-5
Estimated Unmitigated and Mitigated TSP Emissions from the Site and Along the Gas Pipeline

Emission Source	Area	Duration (months)	Unmitigated TSP (tons)	Mitigated TSP (tons)
Grading Dust:				
Project Site	18 acres	2	6.60	3.30
Gas pipeline	0.181 acre per 1/24th segment	6	0.20	0.10
Wind Blown Dust:				
Plant Site	6 acres	2	0.38	0.19
Laydown Area	1/2 of 5 acres	8	0.79	0.40
Storage Tank Area	7 acres	3	0.67	0.33

TABLE 8.9-5
Estimated Unmitigated and Mitigated TSP Emissions from the Site and Along the Gas Pipeline

Emission Source	Area	Duration (months)	Unmitigated TSP (tons)	Mitigated TSP (tons)
Estimated Total			**8.64**	**4.32**

Assumptions:

Assumes grading for entire site will be completed in a 2-month period overlapping the end of site demolition and plant construction.

The natural gas pipeline will be trenched within or adjacent to existing paved roadways and that a 5-ft wide trench will be adequate. It is expected that excavation and grading along the pipeline will be done in segments. The wind loss estimates are based upon1/24th segments (each 0.1808 acre) and that one segment will be open at all times during the entire 6-month construction window.

These estimates assume that wind erosion will occur only on exposed portions of the site and that plant site will be covered within 2 months after completion of grading; half of the soil area may be exposed through the 10-month construction window; and the storage tank area will have some temporary or permanent protection within 3 months after completion of grading.

Data Sources:

PM10 Emission Factor Source: Jones and Stokes URBEMIS2002 User's Guide, May 2003.

PM10 to TSP Conversion Factor Source: BAAQMD, 2005;

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

8.9.3.5 Other Significant Soil Characteristics

A significant soil characteristic concerning the proposed project is the potential for expansive clays in subsurface soils in the [**MoC**] Monserate sandy loam soil unit. This soil characteristic can pose a potential problem for construction of foundations and onsite pipelines because of the potential for soil movement due to shrink/swell characteristics. It is likely that unsuitable expansive clay soils have already been removed from the site where previous power generating facilities were constructed; however, there is a potential for these soils to occur in areas of the property that were not previously excavated. Construction problems with expansive clays can be avoided by backfilling those clayey portions of excavations for foundations, footings, or pipeline runs with a suitable, imported fill that has a low capacity for shrink/swell.

While the shrink/swell potential of different soil mapping units was not provided in the Riverside County soil survey (NRCS, 1971), it is expected that expansive subsurface soils could be encountered in any of the soils grouped into the 'Alfisol' soil order, where clayey subsurface layers occur. These would include all the soils listed in Table 8.9-2 for Riverside County except for the [**HcA, HcC,** and **HgA**] Hanford and [**VsF2**] Vista series soils, [**RsC**] Riverwash, and [**TeG**] Terrace escarpments.

Shallow soils over weathered bedrock or cemented hardpan, is another soil characteristic that could increase the difficulty and costs of excavation. This characteristic could be significant for the soil mapping unit underlying the Project Site, [**MoC**] Monserate sandy loam, as well as the following soil mapping units along the proposed gas pipeline route: [**FaD2** and **FaE2**] Fallbrook sandy loam, eroded; [**MaB2**] Madera fine sandy loam, eroded; [**MmB**] Monserate sandy loam; [**MoC**] Mottsville loamy sand; and [**VsF2**] Vista coarse sandy loam, eroded. Excavations within the [**TeG**] Terrace escarpment soil mapping units could also encounter a significant proportion of boulders that could also increase the difficulty and costs of excavation.

The [**MoC**] Monserate sandy loam soil mapping unit is a well drained soil, as are other soil units in the immediate project vicinity. There are no soils mapped in the project area that are classified as somewhat poorly or poorly drained, which could indicate hydric soil conditions. However, the drainage ditch near the northern site boundary and the stormwater detention basin within the park area in the southern portion of the site could be considered as jurisdictional wetlands if they satisfy U.S. Army Corps of Engineers criteria for wetland vegetation, hydrology, and soils or are linked to 'Waters of the U.S.' However, neither of these features will be affected by the project construction.

While the drainage class of the [**RsC**] Riverwash soil mapping unit was listed as variable, it is likely that this area is subject to regular (periodic) flooding and has a high probability of being a jurisdictional 'Waters of the U.S.' A pipeline crossing of this type of soil mapping unit could also require a Section 404 permit and may also be subject to a Streambed Alteration Agreement (Section 1601 permit) from the California Department of Fish and Game (see Subsection 8.2, Biological Resources).

Overall inherent soil fertility in the project area is indicated to be moderate to moderately high. However, in developed urban areas there is a strong possibility that much of the native surface soils have been mixed by grading or replaced with structural fill. For this reason, it is not possible to assess the actual soil fertility in the project area. To assure suitable soil fertility for revegetation success in the project area, it may be necessary to stockpile excavated topsoil; to add soil amendments to low fertility soils; or to import a suitable amended topsoil material.

8.9.4 Potential Environmental Analysis

The following subsections describe the potential environmental effects on agricultural production and soils during the construction and operation phases of the project. The potential for impacts to agricultural and soils resources were evaluated with respect to the criteria described in the Appendix G checklist of CEQA. An impact is considered potentially significant if it would:

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

8.9.4.1 Impacts on Agricultural Soils

Construction of the project will be limited to the previously developed property. With the exception of the gas line and the potable water line, the linears are located adjacent to the site. The natural gas supply pipeline will be almost entirely limited to existing roadways and rights-of-way. As such, the proposed project will not remove any land from agriculture.

8.9.4.2 Construction

Project construction could potentially cause increased compaction of onsite soils in areas needed for facilities such as foundations, footings or onsite pipelines. In addition, the proposed project could result in a slight increase in soil erosion by water or wind. If this impact is not controlled, it could possibly increase the sediment load within surface waters downstream of the construction site or adversely impact local air quality from fugitive dust.

Construction of the Project Site would result in temporary soil compaction in parking, trailer, and laydown areas, and require potential dust control and erosion control measures. Approximately 18 acres on the site would be affected, almost all of which, has been previously impacted by the prior power plant development.

The amount of grading and filling will be determined by the need to smooth the transition from the current ground surface and the lower tank basins. Another factor affecting the grading and filling will be the amount of potentially unsuitable foundation material that might be encountered in the subsoil as it pertains to the site layout. Any excavated soils not reused during construction at the site would be managed or removed to prevent subsequent erosion and sedimentation issues.

Construction along the gas supply pipeline would involve excavation of soil materials from the pipeline trench, temporary stockpiling of these soil materials adjacent or nearby to the trench, compaction of soils placed beneath and above the installed pipeline, and temporary and permanent erosion control. Temporary stockpiling of excavated soil materials will segregate fertile topsoil from the subsoil so it can be reused for revegetation of the completed pipeline ground surface. Unsuitable pipeline bedding materials, such as expansive soils, will be removed and replaced with structural fill with suitable compaction and load bearing properties. Any excavated soils not reused during construction along the pipeline would be managed or removed to prevent subsequent erosion and sedimentation issues. As previously described, the proposed pipeline route will follow existing developed railroad and roadway rights-of-way.

The proposed construction will incorporate BMPs to the extent feasible and will follow appropriate plans to limit soil erosion and sedimentation. Because all plant construction will be limited to the previously developed Highgrove Generating Station site, and because the gas supply pipeline construction will follow existing developed rights-of-way, the proposed construction of the project will have a less than significant impact on soil resources and no impact on agricultural land use.

8.9.4.3 Operation

Project operation would not result in impacts to the soil from erosion or compaction. Routine vehicle traffic during project operation would be limited to existing paved roads. Standard operating activities would not involve the disruption of soil. Impacts to soil from project operations would be less than significant.

8.9.4.4 Effects of Generating Facility Emissions on Soil-Vegetation Systems

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

In the case of the Highgrove Project, the dominant land uses downwind of the project are developed urban areas with limited areas in use for agriculture. There are no serpentine habitats in the project area. The addition of small amounts of nitrogen to agricultural areas would be insignificant within the context of fertilizers, herbicides, and pesticides typically used.

8.9.4.5 Cumulative Effects

The Project Site is located in the City of Grand Terrace in San Bernardino County. The site is current zoned for [M2] Industrial uses and has been previously developed for use for electrical power generation. For this reason, the potential cumulative impact of the project is considered to be less than significant to soil resources and will have no impact on agricultural resources.

8.9.5 Mitigation Measures

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

8.9.5.1 Temporary Erosion Control Measures

Temporary erosion control measures would be implemented before construction begins, and would be evaluated and maintained during construction. These measures typically include revegetation, mulching, physical stabilization, dust suppression, berms, ditches, and sediment barriers. Vegetation is the most efficient form of erosion control because it keeps the soil in place and maintains the landscape over the long-term. Vegetation reduces erosion by absorbing raindrop impact energy and holding soil in place with fibrous roots. It also reduces runoff volume by decreasing erosive velocities and increasing infiltration into the soil.

Disturbed areas would be revegetated with rapidly growing restoration groundcover or landscaping materials as soon as possible after construction, with vehicle traffic kept out of revegetated areas. Physical stabilization, such as temporary erosion control matting, may be required depending on the time of year revegetation is performed. If required, revegetation of non-landscaped areas disturbed by construction of the linear facilities would be accomplished using locally prevalent, fast-growing plant species compatible with adjacent existing plant species.

During construction of the project, dust erosion control measures would be implemented to minimize the wind-blown erosion of soil from the site. Water of a quality equal to or better than either existing surface runoff or irrigation water would be sprayed on the soil in construction areas to control dust.

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

The site construction will occur on previously developed land whose separate portions are relatively level; therefore, it is not considered necessary to place barriers around the entire property boundary. However, some barriers would be placed in locations where offsite drainage could occur to prevent sediment from leaving the site. Barriers and other sedimentation control measures would be used to prevent runoff into storm drains or surface water channels located near the site. If used, straw bales would be properly installed (staked and keyed), then removed or used as mulch after construction. Runoff detention basins, drainage diversions, and other large-scale sediment traps are not considered necessary due to the level topography and surrounding paved areas. Any soil stockpiles would be stabilized and covered if left onsite for long periods of time, including placement of sediment barriers around the base of the stockpile.

8.9.5.2 Permanent Erosion Control Measures

Permanent erosion control measures on the site could include drainage and infiltration systems, detention basins, slope stabilization, and long-term revegetation or landscaping. Revegetation or landscaping would follow from planting for short-term erosion control.

A mitigation monitoring plan will be developed in conjunction with CEC staff to set performance standards and monitor the effectiveness of mitigation measures. This plan will address the timing and methods for monitoring plant establishment, as well as reporting and response requirements.

