APPENDIX F
PHASE I CULTURAL RESOURCES TECHNICAL REPORT

The cultural resources technical report supports the cultural and paleontological resources impact assessments presented in Section 5.8 of the Draft EIR. This cultural resources technical report for the AV Solar Ranch One Project includes CONFIDENTIAL SITE LOCATION information (Appendix F; Appendices A, B, and C). Disclosure of this information to the public may be a violation of both federal and state laws. Accordingly, the confidential portions (Appendices A, B, and C) are not appropriate for public distribution.

PHASE I CULTURAL RESOURCES SURVEY TECHNICAL REPORT

AV SOLAR RANCH ONE PHOTOVOLTAIC SOLAR PROJECT, LOS ANGELES AND KERN COUNTIES, CALIFORNIA

Prepared for:

Los Angeles County Department of Regional Planning

and

NextLight Renewable Power, LLC

AV Solar Ranch 1, LLC
353 Sacramento Street, Suite 2100
San Francisco, CA 94111

Prepared by:

URS
130 Robin Hill Road, Suite 100
Santa Barbara, California 93117
(805) 964-6010 ◆ Fax: (805) 964-0259

URS Project Number 28907103

June 2010

National Archaeological Database Information

Authors:	Mark Neal, M.A., R.P.A., Laurie Solis, M.A., and Suzanne Black
Consulting Firm:	URS Corporation Americas
Report Date:	August 2009
Report Title:	Phase I Cultural Resources Survey Technical Report: AV Solar Ranch One Project
Prepared by:	URS Corporation Americas, 130 Robin Hill Road, Suite 100, Santa Barbara, CA 93117
Prepared for:	AV Solar Ranch 1, LLC
Submitted to:	Los Angeles County Department of Regional Planning
Acreage:	2,100 acres plus 3.5 miles of off-site linear transmission line
USGS Quadrangles:	Fairmont Butte 7.5 minute, rev. 1995.
Sites Recorded:	CA-LAN-1776, CA-LAN-1777, CA-LAN-1780, CA-LAN-1781, URS-SB-1, URS-SB-2, URS-SB-3, URS-SB-4, URS-SB-5, URS-SB-6, URS-MN-1, URS-MN-2, URS-MN-3, URS-MN-4, URS-MN-5, URS-MN-6, URS-MN-7, URS-MN-9, URS-MN-10, URS-MN-11, URS-MN-12, URS-MN-13, URS-MN-15, URS-MN-16, URS-MN-17, NL-NO-Temp 1.
Keywords:	Mojave Desert, Antelope Valley, lithic scatter, rhyolite, historic trash scatter, fire affected rock, groundstone, metate, mano, pestle.

TABLE OF CONTENTS

Section **Page**

Section **Page**

Section **Page**

List of Tables **Page**

List of Figures

List of Confidential Appendices

MANAGEMENT SUMMARY

URS Corporation was contracted by AV Solar Ranch 1, LLC to perform a Phase I Archaeological Inventory and Paleontological Record Search for the NextLight AV Solar Ranch One Project. The proposed Project (refer to Figures 1 and 2) consists of construction and operation of a 230-megawatt (MW) alternating current (AC) solar photovoltaic (PV) facility on approximately 2,100 acres of primarily fallow agricultural land located in northern Los Angeles County along State Route 138 (SR-138) (West Avenue D). The Project includes a 230-kilovolt (kV) transmission line for interconnecting the electrical output of the Project to the regional transmission system. The proposed off-site transmission line is approximately 3.5 miles long, and would interconnect to Southern California Edison's (SCE) planned Whirlwind Substation north of the Project site in southern Kern County.

A Phase I Archaeological Survey of the proposed Project site and off-site transmission line was conducted by a team of eight URS archaeologists, including Laurie Solis (Cultural Task Leader), Mark Neal (Field Director and Crew Chief), Suzanne Black (Crew Chief), David Barklow, Mark Campbell, William Jenson, Nate Orsi, and Shane Wetherbee. URS archaeologists performed the Phase 1 intensive cultural resources survey from May 4, 2009 to May, 8, 2009 and from May 11, 2009 to May 15, 2009, except for an area measuring approximately 125 acres in the northeastern quarter of Section 24 of Township 8 N, Range 4 W, where extremely low ground visibility and the presence of venomous snakes made surveying hazardous. The methodology consisted of using 15 meter parallel transects on all portions of the Area of Potential Effect (using three to four archaeologists per team).

The pedestrian survey of the supplemental 125-acre project area was conducted on the following dates: January 15, January 18, and January 29, 2010. In addition to the 125 acres, an expanded 200-foot-wide transmission line study area located north of the Project site along 170th Street West in Kern County was surveyed and documented on January 28, 2010. Another supplemental transmission line study area survey covering an additional expanded area east of 170th Street West in the vicinity of the Southern California Edison (SCE) corridor was carried out on March 4, 2010. All segments were systematically walked using 15-meter parallel transects running north to south. In the northeast corner of the 125-acre section, the transects were east to west due to a small part of the parcel that was cordoned off by a fence line. Laurie Solis (Cultural Task Leader) and Nathan Orsi (Archaeologist 1) were the two archaeologists who completed the supplemental work in early 2010.