8.9.6 Permits and Agency Contacts

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

TABLE 8.9-6
Permits and Agency Contacts for Agriculture and Soils

Permit or Approval	Schedule	Agency Contact	Applicability
City of Grand Terrace Grading Permit	At least 90 days prior to construction	John Lampe or Rich Shield, Planners Planning and Community Development City of Grand Terrace 22795 Barton Road Grand Terrace, CA 92324 909-430-2256	Grading of site surface
City of Riverside Encroachment Permit for Utility Easement	Prior to Construction	Dirk Jenkins, Senior Planner Planning Department City Of Riverside 3900 Main Street Riverside, CA 92522 951-826-5371	Utility encroachments in public roadways and rights-of way

TABLE 8.9-6
Permits and Agency Contacts for Agriculture and Soils

Permit or Approval	Schedule	Agency Contact	Applicability
City of Riverside Street Opening Permit and General or Specific Permit	Prior to Construction	Don Young, Plan Check Engineer Public Works Department City Of Riverside 3900 Main Street Riverside, CA 92522 951-826-5341	Excavations within roadways and utility encroachments across existing City facilities (e.g., water or utility)
Riverside County Grading Plan Approval and Permit	3 months prior to construction	Loi Chan, Grading Plan Reviewer Riverside County Building and Safety Department 4080 Lemon Street, 9th Floor Riverside, CA 92501 951-955-9622	Grading for projects in unincorporated parts of Riverside County
Riverside County Plan review and encroachment permit	3 months prior to construction	Eric Fletcher, Riverside County Transportation and Land Management Department 4080 Lemon Street, 9th Floor Riverside, CA 92501 951-955-6761	Grading or trenching in a public rights-of- way in unincorporated parts of Riverside County
Construction Activity, Stormwater and NPDES Permit	Prior to construction	Michelle Beckwith Santa Ana Regional Water Quality Control Board 3737 Main Street Suite 500 Riverside, CA 92501-3339 951-320-6396	Regulation of stormwater discharge from site and linear facilities during construction

8.9.7 References

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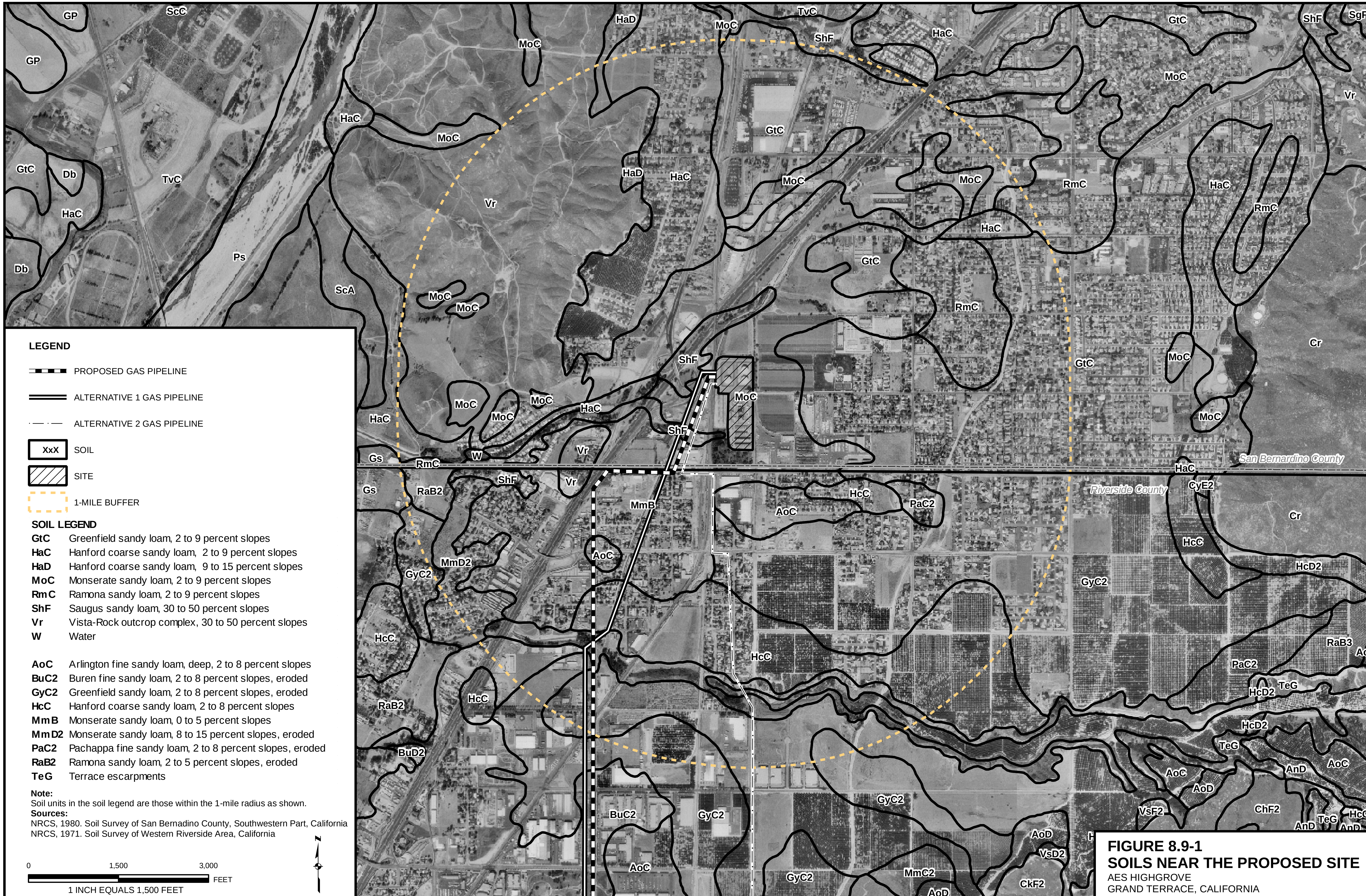
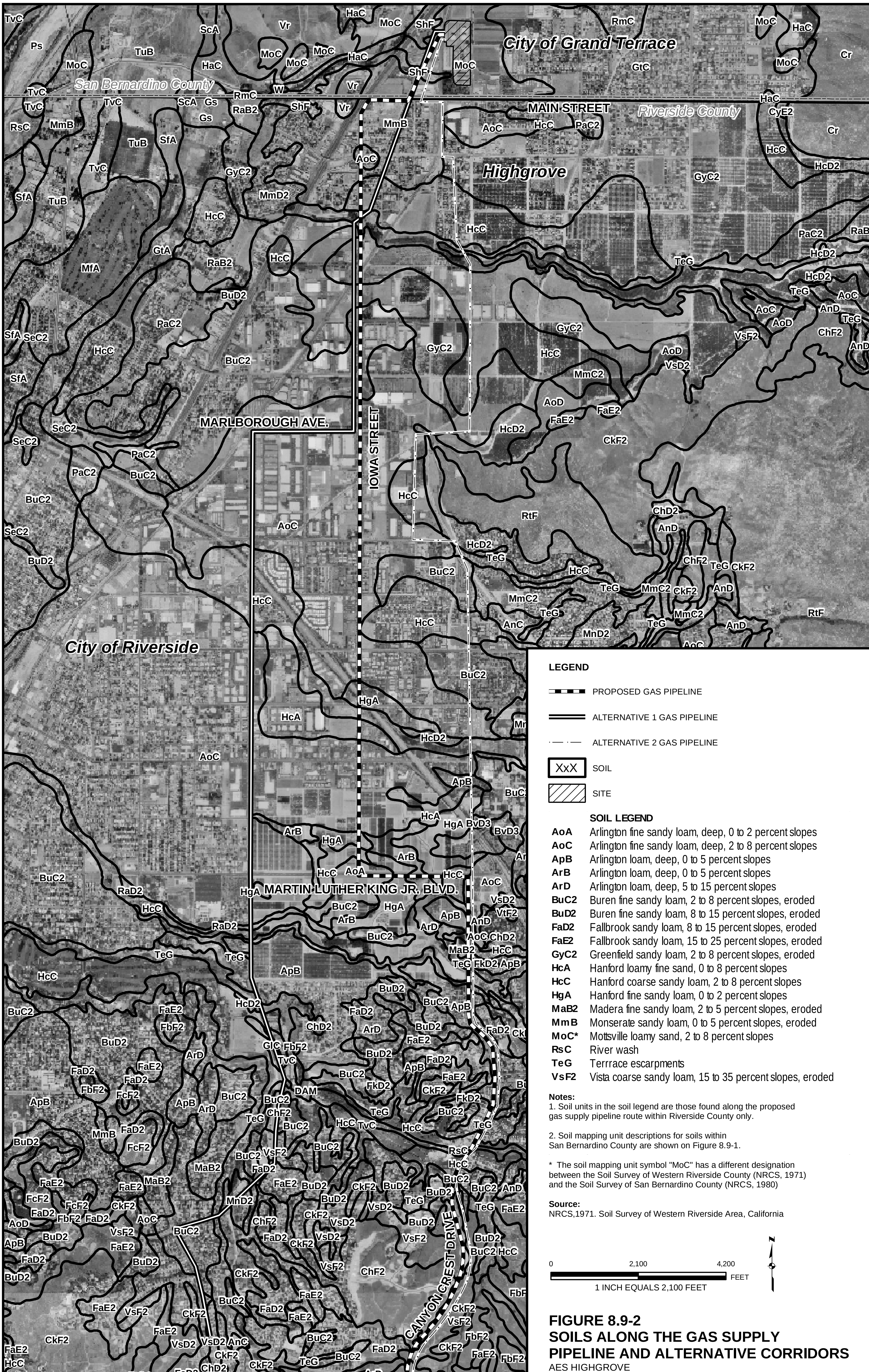


FIGURE 8.9-1
SOILS NEAR THE PROPOSED SITE
AES HIGHGROVE
GRAND TERRACE, CALIFORNIA

RDD \\LOKI\PROJECTS\RDDGIS\AES_HIGHGROVE\MXD\8_9-1_SOIL.MXD 4/7/2006 12:57:07



LEGEND

PROPOSED GAS PIPELINE

ALTERNATIVE 1 GAS PIPELINE

ALTERNATIVE 2 GAS PIPELINE

XxX SOIL

SITE

SOIL LEGEND

AoA	Arlington fine sandy loam, deep, 0 to 2 percent slopes
AoC	Arlington fine sandy loam, deep, 2 to 8 percent slopes
ApB	Arlington loam, deep, 0 to 5 percent slopes
ArB	Arlington loam, deep, 0 to 5 percent slopes
ArD	Arlington loam, deep, 5 to 15 percent slopes
BuC2	Buren fine sandy loam, 2 to 8 percent slopes, eroded
BuD2	Buren fine sandy loam, 8 to 15 percent slopes, eroded
FaD2	Fallbrook sandy loam, 8 to 15 percent slopes, eroded
FaE2	Fallbrook sandy loam, 15 to 25 percent slopes, eroded
GyC2	Greenfield sandy loam, 2 to 8 percent slopes, eroded
HcA	Hanford loamy fine sand, 0 to 8 percent slopes
HcC	Hanford coarse sandy loam, 2 to 8 percent slopes
HgA	Hanford fine sandy loam, 0 to 2 percent slopes
MaB2	Madera fine sandy loam, 2 to 5 percent slopes, eroded
MmB	Monserate sandy loam, 0 to 5 percent slopes, eroded
MoC*	Mottsville loamy sand, 2 to 8 percent slopes
RsC	River wash
TeG	Terrrace escarpments
VsF2	Vista coarse sandy loam, 15 to 35 percent slopes, eroded

Notes:

1. Soil units in the soil legend are those found along the proposed gas supply pipeline route within Riverside County only.