During the survey, 22 previously unrecorded archaeological sites were discovered. In addition four known sites were relocated and their records updated. Of those 26 sites, 24 were of prehistoric origin and can be described as scatters of fire affected rock, groundstone fragments, and flaked tool manufacturing materials, primarily in the form of rhyolite cores and large primary flakes and shatter. These sites have potential to yield additional information regarding prehistory, including but not limited to such topics as prehistoric land use, settlement and subsistence patterns, toolstone procurement and use, and chronology. Therefore, Phase II testing and evaluation of the prehistoric sites is recommended prior to construction.

The two historic era sites consisted of one refuse deposit with only extremely fragmented non-diagnostic glass and ceramic artifacts with one glass bottle base dating to the late 1800s, and one scatter of possibly late 19th century bottle glass with one bottle base having been worked using flaked tool manufacturing methods. The Larsen Ranch property within the overall Project site was documented as a historic resource. These sites are not considered eligible for listing in the California Register of Historic Resources (CRHR).

Of the 44 archaeological isolates discovered, 41 are from the prehistoric era. Prehistoric isolates recorded include; 30 incidences of rhyolite flakes, cores, or extremely low density flake scatters; nine incidences of single pieces of low density clusters of groundstone fragments; one well-finished and shaped pestle, one possible chopping tool, and one flake of cryptocrystalline silicate material. The two historic isolates consisted of one bottle base dating to the early 20th century and one hand-forged pick blade.

URS recommends the following mitigation measures.

CUL-1: Avoid Archaeological Sites. Prehistoric archaeological sites within the proposed Project area shall be avoided and protected from future disturbance or evaluated for significance and mitigated, as appropriate, to the extent feasible and practicable.

CUL-2: Phase II Testing/Phase III Data Recovery. Prior to construction, Phase II testing and evaluation shall be conducted at all unavoidable prehistoric archaeological sites in the proposed Project area to determine their significance under Section 15064.5 of California Environmental Quality Act (CEQA). Sites determined eligible for the CRHR shall either be avoided and protected from future disturbance, or a Phase III data recovery plan shall be prepared and implemented prior to construction. All archaeological collections, technical reports and related documentation shall be curated at a County-approved curation facility.

CUL-3: Archaeological Monitoring. Prior to construction, an archaeological monitoring plan shall be prepared and implemented. An archaeological monitor shall be present during all ground disturbing activities, including vegetation clearing, grubbing, grading, filling, drilling, and trenching. In the event that any prehistoric or historic cultural resources (chipped or ground stone lithics, animal bone, ashy midden soil, structural remains, historic glass or ceramics, etc.) are discovered during the course of construction, all work in the vicinity shall halt, and the archaeologist will record the resources on the appropriate DPR 523 Series Forms, evaluate the significance of the find, and if significant, determine and implement the appropriate mitigation, including but not limited to Phase III data recovery and associated documentation. Such activities may result in the preparation of additional

Phase II and Phase III technical reports. After ground-disturbing construction activities have been completed, an archaeological construction monitoring report shall be completed.

CUL-4: Native American Monitor. A Native American monitor (Tataviam/Fernadeno Band of Mission Indians) shall be notified prior to construction and allowed the opportunity to be present during all ground disturbing activities, including vegetation clearing, grubbing, grading, filling, drilling, and trenching. In the event that any sacred site or resource is identified, the Native American Monitor, or archaeologist if the Native American Monitor is unavailable, shall be on-site to divert construction activities to another area of the Project site while a proper plan for avoidance or removal is determined.

CUL-5: Human Remains. In the event human remains are encountered, construction in the area of the finding will cease, and the remains will stay in situ pending definition of an appropriate plan. The Los Angeles County Coroner (Coroner) will be contacted to determine the origin of the remains. In the event the remains are Native American in origin, the NAHC will be contacted to determine necessary procedures for protection and preservation of the remains, including reburial, as provided in the CEQA Guidelines, Section 15064.5(e), "CEQA and Archaeological Resources," CEQA Technical Advisory Series.[1]

CUL-6: Paleontological Resources Protection. In the event paleontological discoveries are encountered, all excavation shall cease in the area of the find and a paleontologist shall be contact who shall devise a plan for recovery in accordance with standards for such established by the Society of Vertebrate Paleontology. Any paleontological resources shall be documented and submitted to the Natural History Museum of Los Angeles County, or any other accredited institution (i.e., San Bernardino County Museum, UCLA Dept of Earth and Space Sciences) that will accept paleontological resources for curation.

CUL-7: Construction Worker Training. Prior to construction, the archaeological and Native American monitor shall conduct a brief educational workshop to that all construction personnel understand monitoring requirements, roles and responsibilities of the monitors, and penalties for unauthorized artifact collecting or intentional disturbance of archaeological resources.

[1] California Resources Agency. 16 September 2004. California Environmental Quality Act, Article 5, §15064.5(e): "Determining the Significance of Impacts to Archaeological and Historical Resources." Available at: <http://ceres.ca.gov/topic/env_law/ceqa/guidelines/art5.html>.

SECTION 1.0
INTRODUCTION

The following document is a report of a Phase I archaeological investigation conducted by URS Corporation for the AV Solar Ranch One Project. The investigation was conducted in order to comply with federal, state, and county regulations.