2. Soil mapping unit descriptions for soils within San Bernardino County are shown on Figure 8.9-1.

* The soil mapping unit symbol "MoC" has a different designation between the Soil Survey of Western Riverside County (NRCS, 1971) and the Soil Survey of San Bernardino County (NRCS, 1980)

Source:
NRCS,1971. Soil Survey of Western Riverside Area, California

0 2,100 4,200 FEET

1 INCH EQUALS 2,100 FEET

N

FIGURE 8.9-2
SOILS ALONG THE GAS SUPPLY PIPELINE AND ALTERNATIVE CORRIDORS
AES HIGHGROVE
GRAND TERRACE, CALIFORNIA

CH2MHILL

RDD \\LOKI\PROJECTS\RDDGIS\AES_HIGHGROVE\MXD\8_9-2_SOIL_GASLINE.MXD 5/2/2006 14:53:33

FIGURE 8.9-3
IMPORTANT FARMLANDS NEAR THE PROPOSED SITE
AES HIGHGROVE
GRAND TERRACE, CALIFORNIA

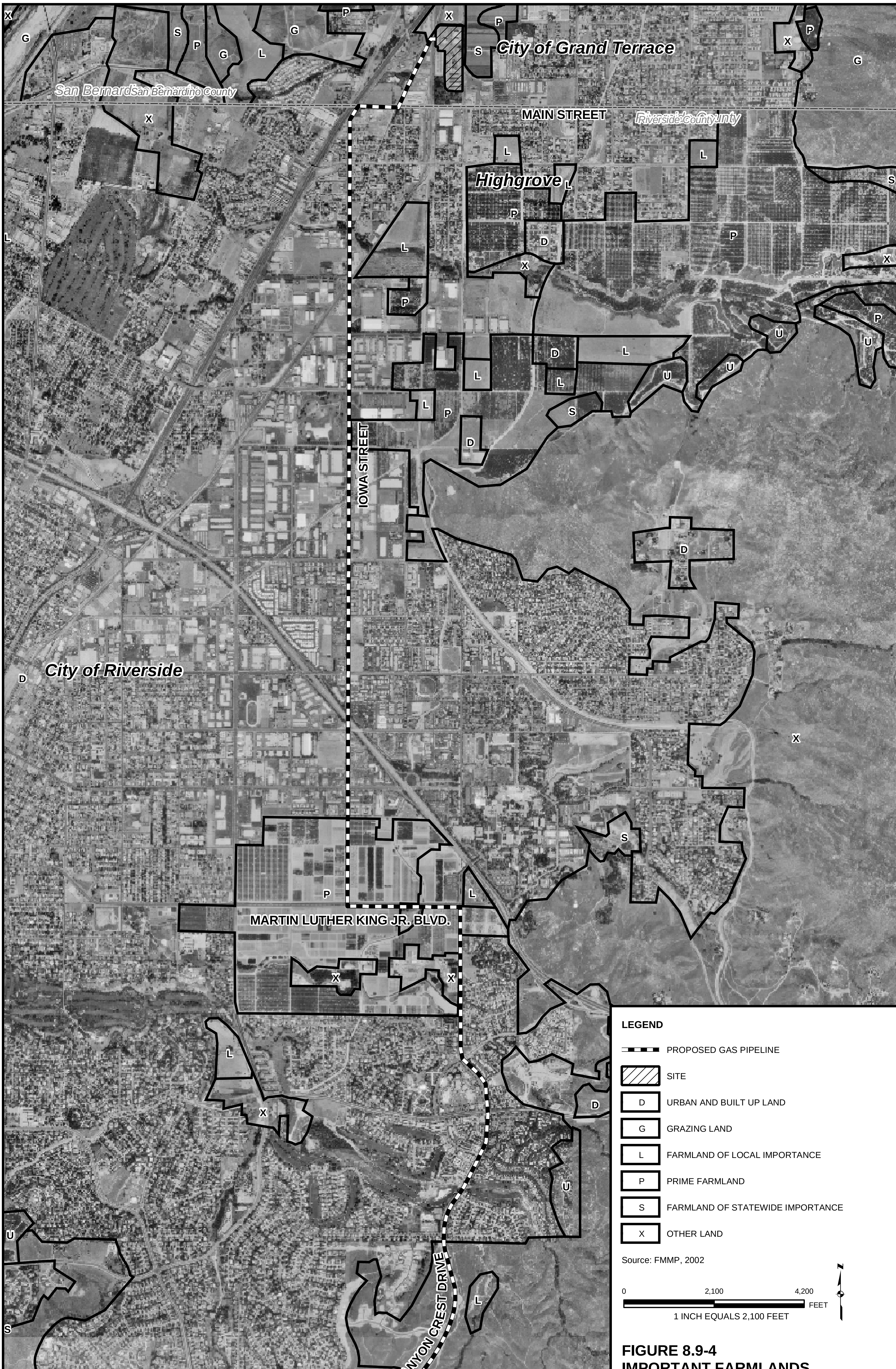


FIGURE 8.9-4
IMPORTANT FARMLANDS ALONG THE GAS SUPPLY PIPELINE
AES HIGHGROVE
GRAND TERRACE, CALIFORNIA

8.10 Traffic and Transportation

8.10.1 Introduction

This subsection assesses transportation impacts associated with the construction of the proposed project. The analysis primarily quantifies impacts on roadways expected during demolition, construction and operation of the proposed project. The main impacts are the addition of approximately 246 daily vehicles (including construction workers and trucks) and lane/road closures due to gas pipeline construction. Additional transportation factors examined in this subsection include pedestrian and bicyclist impacts, safety, goods movement, and any potential impacts to air, rail, and waterborne transportation networks.

Descriptions of existing transportation facilities in proximity of the proposed project and an analysis of the proposed project's potential impacts on the existing transportation network are provided. The roadway analysis examines the worst-case scenario during construction activities (which would occur for a 2-month duration) to the local study area roadways. The operation of the proposed project would include relatively few permanent employees (less than 15 employees, or 30 daily trips). Once these 30 trips are distributed on the street network, traffic impacts would be immeasurable due to the relatively low volume of traffic generated.

Information sources include the General Plan of the County of Riverside, the General Plan of the City of Riverside, the General Plan of the City of Grand Terrace, the Outdoor Adventures Center (OAC) Final Environmental Impact Report, the California Department of Transportation (Caltrans), and field observations. This subsection also discusses applicable laws, ordinances, regulations, and standards (LORS) relevant to the potential transportation impacts caused by the proposed project.

8.10.2 Laws, Ordinances, Regulations, and Standards

LORS related to traffic and transportation are summarized in the following subsections.

8.10.2.1 Federal

- Title 49, Code of Federal Regulations (CFR), Sections 171-177 (49 CFR 171-177), governs the transportation of hazardous materials, the types of materials defined as hazardous, and the marking of the transportation vehicles.
- 49 CFR 350-399, and Appendices A-G, Federal Motor Carrier Safety Regulations, address safety considerations for the transport of goods, materials, and substances over public highways.
- 49 CFR 397.9, the Hazardous Materials Transportation Act of 1974, directs the U.S. Department of Transportation to establish criteria and regulations for the safe transportation of hazardous materials.

8.10.2.2 State

State laws that apply to this project include the following sections of the California Vehicle Code (CVC), unless specified otherwise:

- California Street and Highways Code (S&HC), Sections 660, 670, 1450, 1460 et seq., 1470, and 1480, regulates right-of-way encroachment and granting of permits for encroachments on state and county roads.
- Sections 13369, 15275, and 15278 address the licensing of drivers and classifications of licenses required to operate particular types of vehicles. In addition, certificates permitting the operation of vehicles transporting hazardous materials are addressed.
- Sections 25160 et seq. address the safe transport of hazardous materials.
- Sections 2500-2505 authorize the issuance of licenses by the Commissioner of the California Highway Patrol (CHP) to transport hazardous materials, including explosives.
- Sections 31303-31309 regulate the highway transportation of hazardous materials, routes used, and restrictions. CVC Section 31303 requires hazardous materials to be transported on state or interstate highways that offer the shortest overall transit time possible.
- Sections 31600-31620 regulate the transportation of explosive materials.
- Sections 32000-32053 regulate the licensing of carriers of hazardous materials and include noticing requirements.
- Sections 32100-32109 establish special requirements for the transportation of substances presenting inhalation hazards and poisonous gases. CVC Section 32105 requires shippers of inhalation or explosive materials to contact the CHP and apply for a Hazardous Material Transportation License. Upon receiving this license, the shipper will obtain a handbook specifying approved routes.
- Sections 34000-34121 establish special requirements for transporting flammable and combustible liquids over public roads and highways.
- Sections 34500, 34501, 34501.2, 34501.3, 34501.4, 34501.10, 34505.5-7, 34506, 34507.5, and 34510-11 regulate the safe operation of vehicles, including those used to transport hazardous materials.
- S&HC, Sections 117 and 660-72, and CVC, Sections 35780 et seq., require permits to transport oversized loads on county roads. California S&HC Sections 117 and 660 to 711 requires permits for any construction, maintenance, or repair involving encroachment on state highway rights-of-way. CVC Section 35780 requires approval for a permit to transport oversized or excessive loads over state highways
- California State Planning Law, Government Code Section 65302, requires each city and county to adopt a General Plan, consisting of seven mandatory elements, to guide its physical development. Section 65302(b) requires that a circulation element be one of the mandatory elements.

- All construction in the public right-of-way will need to comply with the Manual of Traffic Controls for Construction and Maintenance of Work Zones (Caltrans, 1996).
- Caltrans weight and load limitations for state highways apply to all state and local roadways. The weight and load limitations are specified in the CVC Sections 35550 to 35559. The following provisions, from the CVC, apply to all roadways and are therefore applicable to this project.

  General Provisions:

  - The gross weight imposed upon the highway by the wheels on any axle of a vehicle shall not exceed 20,000 pounds and the gross weight upon any one wheel, or wheels, supporting one end of an axle, and resting upon the roadway, shall not exceed 10,500 pounds.
  - The maximum wheel load is the lesser of the following: (a) the load limit established by the tire manufacturer, or (b) a load of 620 pounds per lateral inch of tire width, as determined by the manufacturer's rated tire width.

  Vehicles with Trailers or Semi-trailers:

  - The gross weight imposed upon the highway by the wheels on any one axle of a vehicle shall not exceed 18,000 pounds and the gross weight upon any one wheel, or wheels, supporting one end of an axle and resting upon the roadway, shall not exceed 9,500 pounds, except that the gross weight imposed upon the highway by the wheels on any front steering axle of a motor vehicle shall not exceed 12,500 pounds.

8.10.2.3 Local

The transportation elements of local plans that are applicable to the project are policies of the City of Grand Terrace, County of San Bernardino, County of Riverside, and City of Riverside.

8.10.2.3.1 City of Grand Terrace Objectives

1. Plan, provide, and maintain an integrated vehicular circulation system to accommodate projected local and regional needs.
2. Develop a vehicular circulation system consistent with accepted standards of transportation engineering safety, with sensitivity to adjoining land uses.
3. Establish, develop, and promote systems and amenities for alternative travel modes including bicycle, pedestrians and transit.
4. Take proactive measures to ensure that the City's residential neighborhoods are not adversely affected by excessive traffic and are more livable and pedestrian friendly.
5. The City will ensure that the Master Plan of Streets and Highways Circulation System is completed by utilization of a variety of means to fund the construction of these improvements which are described below. In addition, the City will pursue alternative means to fund ongoing maintenance and safety enhancement of the circulation infrastructure.

8.10.2.3.2 County of San Bernardino Policies

The General Plan for the County of San Bernardino, transportation and circulation element sets forth policies that are applicable to the project. Specific, relevant policies set forth in the General Plan are as follows:

CI 4.3 Strive to achieve Level of Service "C" on all County roadways. Through the review of new development proposals, ensure that traffic impacts, including cumulative impacts, are properly addressed and mitigated to maintain Level of Service "C" on the County's circulation system.

CI 5.2 Protect and increase the designed roadway capacity of all vehicular thoroughfares and highways.

CI 6.1 Require safe and efficient pedestrian and bicycle facilities in residential, commercial, industrial and institutional developments to facilitate access to public and private facilities and to reduce vehicular trips. Install bicycle lanes and sidewalks on existing and future roadways, where appropriate and as funding is available

CI 8.6 Ensure that future developments have no less than two points of access for emergency evacuation and for emergency vehicles, in the event of wildland fires and other natural disasters.

8.10.2.3.3 County of Riverside Policies

County of Riverside, transportation and circulation element sets forth policies that are applicable to the project. They are as follows:

As the County continues to grow, transportation demand management and systems management will be necessary to preserve and increase available roadway "capacity." Level of Service (LOS) standards are used to assess the performance of a street or highway system and the capacity of a roadway.

An important goal when planning the transportation system is to maintain acceptable levels of service along the federal and state highways and the local roadway network. To accomplish this, the Caltrans, Riverside County Transportation Commission, the County, and local agencies adopt minimum levels of service to determine future infrastructure needs. Riverside County must provide and maintain a highway system with adequate capacity and acceptable levels of service to accommodate projected travel demands associated with the build out of the Land Use Element. This can be accomplished by establishing minimum service levels for the designated street and conventional state highway system. Strategies that result in improvements to the transportation system, coupled with local job creation, will allow County residents to have access to a wide range of job opportunities within reasonable commute times.

Specific policies set forth in the County of Riverside General Plan are as follows:

C 2.1 Maintain the following countywide target Levels of Service:

> LOS "C" along all County maintained roads and conventional state highways. As an exception, LOS "D" may be allowed in Community Development areas, only at intersections of any combination of Secondary Highways, Major Highways,

Arterials, Urban Arterials, Expressways, conventional state highways or freeway ramp intersections.

LOS "E" may be allowed in designated community centers to the extent that it would support transit-oriented development and walkable communities.

C 2.2 Apply level of service standards to new development via a program establishing traffic study guidelines to evaluate traffic impacts and identify appropriate mitigation measures for new development.

C 2.3 Traffic studies prepared for development entitlements (tracts, plot plans, public use permits, conditional use permits, etc.) Shall identify project related traffic impacts and determine the "significance" of such impacts in compliance with CEQA.

C 2.4 The direct project related traffic impacts of new development proposals shall be mitigated via conditions of approval requiring the construction of any improvements identified as necessary to meet level of service standards.

C 2.5 The cumulative and indirect traffic impacts of development may be mitigated through the payment of various impact mitigation fees such as County Development Impact Fees, Road and Bridge Benefit District Fees, and Transportation Uniform Mitigation Fees to the extent that these programs provide funding for the improvement of facilities impacted by development.

C 2.6 Accelerate the construction of transportation infrastructure in the Highway 79 Policy Area. The County shall require that all new development projects demonstrate adequate transportation infrastructure capacity to accommodate the added traffic growth. The County shall coordinate with cities adjacent to the policy area to accelerate the usable revenue flow of existing funding programs, thus assuring that transportation infrastructure is in place when needed.

C 2.7 Establish a program to reduce overall trip generation in the Highway 79 Policy Area by creating a trip cap on residential development within this policy area which would result in a net reduction in overall trip generation of 70,000 vehicle trip per day from that which would be anticipated from the General Plan Land Use designations as currently recommended. The policy would generally require all new residential developments proposals within the Highway 79 Policy Area to reduce trip generation proportionally, and require that residential projects demonstrate adequate transportation infrastructure capacity to accommodate the added growth.

8.10.2.3.4 City of Riverside Policies

Policy CCM-2.1: Complete the Master Plan of Roadways shown on Master Plan of Roadways.

Policy CCM-2.2: Balance the need for free traffic flow with economic realities and environmental and aesthetic considerations, such that streets are designed to handle normal traffic flows with tolerances to allow for potential short-term delays at peak-flow hours.

Policy CCM-2.3: Maintain LOS D or better on Arterial Streets wherever possible. At key locations, such as City Arterials that are used by regional freeway bypass traffic and at heavily traveled freeway interchanges, allow LOS E at peak hours as the acceptable standard on a case-by-case basis.

Policy CCM-2.4: Minimize the occurrence of streets operating at LOS F.

Policy CCM-2.5: Review and update street standards as necessary to current capacity and safety practices.

Policy CCM-2.6: Consider all alternatives for increasing street capacity before widening is recommended for streets within existing neighborhoods.

Policy CCM-2.7: Limit driveway and local street access on Arterial Streets to maintain a desired quality of traffic flow. Wherever possible, consolidate driveways and implement access controls during redevelopment of adjacent parcels.

Policy CCM-2.8: Design street improvements considering the effect on aesthetic character and livability of residential neighborhoods, along with traffic engineering criteria.

Policy CCM-2.9: Design all street improvement projects in a comprehensive fashion to include consideration of street trees, pedestrian walkways, bicycle lanes, equestrian pathways, signing, lighting, noise and air quality wherever any of these factors are applicable.

Policy CCM-2.10: Emphasize the landscaping of parkways and boulevards.

Policy CCM-2.11: Consider the use of special design traffic control devices which reflect the historic or aesthetic character of the neighborhoods in which they are located.

Policy CCM-2.12: Consider connecting Local Streets at strategic locations to accommodate residential neighborhood traffic movement, provided such connections do not encourage diversion of regional trips, do not impact sensitive environments, or do not disrupt the character of residential neighborhoods.

Policy CCM-2.13: Support the establishment of additional east-west connections southerly of Van Buren Boulevard between Barton Road and Washington Street.

Policy CCM-2.14: Ensure that intersection improvements on Victoria Avenue are limited to areas where Level of Service is below the City standard of D. Allow only the minimum necessary improvements in recognition of Victoria Avenue's historic character.

8.10.2.4 Compliance with Laws, Ordinances, Regulations, and Standards

All applicable LORS and administering agencies are summarized subsequently. Table 8.10-1 describes how the project will comply with all LORS pertaining to traffic and transportation impacts.

TABLE 8.10-1
Laws, Ordinances, Regulations, and Standards Applicable to Traffic and Transportation

Authority	Administering Agency	Requirements	Compliance
49 CFR, Section 171-177 and 350-300 Chapter II, Subchapter C and Chapter III, Subchapter B	U.S. Department of Transportation and Caltrans	Requires proper handling and storage of hazardous materials during transportation.	Project and transportation will comply with all standards for the transportation of hazardous materials.
CVC §31300 et seq.	Caltrans	Requires transporters to meet proper storage and handling standards for transporting hazardous materials on public roads.	Transporters will comply with standards for transportation of hazardous materials on state highways during construction and operations. The project will conform to CVC §31303 by requiring that shippers of hazardous materials use the shortest route possible to and from the site.
CVC §§31600 – 31620	Caltrans	Regulates the transportation of explosive materials.	The project will conform to CVC 31600 - 31620.
CVC §§32000 – 32053	Caltrans	Regulates the licensing of carriers of hazardous materials and includes noticing requirements.	The project will conform to CVC 32000 - 32053.
CVC §§32100 - 32109 and 32105.	Caltrans	Establishes special requirements for the transportation of substances presenting inhalation hazards and poisonous gases. Requires that shippers of inhalation or explosive materials contact the CHP and apply for a Hazardous Material Transportation License.	The project will conform by requiring shippers of inhalation or explosive materials to contact the CHP and obtain a Hazardous Materials Transportation License.
CVC §§34000 –34121.	Caltrans	Establishes special requirements for the transportation of flammable and combustible liquids over public roads and highways.	The project will conform to CVC §§34000 - 34121.
CVC §§34500, 34501, 34501.2, 34501.3, 34501.4, 34501.10, 34505.5-7, 34506, 34507.5 and 34510-11.	Caltrans	Regulates the safe operation of vehicles, including those used to transport hazardous materials.	The project will conform to these sections in the CVC.
CVC §§35550-35559	Caltrans	Regulates weight and load limitations.	The project will conform to these sections in the CVC.
CVC §§25160 et seq.	Caltrans	Addresses the safe transport of hazardous materials.	The project will conform to these sections in CVC.

TABLE 8.10-1
Laws, Ordinances, Regulations, and Standards Applicable to Traffic and Transportation

Authority	Administering Agency	Requirements	Compliance
CVC §§2500-2505.	Caltrans	Authorizes the issuance of licenses by the Commissioner of the CHP for the transportation of hazardous materials including explosives.	The project will conform to these sections in the CVC.
CVC §§13369, 15275, and 15278.	Caltrans	Addresses the licensing of drivers and classifications of licenses required for the operation of particular types of vehicles. In addition, certificates permitting the operation of vehicles transporting hazardous materials are required.	The project will conform to these sections in the CVC.
S&HC §§117, 660-711	Caltrans	Requires permits from Caltrans for any roadway encroachment during truck transportation and delivery.	Encroachment permits will be obtained by transporters, as required.
CVC §35780; S&HC §660-711; 21 CCR 1411.1-11411.6	Caltrans	Requires permits for any load that exceeds Caltrans weight, length, or width standards for public roadways.	Transportation permits will be obtained by transporters for all overloads, as required.
S&HC §§660, 670, 1450, 1460 *et seq.*, 1470, and 1480	Caltrans	Regulates right-of-way encroachment and the granting of permits for encroachments on state and county roads.	The project will conform to these sections in the CVC.
California State Planning Law, Government Code Section 65302	Caltrans	Project must conform to the General Plan.	Project will comply with General Plan.

CCR	California Code of Regulations	CVC	California Vehicle Code
CFR	Code of Federal Regulations	S&HC	California Streets and Highways Code

8.10.3 Affected Environment

8.10.3.1 Project Description

The AES Highgrove Project will be a nominal 300-megawatt (MW) peaking facility consisting of three natural-gas-fired turbines and associated equipment. The Highgrove project will connect to Southern California Edison's (SCE) electrical transmission system via the adjacent 115-kV Highgrove Substation. The Highgrove Project will be located on approximately 9.8 acres of land. The site is located in an industrially zoned area of the City of Grand Terrace, San Bernardino County, California.

The project will also include approximately 7 miles of new 12-inch-diameter natural gas pipeline. The gas pipeline alignment is located primarily in Riverside County and will be constructed within surface streets within the jurisdiction of City of Grand Terrace and the City of Riverside. Figure 8.10-1 shows the location of the generating facility site and water supply line.

8.10.3.1.1 Project Site Access

The site is located on 12700 Taylor Street, on the northwest corner of the intersection of Taylor Street and Main Street. Primary access to the site will be provided via an existing entrance from Taylor Street, which was used to access the existing Highgrove Generating Station.

Figure 8.10-2 illustrates the regional location of the Highgrove project site and its relative transportation and transit facilities. The surrounding land uses of the plant site are primarily lumber yards and storage facilities. The proposed facility would result in additional traffic that includes both passenger vehicles related to construction workers and permanent employees, and delivery vehicles transporting commercial equipment, as well as potential impacts related to street closures associated with pipeline installation.

8.10.3.1.2 Gas Pipeline

The Applicant considered several alternative gas pipeline routes. This analysis focuses solely on the preferred gas pipeline route. Figure 8.10-3 illustrates the proposed and alternative gas pipeline routes.

The proposed approximately 7-mile-long, 12-inch natural gas line from the Highgrove Project to Southern California Gas Company's (SoCalGas) Line 2001 would exit the west side of the power plant and follow the Riverside Canal southwest to Main Street. It would turn west on Main Street to Iowa Street and head south on Iowa Street to Martin Luther King Boulevard. It would turn east on Martin Luther King Boulevard to Canyon Crest Drive. On Canyon Crest Drive, the line would head south and end at Via Vista Drive where it would connect into Line 2001.