1.1 PROJECT LOCATION AND DESCRIPTION

AV Solar Ranch 1, LLC is proposing to construct the AV Solar Ranch One Project (Project), which will be located approximately 15 miles northwest of downtown Lancaster in the Antelope Valley of California (Figure 1). The Project area is primarily in Los Angeles County, with a portion of the northern end of the proposed transmission line route being in Kern County. The proposed Project is located on private lands with the exception of the proposed off-site transmission line route which is located in the public road right-of-way (ROW) along 170th Street West or adjacent private lands in Los Angeles and Kern counties.

URS Corporation was contracted by AV Solar Ranch 1, LLC to perform a Phase I Archaeological Inventory and Paleontological Record Search for that project. The proposed Project (refer to Figure 2) consists of construction and operation of a 230-MW AC PV facility on approximately 2,100 acres of former agricultural land located in northern Los Angeles County along SR-138 (West Avenue D). The Project includes a 230-kV transmission line for interconnecting the electrical output of the Project to the regional transmission system. The proposed transmission line is approximately 3.5 miles long, and is planned to interconnect to SCE's planned Whirlwind Substation north of the Project site in southern Kern County.

The Project is designed to meet the increasing demand for clean, renewable electrical power. The United States has a greater solar energy resource potential than any other industrialized nation. The multiple benefits associated with developing this resource have been recognized repeatedly by both federal and state policy-makers. Development of solar resources reduces reliance on foreign sources of fuel, promotes national security, diversifies energy portfolios, contributes to the reduction of greenhouse gas emissions, and generates "green" jobs. The Project will contribute much needed on-peak power to the electrical grid in California. Construction phases required for completion of the Project include:

- **Clearing:** Selective vegetation removal for installation of the PV panel structures will be completed as necessary ahead of structure installation, but will be conducted to minimize the amount of disturbed ground surface at any one time.
- **Staging and Laydown:** Parking areas for construction workers, and staging and laydown areas for construction materials, will be prepared inside the solar field area.

Access Roads: Construction access road beds will typically be 20 to 30 feet wide, and will consist of compacted earth, surfaced with gravel or compacted soil. A stabilized entrance/exit will be provided to clean vehicle wheels prior to exiting the construction area. Most construction staff and workers will be at the jobsite on a daily basis.

- **Site Grading:** Because of the flat topography at the site, minimal site grading is expected. The tracker units have telescoping legs that allow for installation on uneven ground, minimizing the need for grading. Local vegetation removal and/or grading under individual trackers may be required depending on the specific topography. Most of grading will be associated with improvement of the on-site drainage channel to control flood flows.
- **Site Stabilization:** Disturbed areas will be stabilized during construction to minimize wind and water erosion, and generation of fugitive dust, by watering and/or the use of dust palliatives. Cleared and graded surfaces that will not be subject to future disturbance will be revegetated as practical to minimize dust. Revegetation will be conducted as soon as practicable, based on seasonal weather conditions, to maximize revegetation success.
- **Demobilization:** All temporary assembly and construction facilities will be removed from the site once construction is complete and the plant is in commercial operation.

1.2 LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

1.2.1 Federal Regulations

Federal laws, regulations and guidelines are not applicable to the proposed Project since it does not meet the definition of a federal undertaking (36 CFR 800.16).

Summaries of State and local laws and regulations governing historic, archaeological, Native American and paleontological resources that are potentially applicable to the proposed Project area provided below.

1.2.2 State Regulations

1.2.2.1 California Environmental Quality Act, '21084.1: "Historical Resource; Substantial Adverse Change" (California Resources Agency 2003)

For the purposes of this section, a historical resource is a resource listed in, or determined to be eligible for listing in, the California Register of Historical Resources (CRHR). Historical resources as defined in subdivision (k) of Section 4020.1, and included as such in a local register, or deemed significant pursuant to criteria set forth in subdivision (g) of Section 5024.1, are presumed to be historically or culturally significant for purposes of this section, unless the preponderance of the evidence demonstrates that the resource is not historically or culturally significant. The fact that a resource is not listed in, or determined to be eligible for listing in, the CRHR, not included in a local register, or not deemed significant pursuant to criteria set forth in subdivision (g) of Section 5024.1 shall not preclude a lead agency from determining whether the resource may be a historical resource.

1.2.2.2 California Environmental Quality Act, ‘15064.5: “Determining the Significance of Impacts to Archeological and Historical Resources” (California Resources Agency 2003)

For the purpose of this section, a resource shall be considered to be historically significant if it meets the criteria for listing on the CRHR (Public Resources Code [PRC] 5024.1, Title 14 California Code of Regulations [CCR], Section 4852), including the following:

- It is associated with events that have made a significant contribution to the broad patterns of California□s history and cultural heritage.
- It is associated with the lives of persons important in our past.
- It embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of an important creative individual, or possesses high artistic values.
- It has yielded, or may be likely to yield, important information in prehistory or history.

An adverse effect on a cultural resource is defined as:

- A substantial adverse change in the significance of a historical resource by physical demolition, destruction, relocation, or alteration of the resource or its immediate surroundings; or
- A change that demolishes or materially alters those physical characteristics of a historical resource that convey its significance and that justify its inclusion in, or eligibility for inclusion in, the CRHR, or inclusion in a local register.