8.10.3.2 Existing Transportation Facilities

The proposed project lies near primary transportation corridors that traverse the southern part of San Bernardino County and northern part of Riverside County. While the proposed project in is San Bernardino County, most of the affected transportation facilities are in Riverside County. Major freeways in proximity to the proposed Highgrove project site include Interstate 215 (I-215), State Route 91 (SR 91), and SR 60.

8.10.3.2.1 Interstate 215

I-215 is an alternate route to I-15 between Temecula and San Bernardino. It is a generally north-south freeway facility. It merges with Interstate 15 in Temecula to the south of the project and in San Bernardino to the north. It goes through Murrieta, Sun City, Perris, Moreno Valley, Highgrove, Grand Terrace, San Bernardino and Highland. I-215 is comprised of four to six lanes of mixed flow traffic in the area near the proposed project. According to traffic counts conducted by Caltrans in 2003, I-215 carries an average of 150,500 vehicles per day in the vicinity of the project site (post mile 45.01).

8.10.3.2.2 State Route 91

SR 91 is a major east-west freeway connecting Los Angeles, Orange and Riverside counties. SR 91 is comprised of four to six lanes of mixed flow traffic in the area near the proposed project. According to traffic counts conducted by Caltrans in 2003, SR 91 carries an average of 160,000 vehicles per day in the vicinity of the project site (post mile 21.66). Access to and from SR 91 in the vicinity of the project site is via I-215.

8.10.3.2.3 State Route 60

SR 60 is a major east-west freeway connecting Los Angeles and Riverside County. SR 60 is comprised of six to eight lanes of mixed flow traffic in the area near the proposed project. According to traffic counts conducted by Caltrans in 2003, SR 60 carries an average of 128,000 vehicles per day in the vicinity of the project site (post mile 12.21). Access to and from SR 60 in the vicinity of the project site is via I-215.

Local Roadway Facilities

Riverside has an extensive street grid system that connects the proposed project to neighboring communities, and the major freeways described above.

Roadways within the study area that provide access to the plant site and gas pipeline include: Main Street, Taylor Street, Iowa Avenue, Center Street, Chicago Avenue, Marlborough Avenue, Martin Luther King Boulevard, Canyon Crest Drive, and Alessandro Boulevard. These roadways are briefly described below, while Figure 8.10-3 shows the arrangement of the local roadway network in the vicinity of the project site.

Alessandro Boulevard

Alessandro Boulevard is a four-lane roadway with raised median and turn bays in the center. It has bike lanes on both sides of the road. The speed limit within the project area is 55 miles per hour (mph). Adjacent land use is residential.

Canyon Crest Drive

Canyon Crest Drive is a two- to four-lane north-south roadway. The speed limit varies from 25 mph to 45 mph. It has a striped median or raised median with turn bays along the roadway. Adjacent land use is mostly residential. It has signalized intersections with Blaine, Linden, Martin Luther King Junior Boulevard, El Cerrito, Central, Country Club, Via Vista, and Alessandro Boulevard.

Center Street

Center Street is the border between Riverside and San Bernardino counties. It is a four-lane east-west roadway with a signalized intersection at Iowa Avenue in the project vicinity. It has a striped median and sidewalks. Abutting land use is mostly residential, with some commercial land use near the intersection of Prospect Avenue. It has a railroad crossing within the project limit. Speed limit on Iowa Avenue is 40 mph. Daily traffic volumes on Center Street are approximately 5,000 vehicles per day.

Chicago Avenue
Chicago Avenue is a four-lane north-south roadway with a 45 mph speed limit. It has a raised or striped median on different segments of the street. It has sidewalk, parking, and bike lane on different segments along the road. It has signalized intersections at Blaine, Spruce, Alessandro, Ransom, Country Club, Central, Martin Luther King Boulevard, and University Avenue.

Iowa Avenue
Iowa Avenue is a major north-south roadway in the project vicinity, starting in the City of Grand Terrace and continuing south into the City of Riverside Most of Iowa Avenue has five lanes with a center turn lane. It has sidewalks and bike lanes on different segments of the road. It has signalized intersections at Columbia, Palmyrita Avenue, Center Street, Marlborough Avenue, Spruce Street, Blaine, Linden, and Martin Luther King Boulevard in the project vicinity. The abutting land use is mix of office, Industrial, and residential. The speed limit on Iowa is 45 to 50 mph. Daily traffic volumes on Iowa Avenue range from 15,000 to 19,000 vehicles per day.

Main Street
Main Street is a two lane east-west roadway with parking on both sides of the streets. The abutting land use is industrial. There are two rail crossings on Main Street in the project vicinity. Existing (2001) traffic volumes on Main Street range from 1600 to 3100 vehicles per day (City of Grand Terrace, Traffic Flow Map).

Marlborough Avenue
Marlborough Avenue is a east-west two-lane facility with signalized intersections at Iowa and Chicago avenues. Adjacent land use is mostly industrial or office complex. It has head-in parking on the segment between Iowa and Chicago for the adjacent Hunter Park. East of the railroad crossing, Marlborough Avenue is a narrow segment (approximately 20 feet wide) with no shoulder and no parking.

Martin Luther King Boulevard
Martin Luther King Boulevard is a four-lane east-west roadway. It has raised median and bike lane on both sides of the road. It has signalized intersections at Canyon Crest, Iowa, and Chicago. Abutting land use is open fields, parking lots and agricultural.

Taylor Street
Taylor Street is a two-lane north-south roadway that is the primary access to the plant site. It currently ends at Pico Street, just north of Main Street, in the City of Grand Terrace. It has a striped median. Abutting land use is industrial.

8.10.3.3 Pedestrian/Bicycle Facilities

Riverside County's bikeway system is included as part of the County's circulation system. Planned bicycle routes are shown on the Bikeways and Trails Plan. Riverside County uses three types of bike path classifications:

- Class I - Provides a completely separated right-of-way for the exclusive use of bicycles and pedestrians with cross-flow minimized.

- Class II - Provides a striped lane for one-way bike travel on a street or highway.
- Class III - On-road, signed bicycle routes with no separate lanes.

Pedestrian facilities include sidewalks, walkways, bridges, crosswalks, signals, illumination, and benches, among other items. Pedestrian facilities provide a vital link between many other modes of travel and can make up a considerable portion of short-range trips made in the community. Where such facilities exist, people will be much more likely to make shorter trips by walking rather than by vehicle. Pedestrian facilities also provide a vital link for commuters who use other transportation facilities such as rail, bus, and park-n-rides. Without adequate pedestrian facilities, many commuters may be forced to utilize an automobile because of difficult or unsafe conditions that exist at their origin or destination. Pedestrian facilities within the immediate vicinity of schools and recreational facilities are important components of the non-motorized transportation system. Such facilities, typically in the form of sidewalks, are provided where they are appropriate and enhance the safety of those who choose to walk to and from their destination.

8.10.3.4 Public Transportation

Due to the interrelationship of urban and rural activities (employment, housing and services), and the low average density of existing land uses, the private automobile is the dominant mode of travel in the project vicinity. The public transit system alternatives for Riverside County include: fixed route public transit systems, common bus carriers, AMTRAK (intercity rail service), Metrolink (commuter rail service), and other local agency transit and paratransit services. Concentrated growth and increased job creation will require a regional and local linkage system between communities in the County. The public transportation system can facilitate those linkages, and help to shape future growth patterns.

8.10.3.4.1 Inter and Intra-County/Subregional Systems

The Riverside Transit Agency (RTA) operates fixed bus routes providing public transit service throughout a 2,500-square-mile area of western Riverside County. RTA's fixed routes have been designed to establish transportation connections between all cities and unincorporated communities in western Riverside County. RTA currently operates full-size buses, mini-buses, vans, and trolleys. The system carries approximately 6.4 million passengers annually, which is approximately 18,000 passengers per day. RTA also provides service to San Bernardino and Orange counties.

Sun Line Transit Agency (Sun Line) also provides public transit services in the project vicinity. The service area covers 928 square miles. Sun Line operates fixed routes, serving over 3 million passengers annually. All of Sun Line's buses are equipped with front-mounted bicycle racks; and overall, the system carries over 6,000 bicycles per month. Sun Line also operates the Sun Dial System, which provides curb-to-curb demand responsive (dial-a-ride) service for members of the community requiring such assistance.

8.10.3.4.2 Paratransit Service

The County supports reliable, efficient, and effective paratransit service by encouraging development of service systems that satisfy the transit needs of the elderly and physically handicapped. Paratransit services are transportation services such as car pooling, van pooling, taxi service, and dial-a-ride programs.

8.10.3.4.3 Fixed Route Transit Service

The County supports fixed-route, scheduled bus services that have convenient access to major population, economic, institutional, recreation, community, and activity centers. Fixed route transit services include urban and suburban rail, and bus systems. These services operate on regular schedules along a designated route, and can be used as additional transportation alternatives within the County. The closest public transit service route to the plant site is on Michigan Avenue. RTA Route 25 goes through Michigan Avenue and Center Street. Omnitrans Route 200 goes through Michigan Avenue. However, there are several RTA routes along the gas pipeline alignment. RTA operates public service buses on Center Street, Iowa Avenue, Chicago Avenue, Blaine, University Avenue, Martin Luther King Boulevard, Canyon Crest Drive, and Alessandro Boulevard.

8.10.3.5 Rail Traffic

The freight rail system within the County is vital to the economy of the county. This system provides movement for goods within and outside of the County's jurisdiction. Riverside County will continue to support operation of passenger and freight rail systems that offer efficient, safe, convenient, and economical transport of County residents and commodities. The proposed California high-speed rail system will directly serve residents and businesses in Riverside County, enabling the County to compete in the global economy.

8.10.3.5.1 AMTRAK

The closest AMTRAK station to the project is in the Downtown of the City of Riverside. This station provides connecting AMTRAK service to points west including Los Angeles, and to points east including Tucson, Arizona; and El Paso, Texas. AMTRAK provides bus connections to and from other Riverside County areas to the San Bernardino AMTRAK station on a daily basis.

8.10.3.5.2 Metrolink

Metrolink's Riverside Line provides commuter rail train service between Riverside and Los Angeles. Metrolink currently has multiple stations located in Riverside County including: Pedley Station, Riverside-Downtown Station, Riverside-La Sierra Station, and West Corona Station. Long-term plans call for an extension of the Riverside Transit Corridor, in accordance with performance standards, along the San Jacinto branch line to the City of Hemet. Riverside Downtown Station is closest Metrolink Station to the project site.

8.10.3.5.3 Freight Rail

The Union Pacific and the Burlington Northern Santa Fe Railroads provide freight service in Riverside County, connecting the County with major markets within California and other destinations north and east. Both agencies have rail tracks just east and west of the project site.

8.10.3.6 Air Traffic

The provision of general aviation facilities and services that meet the needs of the residents of Riverside County is an important component of the County's transportation system. To meet these needs, the County must facilitate coordination of County airport plans with aviation planning conducted by the State, the County Economic Development Agency, and local agencies related to transportation, land use, and financing. Airports used by County residents and businesses are tied into the regional air transportation system.

8.10.3.6.1 Aviation Facilities

There are two regional aviation facilities that are close to the Highgrove project site: Palm Springs International Airport, Ontario International Airport (San Bernardino County). Palm Springs International Airport is located in Riverside County, but Ontario International airport is closer to the facility (approximately 20 miles to the west). In addition to the regional air passenger airport facilities, the March Inland Port/Air Reserve Base is located in Riverside County along I-215 near Perris. This airport provides regional air cargo service and also continues to function as the Air Reserve Base in Riverside County. There are three other local airports close to the project site. Those are Hemet-Ryan airport, Riverside Municipal Airport and French Valley airport.