1.2.2.3 California Health and Safety Code, Section 7052

Section 7052 of the California Health and Safety Code establishes a felony penalty for mutilating, disinterring, or otherwise disturbing human remains, except by relatives (State of California).

1.2.2.4 California Penal Code, Section 622.5

Section 622.5 of the California Penal Code establishes a misdemeanor penalty for injuring or destroying objects of historical or archaeological interest located on public or private lands, but specifically excludes the landowner (State of California).

1.2.2.5 California Public Resources Code, Section 5097.5

Section 5097.5 of the California PRC establishes a misdemeanor penalty for the unauthorized disturbance or removal of archaeological, historical, or paleontological resources located on public lands (State of California).

1.2.2.6 California Register of Historical Resources

In 1992, the California Legislature established the CRHR. The CRHR is used as a guide by state and local agencies, private groups, and citizens to identify the state's historical resources and to indicate which properties are to be protected, to the extent prudent and feasible, from substantial adverse change. The CRHR, as instituted by the California PRC, automatically includes all California properties already listed in the NRHP and those formally determined to be eligible for the NRHP (Categories 1 and 2 in the State Inventory of Historical Resources), as well as specific listings of State Historical Landmarks and State Points of Historical Interest. The CRHR also may include various other types of historical resources that meet the criteria for eligibility, including the following:

- Individual historic resources;
- Resources that contribute to a historic district;
- Resources identified as significant in historic resource surveys; and
- Resources with a significance rating of Category 3 through Category 5 in the State Inventory (Categories 3 and 4 refer to potential eligibility for the NRHP; Category 5 indicates a property with local significance).

A property must meet at least one of the following criteria to be eligible for inclusion in the CRHR:

- It is associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage.
- It is associated with the lives of persons important in our past.
- It embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of an important creative individual, or possesses high artistic values.
- It has yielded, or may be likely to yield, information important in prehistory or history.

One property in the community of Lancaster has been designated by the State as California State Historic Landmarks.

1.2.2.7 Evaluation of Resources Less than 50 Years Old

The California Register follows the lead of the NRHP in utilizing the 50-year threshold. A resource is usually considered for its historical significance after it reaches the age of 50 years. This threshold is not absolute; it was chosen as a reasonable span of time after which a professional evaluation of historical value/importance can be made. It has been determined that previously identified archaeological sites that occur on site are not eligible for inclusion under the CRHR (Office of Historic Preservation 1992).

1.2.2.8 State Historic Resources Commission and the Office of Historic Preservation

In accordance with state law (California PRC Section 5020.4), the primary responsibility of the State Historic Resources Commissions (SHRC) is to review applications for listing historic and archaeological resources on the NRHP, the CRHR, and the California Historical Landmarks and California Points of Historical Interest registration programs.

The SHRC is also charged with the following responsibilities:

- Conduct a statewide inventory of historical resources and maintain comprehensive records of these resources;
- Develop and adopt criteria for the rehabilitation of historic structures;
- Establish policies and guidelines for a comprehensive statewide historical resources plan;
- Submit an annual report to the Director of the Department of Parks and Recreation and the state legislature giving an account of its activities, identifying unattained goals of plans and programs, and recommending needed legislation for the support of these programs;
- Consult with and consider the recommendations of public agencies, civic groups, and citizens interested in historic preservation; and
- Develop criteria and procedures based on public hearings and active public participation for the selection of projects to be funded through the National Historic Preservation Fund and other federal and state grants-in-aid programs.

The Office of Historic Preservation (OHP) is the governmental agency primarily responsible for the statewide administration of the historic preservation program in California. The chief administrative officer for the OHP is the State Historic Preservation Officer (SHPO). The SHPO is also the executive secretary of the SHRC. The mission of the OHP and the SHRC, in partnership with the people of California and governmental agencies, is to preserve and enhance California's irreplaceable historic heritage as a matter of public interest so that its vital legacy of cultural, educational, recreational, aesthetic, economic, social, and environmental benefits will be maintained and enriched for present and future generations (Office of Historic Preservation 2002).

The OHP is responsible for carrying out its mission by meeting the following goals:

- Identifying, evaluating, and registering historic properties;
- Ensuring compliance with federal and state regulatory obligations;
- Cooperating with traditional preservation partners while building new alliances with other community organizations and public agencies;
- Encouraging the adoption of economic incentives programs designed to benefit property owners; and
- Encouraging economic revitalization by promoting a historic preservation ethic through preservation education and public awareness, and, most significantly, by demonstrating leadership and stewardship for historic preservation in California.

1.2.3 Local Regulations

1.2.3.1 <u>Southern California Association of Governments</u>

The Southern California Association of Governments (SCAG) Growth Management Chapter (GMC) has instituted policies regarding the protection of cultural resources. SCAG GMC Policy No. 3.21 "encourages the implementation of measures aimed at the preservation and protection of recorded and unrecorded cultural resources and archaeological sites" (Southern California Association of Governments 2001).