8.10.3.6.2 Air Cargo

Air cargo is the fastest growing method of transporting goods in and out of the southern California region, and is expected to continue to increase at a faster rate than passenger air service. Trucking, rail, and air cargo operations in this area make it one of the larger multi-modal freight management and distribution complexes in the nation. Land development is occurring in support of these functions, extending into the Mira Loma and Norco areas of Riverside County. The March Air Reserve Base is currently a joint use status land use. The Air Reserve Base will gradually reduce the military use of this facility and begin to increase the amount of goods and cargo that can be accommodated at this site. As the amount of goods transported into this area via the March Air Reserve Base increases, so does the potential to establish viable land uses that can make use of this facility This area can be used to accommodate the increased growth in goods movement, with the potential to become a passenger airport.

8.10.3.7 Transportation Improvements

8.10.3.7.1 Local Comprehensive Transportation Plans

The Regional Transportation Plan (RTP) is a multi-modal, long-range planning document prepared by the Southern California Association of Governments (SCAG), in coordination with federal, state, and other regional, sub-regional, and local agencies in southern California.

The RTP includes programs and policies for congestion management, transit, bicycles and pedestrians, roadways, freight, and finances. The RTP is prepared every 3 years and reflects the current future horizon based on a 20-year projection of needs.

The RTP's primary use is as a regional long-range plan for federally funded transportation projects. It also serves as a comprehensive, coordinated transportation plan for all governmental jurisdictions within the region.

Each agency responsible for transportation, such as local cities, counties, and Caltrans, has different transportation implementation responsibilities under the RTP. The RTP relies on the plans and policies governing circulation and transportation in each county to identify the region's future multi-modal transportation system.

According to the RTP and the general plans of the cities and county, there are no planned transportation improvements on the surface streets adjacent to the proposed gas line route.

8.10.3.7.2 Other Future Plans and Projects

A Specific Plan for the development of the OAC (a commercial development) was approved in 2004 for the land just north and northwest of the proposed project. Construction is expected to start in January, 2007. Grading, streets, and utilities will all be installed as part of the initial phase, which will take approximately one year to complete. Actual building construction will occur over approximately 2 years.

As part of that project, Taylor Street, Commerce Way, and Van Buren will all be extended from their current termini. Taylor Street will be extended to Commerce Way (to the north), and built to its ultimate cross-section width (84 feet) as a secondary highway. The Environmental Impact Report for the OAC Specific Plan also lists a series of intersection improvements required to provide acceptable operations in the opening year and 2030. A total of 13 intersections were identified, and specific widening projects (added lanes and reconstructed interchanges) were listed. However, the improvements will be phased as future traffic impact study reports are submitted with development plans.

The specific improvements listed for the intersections nearest to the proposed project are as follows:

- Iowa Avenue/Main Street: A new traffic signal would be installed at the intersection before the OAC is opened. Future (2030) improvements are to add northbound through lanes, a southbound left-turn and through lane, and a westbound free right-turn lane.
- Taylor Street/Main Street: A new traffic signal would be installed at the intersection before the OAC is opened. Future (2030) improvements are to add a southbound free right-turn lane and an eastbound left-turn lane.
- Northbound and southbound I-215/Iowa Avenue ramp terminal intersections: Reconstructed interchanges are needed for opening year (2006) conditions. Also, the Environmental Impact Report indicates that the City of Grand Terrace is proposing new ramps for northbound I-215 at the terminus of De Barry Street. The existing southbound ramps at Barton Road would also be used for the OAC.

There are also plans to build a new high school on the site of existing lumberyards, just east of the Highgrove project site on the other side of the Taylor Street. Roadway infrastructure improvements associated with the projects will affect roadways in the project area. Both projects also have the potential to add traffic to local streets.

8.10.4 Environmental Analysis

This subsection discusses potential environmental impacts of the proposed project. Potential traffic impacts during construction of the plant as well as plant operations after construction have been analyzed.

Project area reconnaissance was performed by CH2M HILL in May 2005 to examine the proposed project area, document roadway characteristics, identify physical constraints, and assess general traffic conditions.

8.10.4.1 Significance Criteria

Significance criteria were developed based on guidance from Appendix G of the CEQA Guidelines. The guidelines identify significant impacts to be caused by a project if it results in an increase in traffic that is substantial relative to the amount of existing traffic, the capacity of the surrounding roadway network and the criteria used by the City of Grand Terrace, County of Riverside, and the City of Riverside.

8.10.4.1.1 City of Grand Terrace Significance Criteria

The maximum acceptable LOS for City's Master Plan of Streets and Highways is LOS C. However, intersections at freeway ramps may have LOS D in peak travel hours. LOS is defined using daily traffic volumes. For four-lane arterials, the volume differences between LOS grades are approximately 4,000 vehicles per day (for divided highways) and 2500 vehicles per day (for undivided). For two-lane arterials, the differences are approximately 1,250 vehicles per day. In other words, the addition of 1,250 vehicles per day on a two-lane arterial would degrade LOS one level.

8.10.4.1.2 County of Riverside Significance Criteria

The following are the significance criteria related to transportation used by the Riverside County Planning Department for the determination of impacts associated with a proposed project:

C 2.1 Maintain the following countywide target Levels of Service:

LOS "C" along all county-maintained roads and conventional state highways. As an exception, LOS "D" may be allowed in Community Development areas, only at intersections of any combination of Secondary Highways, Major Highways, Arterials, Urban Arterials, Expressways, and conventional state highways or freeway ramp intersections.

LOS "E" may be allowed in designated community centers to the extent that it would support transit-oriented development and walkable communities.

C 2.2 Apply level of service standards to new development via a program establishing traffic study guidelines to evaluate traffic impacts and identify appropriate mitigation measures for new development.

C 2.3 Traffic studies prepared for development entitlements (tracts, plot plans, public use permits, conditional use permits, etc.) shall identify project-related traffic impacts and determine the "significance" of such impacts in compliance with CEQA.

C 2.4 The direct project-related traffic impacts of new development proposals shall be mitigated via conditions of approval requiring the construction of any improvements identified as necessary to meet level of service standards.

8.10.4.1.3 City of Riverside Significance Criteria

The Riverside City's guidance is that it will "strive to maintain LOS D or better on arterial streets wherever possible. At some key locations, such as City arterial roadways which are used as a freeway bypass by regional through traffic and at heavily traveled freeway interchanges, LOS E may be acceptable as determined on a case-by-case basis. Locations that may warrant the LOS E standard include portions of Arlington Avenue/Alessandro Boulevard, Van Buren Boulevard throughout the City, portions of La Sierra Avenue and selected freeway interchanges. A higher standard, such as LOS C or better, may be adopted for Local and Collector streets in residential areas. The City recognizes that along key freeway-feeder segments during peak commute hours, LOS F may be expected due to regional travel patterns. Arterials will be designed with sufficient capacity to accommodate anticipated traffic based on intensity of existing and planned land uses while discouraging additional non-local cut-through traffic on City streets."

8.10.4.1.4 Summary

Based on the significance criteria noted above, a degradation of LOS may be considered a significant impact, particularly for operations at LOS D or worse. However, since only limited traffic data are available (in most cases, daily volumes), a more appropriate criterion for this project is the addition of a significant volume of traffic. Using the City of Grand Terrace's LOS standards, a degradation of one LOS level on an arterial would require adding 1,250 to 4,000 vehicles per day, or 125 to 400 vehicles in the peak hour. For a 6-lane freeway, the criterion is 12,000 vehicles per day or 1,200 vehicles in the peak hour (both directions). Therefore, additional volume was used as the significance criterion for traffic, following the CEQA guidance to consider an increase in traffic that is substantial relative to existing levels.

Other construction-related impacts may be considered significant if they reduce access or safety for vehicles, pedestrians, bicyclists, or transit riders. In these cases, significance is evaluated using judgment and standards of the profession for construction.

8.10.4.2 Summary of Construction Phase Impacts

8.10.4.2.1 Impacts from Plant Construction

Daily weekday traffic operations were evaluated during construction for the local roadway network adjacent to the project site. The peak hour analysis examined the worst-case scenario of the impact of 147 daily employees during construction of the project.

Trip Generation

Demolition of the old plant and construction of the proposed plant is anticipated to begin in mid-2007 and last approximately 14 months. A peak workforce of approximately 147 workers per day over a 2-month period during months 7 and 8 of construction is expected.

Construction would generally be scheduled to occur between 6:30 a.m. and 5:00 p.m., 5 days a week, although additional hours may be necessary to make up schedule deficiencies or to complete critical construction activities. Based on the regular schedule, most worker trips to the plant site would occur during the a.m. (inbound to site) and p.m. (outbound from site) peak commute hours. The delivery of construction materials and the hauling of materials from the Highgrove project site would also occur during the day, but not during the peak hours. During the peak construction period, using an average vehicle occupancy factor of 1.3 persons per vehicle for commuting, construction workers would generate an estimated 226 daily trips, 113 a.m. peak hour trips, and 113 p.m. peak hour trips. During this period, approximately 20 truck trips would occur, with no truck trips occurring during the a.m. and p.m. peak commute periods.

Trip Distribution

Trip distribution percentages for the construction employees are based on assumptions of regional demographics of construction workers, and recent surveys of the project site (i.e., drive-by windshield surveys). The construction worker trip distribution has been determined to be: 25 percent within the City of Grand Terrace, Loma Linda and Highgrove area (local trips); 25 percent from north in San Bernardino County (Rialto, Colton, San Bernardino cities); and the remaining 50 percent from southern and western parts of Riverside County.

To arrive at the project site, construction worker trips from San Bernardino County would use southbound I-215 and exit on Iowa Avenue and proceed to Taylor Street. Trips from southern points of Riverside County would use SR 60/I-215 or SR 91, and exit on Center Street/Highgrove. Trips from within the City would use Main Street to reach the plant location.

Traffic Assignment

Based on the assumptions described above, the maximum additional traffic on most of the freeway segments (e.g., SR 60, I-215, or SR 91) would be approximately 28 vehicle trips in the peak hour. Up to 56 trips may be added to SR 91 during the peak hour. This represents no more than one to two percent of the total traffic, which would not have a significant impact on LOS. Using the significance criteria previously described, the number of additional trips in the peak hour (28 to 56) is well below the threshold value of 1,200 vehicles in the peak hour (or 600 vehicles in one direction).

On the arterials, the greatest additional volume of traffic would be on Main and Taylor streets. Up to 113 trips will be added to the peak hour. Since both of these streets have very low traffic volumes (Main Street is operating at LOS A per City of Grand Terrace standards), the impacts are less than significant.

One other potential impact is a conflict with school traffic. Construction would generally be scheduled to occur between 6:30 a.m. and 3:30 p.m. so workers traveling for their shifts would be driving before and after these times. Arrival for work will not present conflicts with most school trips, but the end of the afternoon shift could occur during some school traffic. The closest existing school is Highgrove Elementary School (at Center Street and Garfield Avenue), about 3,000 feet southeast of the Highgrove project site. Also a new high school is planned across Taylor Street from the plant site. The high school is planned to begin construction during the summer of 2006, and to start sessions in the fall of 2008. If construction of the power plant is not completed before school sessions begin, work shifts will be scheduled to avoid conflict with afternoon school traffic.

Summary

Project construction would result in short-term increases in vehicle trips by construction vehicular activities and construction workers. Because the volumes of traffic are low, this impact will be less than significant, with the possible exception of afternoon high school traffic.

8.10.4.2.2 Construction Impacts from Pipeline Construction

The horizontal alignment for the gas pipeline has been designed with traffic impacts in mind. Where possible, the line will be installed in locations where the traffic impacts of construction will be minimized. On arterials, the critical impact locations are often signalized intersections, main thoroughfare, and associated on- and off-ramps, related to lane closures at these areas, which may have the greatest impact on capacity.

Trenching for gas pipeline construction will necessitate temporary lane closures and would reduce the number of lanes for an estimated 150 to 300 feet at a time. It is expected that the contractor will use temporary trench paving, and repaving may occur over longer stretches (i.e., several days of trenching may occur before repaving is completed on a particular section).

The work area will be delineated with lane closure devices approved by Caltrans traffic standards or other approved traffic control standard per governing agency request, such as *Manual of Uniform Traffic Control Devices* (MUTCD) and *Work Area Traffic Control Handbook* (WATCH).

However, these considerations will need to be balanced with other issues, including existing utilities, construction cost and time, and gas pipeline installation requirements. Therefore, there is the potential for traffic impacts for constructing some elements of the gas pipeline. More details on the specifics of the impacts cannot be determined until the horizontal alignment of the pipeline is identified. However, the general impacts from the pipeline construction are summarized below:

Project construction within existing streets would reduce the number of, or the available width of, travel lanes on roads, resulting in temporary disruption of traffic flows and increases in traffic congestion. These impacts are potentially significant. With the implementation of proposed mitigation measures, these impacts will be mitigated to less-than-significant levels.

Project construction within or across streets would affect emergency access, and access to local land uses. These impacts are anticipated to be less-than-significant, and would be further reduced with the implementation of the proposed mitigation measures.

Also, note that work crews associated with pipeline construction, and materials deliveries to the pipeline sites would result in a small number of trips throughout the study area network. The construction crew for the gas pipeline facilities would be staged in appropriate areas adjacent to pipeline construction activities. The impacts of this relatively small number of trips are less than significant.

8.10.4.3 Parking Facilities

Construction of the proposed project would not impact on-street parking. An approximately 7.5-acre area inside the project site will be used as a lay down area (staging, and construction worker parking lot) to meet the construction worker parking demand. The gas pipeline would reduce some available parking adjacent to their construction location. However it will not be significant since it will be temporary.

When completed, the project would contain adequate onsite parking to accommodate the permanent 15 employees. Street parking spaces would not be eliminated as part of the proposed project. Therefore, no significant impacts to parking are anticipated.

8.10.4.4 Public Transportation

There are no bus stops or any other public transit stations close to the Highgrove project site. There will be no impacts to public transit from the plant construction. However the public transit routes along the gas pipeline will be impacted by the construction. The impacts may include closing down bus stops temporarily. The minimal number of employees that might use public transport during construction and during operation would not cause any significant impact to the local public transportation system.

Project construction could temporarily disrupt bus service along the pipe line route. These impacts are anticipated to be less-than-significant, and would be further reduced with the implementation of the proposed mitigation measures.

8.10.4.5 Goods Movement

Construction and operation of the proposed project would not impact adjacent freight rail lines, and air or shipping routes. Therefore, the project would not have a significant impact on goods movement.

8.10.4.6 Safety

The roadways in the vicinity of the proposed Highgrove project site would continue to provide adequate sight distances. Truck traffic within the area would continue to use designated truck routes to access the proposed project site. In addition, the project site is located in an industrial zone.

Project construction within roadways and railroad rights-of-way would temporarily increase the potential for accidents. These impacts are anticipated to be less-than-significant, and would be further reduced with the implementation of the proposed mitigation measures.

Impacts to vehicle, pedestrian, and bicycle safety as a result of construction and operation of the project would be less-than-significant.

8.10.4.7 Air, Rail, and Waterborne Traffic

The proposed project would have no impacts on air, rail, or waterborne traffic.

8.10.4.8 Hazardous Materials Transport

Construction of the proposed project would generate hazardous wastes consisting primarily of batteries, asbestos containing materials, and various liquid wastes (e.g., cleaning solutions, solvents, paint and antifreeze). Contaminated soils could also be generated in the pre-construction or site preparation phase and would be transported as hazardous materials or hazardous waste (see Subsection 8.13). Transport route arrangements would be required with Caltrans officials for permitting and escort, as applicable. Generally, only small quantities of hazardous materials will be used during the construction period, as described in Subsection 8.12, Hazardous Materials Handling. They may include gasoline, diesel fuel, motor oil, hydraulic fluid, solvents, cleaners, sealants, welding flux, various lubricants, paint, and paint thinner. Because of the small quantities of hazardous materials involved, shipments will likely be consolidated. Multiple truck deliveries of hazardous materials during construction are unlikely. During construction, a minimal number of truck trips per month will be required to haul waste for disposal. Because the transport of hazardous wastes will be conducted in accordance with the relevant transportation regulations, no significant impact is expected.

Operation of the project would result in the generation of additional wastes including lubricants, water treatment chemicals, herbicides and pesticides, and sludge. In addition, operation of the project will require transportation of aqueous ammonia, a regulated substance. Aqueous ammonia will be delivered to the plant by truck transport using designated truck routes. Small quantities of sulfuric acid and various other hazardous materials will also be used in project operations, as described in Subsection 8.12. According to Division 13, Section 31303 of the CVC, the transportation of regulated substances and hazardous materials will be on the state or interstate highways that offer the shortest overall transit time possible.

Aqueous ammonia is considered a potential inhalation hazard. Division 14.3, Section 32105 of the CVC specifies that unless there is not an alternative route, every driver of a vehicle transporting inhalation hazards shall avoid, by prearrangement of routes, driving into or through heavily populated areas, congested thoroughfares, or places where crowds are assembled.

The truck loading area will be located within the project site. The use of 19 percent aqueous ammonia will require approximately 14 deliveries of ammonia per year, or 28 truck trips per year. This would conservatively equate to a maximum of 4 deliveries per month during peak periods, or 8 truck trips per peak month (inbound and outbound). These occasional truck trips would generally occur at night or during weekends to avoid school hours. If the plant uses lower concentrations of aqueous ammonia, more frequent delivery would be required.

Table 8.10-2 summarizes expected truck trips for the project, including delivery of hazardous materials and removal of wastes. There will be a maximum of ten truck trips per day, with an average of two or less truck trips per day to the project site. For further information on the management of hazardous materials and waste products, see Subsections 8.12 and 8.13, respectively.

TABLE 8.10-2
Estimated Truck Traffic at the Facility During Operation

Delivery Type	Number and Occurrence of Trucks
Aqueous ammonia	4 per month during peak use
Sulfuric acid	2 per month
Cleaning chemicals	1 per month
Trash pickup	1 per week
Lubricating oil	4 per year
Lubricating oil filters	4 per year
Laboratory analysis waste	4 per year
Oily rags	4 per year
Oil absorbents	4 per year
Water treatment chemicals	Up to 4 per week

Additionally, transporters of inhalation hazardous or explosive materials must contact the CHP and apply for a Hazardous Material Transportation License. Upon receiving this license, the shipper will obtain a handbook that will specify the routes approved to ship inhalation hazardous or explosive materials. The exact route of the inhalation or explosive material shipment will not be determined until the shipper contacts the CHP and applies for a license. Transportation impacts related to hazardous materials associated with power plant operations will not be significant since deliveries of hazardous materials will be limited. Delivery of these materials will occur over prearranged routes and will be in compliance with all LORS governing the safe transportation of hazardous materials.

Standards for the transport of hazardous materials are contained in the Code of Federal Regulations, Title 49 and enforced by the U.S. Department of Transportation. Additionally, the State of California has promulgated rules for hazardous waste transport that can be found in the California Code of Regulations, Title 26. Additional regulations for the transportation of hazardous materials are outlined in the California Vehicle Code (Sections 2500-505, 12804-804.5, 31300, 3400, and 34500-501). The two state agencies with primary responsibility for enforcing federal and state regulations governing the transportation of hazardous wastes are the CHP and Caltrans. Transport of hazardous materials to and from the project site will comply with all applicable requirements.

For those materials that require offsite removal, a licensed hazardous waste transporter would move these substances to one of three Class I hazardous waste landfills in proximity to the project site. The hazardous material carrying trucks should use the shortest possible route between freeway and the plant site and avoid residential area as much as possible. With that objective, the trucks carrying hazardous material should get on I-215 using the shortest route and then use SR 91, SR 60, I-215 based on its destination. The directions for traveling between the project site and I-215 are given below. All deliveries of hazardous materials will use these routes.

From northbound I-215 to project site: Take the Center Street/Highgrove exit. Then turn off into East La Cadena Drive, turn right on West Main Street. Turn left on Taylor Street to reach the project site.

From southbound I-215 to project site: Take the Iowa Avenue exit, turn right, cross I-215 and head south on S. Iowa Avenue. Turn left on West Main Street. Turn left on Taylor Street to reach the project site.

From project site to northbound I-215: Start on Taylor Street, turn right on West Main Street, Turn right on Iowa Avenue, keep on the right lane to continue on to the on ramp to northbound I-215

From project site to southbound I-215: Start on Taylor Street, turn right on West Main Street, Turn right on Iowa Avenue, keep on the center lane, turn left on the frontage road at the southbound ramp intersection, continue on southbound frontage road to southbound ramp and on to southbound I-215.

The major highways and interstates that would be used to carry hazardous wastes from the project site to the appropriate landfills contain adequate capacity to accommodate these vehicle trips. Hauling would be carried out in accordance with local, state, and federal regulations that include the Resource Conservation and Recovery Act (42 U.S. Code 6901 et seq.), the California Integrated Waste Management Act (Public Resources Code Sections 40000 et seq.), and the Department of Public Health of the counties of San Bernardino and Riverside.

In addition, the federal government prescribes regulations for transporting hazardous materials. These regulations are described in the Code of Federal Regulations, Title 49, Part 171. These laws and ordinances place requirements on various aspects of hazardous waste hauling, from materials handling to vehicle signs, to ensure public safety. Transporting and handling of chemicals and wastes are discussed in Subsection 8.12, Hazardous Materials Handling, including the transport of ammonia.

8.10.4.10 Operational Impacts

When completed, the operational phase of the proposed project would generate approximately 15 additional employees, or 30 daily trips. In addition, during operation the plant will average two truck trips per hour. Every hour the concentrated brine wastewater will be trucked to the Santa Ana Regional Interceptor brine line for disposal then return to the plant to switch tanks. The permanent addition of 15 employees for plant operations and two truck trips per hour would result in a less-than-significant impact, as their traffic volumes would be immeasurable in terms of roadway capacity.

8.10.5 Cumulative Impacts

The construction of the proposed Grand Terrace Educational Facility (i.e., high school) will likely occur in the same approximate time frame as the proposed project. Cumulative transportation impacts may result from trips by construction workers for both projects on the same roadways at the same time.

Construction of the proposed high school would generate various levels of truck and automobile traffic throughout the duration of the construction phase, which is expected to take approximately 28 months. The construction-related traffic includes construction workers traveling to and from the site as well as trucks hauling construction materials to the site and demolition/excavation material away from the site. The construction activities would generate approximately 20 truck trips per day to deliver construction material and approximately 10 truck trips per day to remove demolition material from the site. The truck trips would be spread out throughout the workday and would generally occur during non-peak traffic periods. Even coupled with the truck trips for the proposed project, this level of construction-related traffic would not result in a significant cumulative traffic impact on the study area roadway network.

The construction activities for the Grand Terrace Educational Facility would also generate an estimated 40 to 50 workers' trips per day. Table 8.10-3 summarizes the total daily workforce related vehicle trips from both construction projects.