1.3 AREA OF POTENTIAL EFFECT

The archaeological Area of Potential Effect (APE) includes the APE of the project plus a transmission corridor for which an area 50 feet on either side of 170th Street West extending for approximately 4.5 miles north of the main project APE was surveyed (Figure 3).

In January of 2010 the APE for the transmission route was expanded to 200 feet off of the road ROW for 170th Street West in several locations in Kern County. The study area for the transmission line route was expanded again in March 2010. The expanded transmission line route study areas were surveyed on January 28, 2010 and March 4, 2010 for prehistoric and historic cultural resources.

1.4 CULTURAL RESOURCE PERSONNEL

Laurie Solis, M.A. – Principal Investigator

Ms. Solis has 10 years of experience as a Cultural Resource Specialist conducting investigations and assessments for archaeological, historic, and paleontological resources for CEQA and NEPA compliance. Ms. Solis has extensive experience conducting Phase I Archaeological Surveys, Phase II Testing, and Phase III Studies. Ms. Solis specializes in prehistory of the Great Basin and Pioneer/Frontier History and is currently a Professor of Anthropology at College of the Canyons in Valencia, California. During the course of her career, Ms. Solis has written over 70 technical reports and has supervised archaeological investigations (survey, testing, monitoring and data recovery plans and reports), contributed to EISs, EIRs, EAs, AFCs, and published articles in peer-reviewed journals. Ms. Solis is also the author of the book Tataviam: People Who Face the Sun (2008).

Mark Neal, M.A., R.P.A. – Field Director and Crew Chief

Mark Neal has extensive training and experience in archaeological survey, excavation, and data analysis. He has particular expertise in the use of Geographic Information Systems (GIS) and predictive modeling in the field of archaeology and land use planning. He has both Bachelors and Masters degrees in Anthropology from the University of California Santa Barbara.

Mr. Neal also has considerable experience working with tribal government in the process of cultural resource management. In his prior work as tribal Consulting Archaeologist, he provided research and input regarding countless land use management issues and supported tribal government during consultation processes under CEQA, NEPA, and SB18.

Suzanne Black, B.A. – Crew Chief

Suzanne Black is a lab and field technician with 3 years of experience in Cultural Resource Management and Academic Archaeology. She has done fieldwork in a variety of settings in California, with an emphasis in Coastal California. She has participated in large-scale survey projects, as well as excavations and the monitoring of a long term remediation project. Ms. Black specializes in prehistoric coastal adaptation and has technical skills in faunal and lithic analysis, human osteological identification, and artifact curation.

Nathan Orsi, B.A. – Archaeologist I

Mr. Orsi is an archaeologist with URS Los Angeles office and conducts investigations and assessments for archaeological and historic resources for CEQA and NEPA compliance within the state of California. Mr. Orsi has five and a half years of experience as an archaeologist and has also worked in Upstate New York, Virginia, Rhode Island, Arizona, and Belize. Since Mr. Orsi's hire in May 2009 he has successfully completed survey work on various projects throughout southern California both prehistoric and historic in nature. Mr. Orsi has prepared several technical memorandums, carried out record searches, and assisted in historical documentation of various projects. Mr. Orsi has coordinated records requests from various archaeological information centers. He has successfully coordinated with the Native American Heritage Commission and local tribal entities.

SECTION 2.0
ENVIRONMENTAL AND CULTURAL SETTING

2.1 CLIMATE

The project site is situated in the western Mojave Desert characterized by dry, hot summers and cold, somewhat wetter winters. Average rainfall is less than 8 inches annually. Summer temperatures are typically in the mid 90s and winter temperatures range between the upper 50s to the low 60s. The weather pattern that brings the marine layer to Los Angeles brings gusty winds to the Antelope Valley. As a result, gusty southwest winds blow in the afternoons in the Project area virtually year-round.

2.2 FLORA AND FAUNA

Habitat communities within the Project boundaries are currently classified as cropland, with remnant sections of Desert Scrub. (California Gap Analysis 1998). Desert Scrub habitats, the most widespread habitat in the California deserts, are found in California throughout the Mojave and Sonoran deserts at suitable elevations, generally below 1,220 meters (m) (4,000 feet), but may occur 300 m (1,000 feet) higher on south-facing slopes. Desert Scrub is characterized by the presence of rabbitbrush, creosote, and Mojave yucca. As much of the Project area has undergone clearing of natural vegetation, the habitats present today likely do not reflect those that may have been present throughout much of history and prehistory.

2.3 GEOLOGY, SOILS, AND TOPOGRAPHY

The Project site and transmission line route lie within the Antelope Valley, which is characterized by relatively flat-lying topography and valley fill deposits. The valley is bound by the San Gabriel Mountains to the south and southwest and the Tehachapi Mountains to the northwest. The Project site is relatively flat (ranging from approximately 1 to 2 percent slope), sloping gently to the northeast from approximately 2,720 to 2,600 feet above mean sea level. There are no unusual and/or significant landforms or geologic features associated with the Project site.

The site is situated within the westernmost portion of the Mojave Desert Geomorphic Province in Southern California. Geologic structures within the Mojave Desert tend to consist of isolated mountain ranges separated by vast expanses of desert plains, with a predominate northwest-southeast faulting trend, with a secondary trend of east-west (parallel to the Transverse Ranges Province).

The site is underlain by Quaternary alluvium (Qal) except for the southeastern portion, which is underlain by Pleistocene non-marine (Qc) deposits (Figure 4). The soils within the project boundary are of the Hanford-Greenfield association, which are characterized as well drained with moderately rapid subsoil permeability. The soils are primarily used for non-irrigated grain products (Terracon Consultants, Inc. 2009).

2.4 PALEOENVIRONMENTAL RECONSTRUCTION

The prevailing characteristics of the natural environment of the Mojave Desert have set notable constraints on how land could be used by native populations and later settlers. Over the past roughly 12,000 years of human activity within the Mojave Desert, the region has witnessed significant environmental change. Since environmental conditions can significantly influence patterns of human settlement, subsistence, and technology, an understanding of environmental change is necessary to any reconstruction of regional human history.

The overall trend of environmental change in the Mojave Desert has been one of fluctuation from generally cool and wet conditions to significantly warmer and drier conditions such as those that exist today. Throughout the Late Pleistocene (ca. 18000 to 8000 cal. B.C.) conditions were generally cool and wet (Sutton 1996) and gradually transitioned to conditions during the Middle Holocene (ca. 6000 to 3000 B.C.) that were much warmer and drier than those we might observe today. The climate became cooler and wetter again during the Late Holocene (ca. 3000 cal B.C. to present) (Sutton et al. 2007).

Relatively recent studies of woodrat middens and dry lakebeds have greatly improved our understanding of paleoclimatic change Mojave Desert. Over the past 20 years a more detailed picture of environmental conditions has developed, revealing considerable temporal and regional fluctuation with punctuated periods of drought. Following is a chronologic synopsis of paleoenvironmental conditions in the Mojave Desert.

2.4.1 Late Pleistocene (ca. 18000 to 8000 cal. B.C.)

The Late Pleistocene saw the end of the last glacial period and the environment of the Mojave Desert region was considerably different from today. Conditions were cooler and wetter, with several major lake systems, smaller isolated lakes and associated lacustrine zones (Sutton 1996). While the types of vegetation communities were similar to those of the modern Great Basin Desert, they were distributed differently, with Pinyon-Juniper Woodlands extending well into the valleys (Cleland □ Spaulding 1992) and in areas that are presently intense rain shadows, such as the current project area (King 1976).

2.4.2 Early Holocene (ca. 8000 to 6000 cal. B.C.)

A climatic trend towards increased aridity and reduced effective precipitation began ca. 9600 cal. B.C. (Sutton et al. 2007:231) that continued into the Early Holocene (Basgall 2004). That transition seems to have been gradual. For example, the record at Owens Lake indicates that relatively wet conditions and consistently recharged lake levels persisted until about 6000 cal. B.C., transitioning to shallow and rapidly changing levels from that time into the Middle Holocene (Sutton et al. 2007).

It is important to note, however, that the Mojave Desert is not as spatially uniform as the rest of the Great Basin. The Mojave Desert has been characterized as varying considerably not only temporally but spatially, with broad swaths of relatively unproductive habitat dotted with potentially valuable resource patches. Modern climatic data show that reduced rainfall in one location may have been balanced by enhanced conditions in other locations. Basgall □ Hall (1992) report that Early Holocene hydrology was much like modern conditions with slightly elevated playa lake periodicity and spring density (Basgall □ Hall 1992).

2.4.3 Middle Holocene (ca. 6000 to 3000 cal. B.C.)

The trend towards greater aridity continued into the Middle Holocene when conditions became much warmer and drier than today (Sutton et al. 2007). Flora and fauna achieved virtually modern composition and distribution, with creosotic biotic communities becoming established ca. 4900 cal B.C. or soon thereafter (Sutton et al. 2007:231). Rivers and lakes disappeared and colonization by thermophilous shrubs began (Basgall □ Hall 1992).

2.4.4 Late Holocene (ca. 3000 cal. B.C. to A.D. 1100)

The Late Holocene was a period of relative environmental instability, with moderately cooler and wetter conditions disrupted by punctuated events of climatic change (Brunzell 2007; Sutton et al. 2007; Sutton 1996).

One such event, the Medieval Climatic Anomaly (MCA), was a time of warmer temperatures and more arid conditions that occurred between ca. A.D. 800 and A.D. 1350 (Sutton et al. 2007). During the MCA, fundamental climatic, hydrologic, and floristic patterns came together into the environment that now characterizes the Mojave Desert. Woodrat midden studies showing that at least in some areas vegetation composition was essentially the same as that which is found in those areas today, but other data indicate that local, regional, and temporal variability of the effects of the MCA on the environment were considerable (Basgall 2004).

Following the MCA was the Little Ice Age, which occurred between A.D. 1400 and A.D. 1875 (Sutton et al. 2007:233). It was a period of cooler temperatures and greater precipitation that brought about an end to the extended drought conditions that characterized the MCA and fostered a gradual re-expansion of juniper woodlands (Sutton et al. 2007).