TABLE 8.10-3
Total Daily Workforce-Related Vehicle Trip Generation During Construction

Type of Construction	Workers' Trips	Truck Trips	Total Trips
Highgrove Project	226	20	246
Grand Terrace Educational Facility	50	30	80
Total	276	50	326

With the two projects a total of 163 trips will be added to the area roadway network during the a.m. and p.m. peak hours. For the freeways (SR 91 and I-215), the number of additional trips in the peak hour is below the threshold value of 1,200 vehicles per hour in the peak hour (or 600 vehicles in one direction). For the surface streets, up to 128 trips will be added to the peak hour. The construction worker trips for the proposed high school construction are expected to occur on several intersections that will also be used by the construction work force of the proposed project:

- I-215 Southbound Ramps at Iowa Avenue

- I-215 Northbound Ramps at Iowa Avenue
- Iowa Avenue at Main Street
- Iowa Avenue at Center Street
- Taylor Street at Main Street

Since most of these streets have very low traffic volumes (Main Street is operating at LOS A per City of Grand Terrace standards), the cumulative impacts are less than significant.

Cumulative impacts associated with the OAC are much more significant during the operation of the OAC. The Specific Plan for the proposed OAC has an estimated daily traffic volume of 29,879 trips, including 1,454 during the morning peak hour and 2,154 during the evening peak hour. OAC daily traffic volumes are projected to be 3,800 vehicles/day on Iowa Avenue (south of Main Street), 7,800 vehicles/day on Taylor Street (between Iowa Avenue and Main Street) and 8,100 vehicles/day on Taylor Street (north of Main Street).

Operations at Taylor Street/Main Street are not predicted to change significantly with the proposed OAC. However, operations at Iowa Avenue/Main Street are expected to degrade from LOS E to LOS F in the a.m. peak. In the p.m. peak, the intersection will remain at LOS F, but the additional traffic from the OAC will increase the delay substantially. However, improvements are proposed (as part of the OAC mitigation measures) at both intersections. Specifically, new traffic signals will improve operations. The new signals were only analyzed for 2030 (with other improvements), but both intersections are projected to operate at LOS C or better.

Since there are specific improvements at these intersections that will be constructed before the OAC opens, the relatively low traffic volumes associated with the proposed project (163 daily trips) will not be significant. Specifically, new traffic signals will improve operations, so that the construction trips associated with the proposed projects will result in cumulative impacts that are less than significant.

8.10.6 Mitigation Measures

To minimize construction-related impacts, the construction contractor will prepare a construction traffic control plan and construction management plan, also known as a Traffic Management Plan (TMP). The TMP will address timing of heavy equipment and building material deliveries, potential street and/or lane closures associated with pipeline installation, signing, lighting, traffic control device placement, and establishing work hours outside of peak traffic periods. Details on the specific mitigation measures described in this subsection will be documented fully in the TMP.

8.10.6.1 Construction Impacts from Power Plant

As noted in Subsection 8.10.4.2, construction of proposed project would add a moderate amount of traffic to state routes and local roadways during the peak construction period. However, because existing roadway capacity is adequate, these project-related traffic increases will not result in significant impacts. In order to avoid potential impacts of construction traffic that may coincide with afternoon school traffic, the project will develop a construction traffic control plan in coordination with the school officials. That construction traffic control plan will be specifically tailored to address the specific impacts associated with each stage of construction of the power plant and the actual occupancy date of the school.

8.10.6.2 Construction Impacts from Gas Pipeline Construction

This subsection outlines some general strategies and requirements for minimizing the traffic and roadway impacts of gas pipeline construction. In general, Riverside County and the affected cities require an encroachment permit and the permit application specifies some requirements for traffic control. Some of the information in this document reflects on those guidelines, but the City/County will have the final word on requirements for traffic control with the permit submittal.

To minimize construction-related impacts, the following measures will be implemented (and documented in the TMP):

8.10.6.2.1 Traffic Control Standards

All temporary signing, lighting, and traffic control devices during construction should conform to the applicable standards. These include the MUTCD, the WATCH handbook, and the California Joint Utility Traffic Control Committee published Work Area Protection and Traffic Control Manual.

8.10.6.2.2 Construction Work Hours

In general, Riverside County and the affected cities allow construction work on a case-by-case basis. During periods where construction is not allowed, trenches must be plated over to permit use of all travel lanes. Work hours and allowable noise limits will be described in the encroachment permit, as issued by the Encroachment Permit Section of the County of Riverside or affected city.

The specific hours for construction will be determined on a case-by-case basis, in consultation with the County. Any variations in the working hours will be determined with consideration given to impacts to residents and the general public kept to a minimum. Consideration of impacts and justification for those requests will be provided prior to request.

8.10.6.2.3 Traffic Control Standards

All temporary signing, lighting, and traffic control devices during construction should conform to applicable standards (primarily the California Supplement of the MUTCD).

8.10.6.2.4 Lane Closures

The number of travel lanes during all hours of the day (peak, off-peak, and overnight) should be sufficient to meet expected traffic volumes at the construction site. The minimum width of a traffic lane that needs to be maintained is 12 feet (3.6 meters) in each direction. If a required lane closure results in a single (bi-directional) lane of traffic during construction, the remaining lane should be at least 12 feet (3.6 meters) wide. Specific requirements for temporary lane widths and approval for narrower lanes should be obtained during preparation of the Traffic Control Plan.

One traffic lane will remain open at all times on all affected roadways. Full closures of major roadways are not planned. When traffic in both directions must use a single lane, two flagmen will be stationed at both ends of the construction zone to safely direct traffic.

Vehicle access would be restored at the end of each work day through the use of steel trench plates or trench backfilling.

8.10.6.2.5 Driveway Access

The contractor shall develop construction plans defining in detail how driveway access restrictions will be minimized. Any blockages of individual driveways must be described in the traffic control plans. Based on the estimated work pace of up to 300 feet per day, project construction would occur for about one day in front of an individual property on affected roads. Operations must be coordinated with all business and property owners along city streets and state highways, within the limits of contract work, for temporary driveway closures at least ten days prior to performing work that will block access points. The contractor shall provide alternate access to properties, at the property/business owner's approval. In areas where a residence or business has two access points, one access would be open to traffic at all times. In cases where the inconvenience is not minor, such as with an active business that is dependent on one driveway, the work could be scheduled during nighttime hours. Temporary closure of driveways shall only take place during nighttime between 10:00 p.m. and 6:00 a.m.

8.10.6.2.6 Emergency Access

Emergency response service providers shall be notified at least one month in advance of the proposed locations, nature, timing, and duration of any construction activities and advised of any access restrictions that could impact their effectiveness in addition to being provided a copy of detour plans filed with the city or county. Emergency response service providers include police and fire departments and ambulance companies. In no circumstance should the only access to a developed area be cut off for any period of time. Alternate routes must be available, or provisions must be made for temporary emergency providers to be stationed inside the cut-off area. The Traffic Control Plan shall include details regarding emergency service coordination and procedures, and copies shall be provided to all relevant service providers.

8.10.6.2.7 Parking

Along streets where parking will be temporarily lost, the contractor will be required to post notices of closures prior to construction. Signs should indicate that parking will be removed during construction, and specify the duration of the construction period. Permits for parking restrictions must be obtained from the County (Encroachment Permit Section, 951-955-6785). For the day of disruption, residents and business employees typically would park on the other side of the street and walk around the construction area to their homes and workplaces.

8.10.6.2.8 Public Transit

Along streets where bus stops will need to be temporarily closed, the contractor will need to post notices of closure per the city or county's requirement. The public transit service agency may post notice of bus stop closure at their websites.

8.10.6.2.9 Surface Restoration

In general, any construction activities impacting existing surfaces or roadway components (roadway pavements, signing and striping, traffic signals and detectors, driveways, islands, curbs and gutters, sidewalks, medians, and landscaping) shall be mitigated by restoring the facility to its original condition (before construction). While there is no restriction on the length of a section to be repaved, the contractor must provide sufficient capacity for traffic.

Pavement restoration shall meet or exceed the county/city's standard specifications (or Caltrans' standard specifications, with the county/city's specifications taking precedence).

The project Standard Details will outline specifics on pavement restoration. Contract documents will provide details on paving, curb and gutter, signing and striping, detectors, sidewalks, medians and landscaping, and other surface elements.

8.10.6.2.10 General Construction and Traffic Control Requirements

The following general construction and traffic control requirements will allow the required traffic movements to occur with minimum interruption. For the majority of the alignment, at least one through lane of traffic in the direction adjacent to construction is required. Full road closures, where required during construction, will require detour routing.

Minimum Lane Width for all traffic lanes shall be 12 feet (3.6 meters). In addition to a 12-foot (3.6-meter) minimum width, a 2-foot (0.6-meter) buffer shall be maintained between the edge of traveled lane and any traffic control devices including, but are not limited to, concrete barriers, delineators, construction barrels, cones and curb and gutter. Specific requirements for temporary lane widths along roadways where 12-foot wide traffic lanes cannot be achieved will be obtained from the local agencies.

Temporary Concrete Barrier with proper end treatment shall be provided whenever a lateral safety clearance of 10 feet or less between edge of traveled lane and edge of trench is not obtainable.

Reduction of the Speed Limit by 10 mph from the posted speed limit shall be in place during all hours that traffic control is in place.

Flaggers shall be included when only one lane is available for two-way traffic. Two flagmen will be stationed at both ends of the construction zone to safely direct traffic.

Sidewalk Closure will be accomplished by following typical signing requirements.

8.10.6.3 Operations and Maintenance Phase

The operations- and maintenance-related traffic associated with the project is considered to be minimal. State routes and local roadways have adequate capacity to accommodate operations-related traffic. Consequently, no operations-related mitigation measures are required.

8.10.7 Involved Agencies and Agency Contacts

The relevant agencies and appropriate contacts are shown in Table 8.10-4.

TABLE 8.10-4
Agency Contacts

Agency	Contact/Title	Telephone
City of Grand Terrace, Planning Department	Michelle Boustedt 22795 Barton Road Grand Terrace, CA 92313	(909) 430-2247
City of Riverside Planning Department	Transportation Planner 3900 Main Street Riverside, CA 92522	(951) 826-5371
County of Riverside Traffic Operations Section	J. R. Morgan 2950 Washington Street Riverside, CA 92504	(951) 955-6815

8.10.8 Permits and Permitting Schedule

The short duration of the construction, in conjunction with the minute permanent addition of 24 trips, impose a relatively insignificant addition to existing traffic levels. The relevant permits required for work performed within city/county streets in project vicinity are identified in Table 8.10-5.

TABLE 8.10-5
Required Permits

Responsible Agency	Permit/Approval	Schedule
County of Riverside, Encroachment Permit Section	Encroachment Permit	4 weeks
City of Grand Terrace| Public Works Department	Encroachment Permit	2-3 weeks
City of Riverside Public Works Department	Encroachment Permit	72 hours

8.10.9 References

California Department of Transportation (Caltrans). 1996. Traffic Manual, Chapter 5, Manual of Traffic Controls for Construction and Maintenance Work Zones.

California Department of Transportation (Caltrans). 1998. Traffic and Vehicle Systems Data Unit, (website: http:llwww.dot.ca.govlhq/traffops/saferesr/trafdata/index.htm).

California Department of Transportation (Caltrans). 2002. Standard Plans. June.

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Grand Terrace, City of. 1998. Planning Department. General Plan, Transportation Element. Adopted June.

Riverside, City of. Department of Public Works. 2005. Regulations for Construction Permits/Street Opening Permits.

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Riverside County Planning Department. 2002. General Plan, Transportation Element.

Lilburn Corporation. 2004. Outdoor Adventures Center Specific Plan. Final Environment Impact Report. May 6.

Transportation Research Board. 2000. Highway Capacity Manual, Special Report 209.