2.5 REGIONAL PREHISTORIC CONTEXT

The Antelope Valley region was home to Native American population groups for at least thousands of years. The native ecological environment consisted of a large basin surrounded by the San Gabriel Mountains and river and stream drainages which were prime locations for Native American food processing and village sites. Prehistoric archaeological sites are often covered by 3 or more feet of topsoil, often protecting sites even after an area has become highly urbanized, particularly in areas with shallow building foundations, parks, parking lots, and roads. However, prehistoric sites occasionally can be found on the surface in urbanized areas that have not been extensively disturbed. The following is a cultural chronology of the Native American habitation of Southern California. Noted Anthropologist William Wallace first developed this chronology in 1955. Since then, various chronologies suggested for several regions of California have been published. However, all of these regional chronologies were based on Wallace's version, with only minor changes.

The following overview of Mojave Desert culture history is included to provide a framework for adaptive and archaeological patterns that might be encountered in the region of the NextLight Antelope Valley Solar Ranch One Project. The information presented is organized chronologically and focuses on region wide changes in human adaptation strategies over the past approximately 12,000 years of human occupation in the Mojave Desert.

2.5.1 Paleoindian

The period of human culture in North American commonly referred to as Paleoindian occurred from the Late Pleistocene and Early Holocene.

The Clovis is the only cultural complex that has been confidently dated to the late Pleistocene in the Mojave Desert (Sutton et al. 2007). Proponents of a pre-Clovis occupation continue to argue their case. Considering the growing body of evidence for a pre-Clovis occupation in the Americas and in the Mojave Desert, it seems that the possibility of such an occupation cannot be entirely discounted but the archaeological community remains largely unconvinced (Martinez et al. 2008; Sutton et al. 2007).

The Clovis period is characterized by fluted points, and have been recovered from an increasing but rare number of locales. They have most often been found in surface contexts, making the exact chronological position of fluted point forms in the Mojave Desert less clear due to the lack of reliable carbon dates. Based on this sparse evidence, it can only be said that groups in the Mojave Desert at the terminal Pleistocene probably had relatively small populations, were highly mobile, and lived in small, temporary camps near permanent water sources (Sutton et al. 2007:234).

2.5.2 Early Man Horizon (approx. 11000 to 6000 B.C.)

From the end of the Pleistocene (approximately 11,000 years ago) to approximately 6000 B.C., archaeological assemblages attributed to this horizon area were characterized by large projectile points and scrapers. The limited data available suggest that prehistoric populations focused on hunting and gathering, moving from region to region in small nomadic groups.

The most coherent archaeological pattern known from that time is the Early Man Horizon, which was a regional expression of the Western Pluvial Lakes Tradition that was widespread in the western North America.

These sites have been thought to have been associated with the shores of now-dry lakes, but based on more recent data some researchers have come to question that association. Currently available settlement data seem to suggest that the apparent association between lacustrine habitats and sites is biased by differential preservation of older sediments (Basgall and Hall 1992; Basgall 2004). The Pleistocene/Holocene transition was one of climatic oscillations that would have led to environmental instability, requiring extensive monitoring of the distribution and productivity of available resource patches and greater mobility to exploit those patches (Sutton et al. 2007). Current data now seems to suggest a pattern more consistent with generalized foragers where human occupation was attracted by rich resource patches in a variety of environmental situations (Sutton et al. 2007).

Artifact assemblages of the include leaf-shaped lanceolate points, bifacial cutting tools, keeled or dome-shaped scrapers, crescentics, simple flake tools, and rare occurrences of ground stone. (Basgall Hall 1992; Basgall 2004; Brunzell 2007). Hunting patterns of that time are still not well understood. Faunal assemblages seem to reflect a reliance on small taxa such as lagamorphs, rodents, and reptiles, which seems inconsistent with tool assemblages where large bifaces and scrapers predominate (Sutton et al. 2007).

Site components have been reported that include extensive residential accumulations, workshops, and small camps. Extra local materials are common, and marine shell beads have been found, suggesting broad foraging ranges and spheres of social interaction. However, large sites appear to be manifestations of multiple occupation episodes rather than single, intensive ones, (Basgall Hall 1992) so the patterns may reflect a pure forager strategy organized around small social units (Sutton et al. 2007).

2.5.3 Milling Stone Horizon (approx. 6000 to 1000 B.C.)

This horizon is characterized by the appearance of hand-stones and milling-stones and dates between approximately 6000 B.C. to 1000 B.C. Artifact assemblages during the early Milling Stone period reflect an emphasis on plant foods and foraging subsistence systems. Inland populations generally exploited grass seeds, which became the primary subsistence activity. Artifact assemblages are characterized by choppers and scraper planes but generally lack projectile points. The appearance of large projectile points in the latter portion of the Milling Stone Horizon suggests a more diverse subsistence economy.

Environmental instability during the Middle Holocene may have fostered changes in subsistence and settlement strategies among the inhabitants of the Mojave Desert. During that time, the climate became generally warmer and drier with oscillating periods of drought and moister periods. Recent data may indicate that climatic stress varied region-to-region and that conditions were not as inhospitable to human habitation as once thought (Sutton et al. 2007). Until recently it had been thought that when harsher conditions arose people adapted by moving out of the most inhospitable parts of the Mojave, forming settlements around oases at the edges of the desert, from where smaller groups would seasonally occupy the desert. Basgall (2004) argues that such a portrayal would be inconsistent with the large number of extensive deposits being discovered across the southwestern Great Basin. It is now thought that Middle Holocene sites occur in a diverse range of topographic and environmental zones, including near remnant pluvial lake basins, ancient stream channels, spring/seep locations, and in upland contexts. Larger sites contain well-developed middens with artifact richness that is greater than that of smaller sites. That data would be consistent with a collector-like strategy with centralized site complexes from which logistical forays were staged into surrounding resource patches (Sutton et al. 2007).

The primary cultural complex of this period is the Pinto. Pinto Complex assemblages are marked by stemmed, indented-base points but in many ways there appears to be broad continuity between the Lake Mojave Pinto Complexes. It was originally thought that the Lake Mojave Complex predated the Pinto Complex, but additional radiometric dates and hydration profiles collected over the past 20 years seem to indicate that the Lake Mojave and Pinto complexes overlapped in the latter part of the Early Holocene. That leads researchers today to suspect that multiple culturally distinct populations may have occupied the Mojave Desert during this period (Sutton et al. 2007).

Artifact assemblages dated to this time period seem to also reflect a transition to a wider diet breadth with greater reliance on vegetal resources. The primary cultural transition that occurs during the Milling Stone Horizon is the greater prevalence of ground stone implements among the site assemblages. It seems that broader-spectrum economies with intensive levels of plant processing began by ca. 7000 cal. B.C. (Sutton et al. 2007:238).

2.5.4 Intermediate Horizon (approx. 1000 B.C. to A.D. 750)

Dated from 1000 B.C. to A.D. 750, the Intermediate Horizon represents a period of transition for prehistoric Native American groups. Little is known about the people of this period, especially those occupying inland southern California. Archaeological site assemblages possess many attributes of the Milling Stone Horizon. In addition, however, these sites generally contain large stemmed (or notched) projectile points and portable mortars and pestles. It is believed that the mortars and pestles were used to harvest, process, and consume acorns. Given the general lack of data on the subsistence system and the cultural evolution of this period, the substrates representing the cultural behavior are not well understood.

Environmental conditions during this time became hotter and drier, which may have left large areas of the Mojave Desert uninhabitable. This is reflected in the very low population densities for roughly 1,000 years between the times associated with the Pinto and Gypsum complexes and is thought to account for the lack of data for this time period.

The Rose Springs Complex became dominant ca. A.D. 200 (Sutton et al. 2007:241-242) and was also a time of major cultural change among the inhabitants of the Mojave Desert. During that time major population increases reached their peak, and the presence of architecture such as pit houses and wikiups suggest more intensive occupation. In addition, hunting technology changed with the diffusion of the bow and arrow into the area. The dominant artifacts of the Rose Springs Complex include smaller projectile points, stone knives, drills, pipes, bone awls, various milling implements, marine shell ornaments, and large quantities of obsidian (Sutton et al. 2007).

The Medieval Climatic Anomaly was a punctuated time of increased aridity that began roughly in the middle of the time during which the Rose Springs was the dominant cultural complex. During that time few people remained in much of the Mojave Desert. Large villages declined and people aggregated to more compact settlement units to make more efficient use of diminishing resources due to environmental degradation (Sutton et al. 2007).

2.5.5 Late Prehistoric Horizon (approx. A.D. 750 to 1769)

From A.D. 750 to Spanish contact in A.D. 1769, the Late Prehistoric Horizon reflects an increased technological sophistication and diversity. This period is characterized by the presence of small projectile points, which imply the use of bow and arrow, as opposed to spear. In addition, site assemblages also include steatite bowls, asphaltum, grave goods, and elaborate shell ornaments. Utilization of bedrock milling slicks is prevalent throughout this horizon. Also, an increase in hunting efficiency and widespread exploitation of acorns provided reliable and storable food resources. These innovations seem to have promoted greater sedentism.

During the Late Holocene in the Mojave Desert major changes took place in technology, settlement systems, and social complexity. Those changes seem to have been influenced by variations in environmental productivity, population size and dynamics, and the diffusion of material culture and adaptive strategies via long-distance trade relations and the occupation of certain desert regions by Southwestern groups (Lechner □ Giambastiani 2008).

During Late Prehistoric times the environment continued to deteriorate, populations declined further, and new technologies were introduced. A variety of types of occupation sites have been dated to this time, including a few major villages with associated cemeteries, special purpose, and seasonal sites. Artifact assemblages include Desert series projectile points, buffware and brownware ceramics, shell and steatite beads, pendants, incised stones, and milling tools.

Population increases combined with decreasing water supplies and improved efficiency of bow and arrow hunting may have resulted in changes that led to the end of the Rose Springs Complex by ca. A.D. 1100 (Sutton et al. 2007).

2.6 ETHNOGRAPHY

2.6.1 The Tataviam

The Tataviam are a Native American group that resided in and around the area encompassing the project site (Figure 5). The name "Tataviam" means, "People who Face the Sun." The Tataviam belong to the family of Serrano people who migrated down into the Antelope, Santa Clarita, and San Fernando Valleys some time before 450 A.D. They settled into the upper Santa Clara River Drainage. Some Tataviam settlements in the Santa Clarita and upper valleys were Nuhubit (Newhall); Piru-U-Bit (Piru); Tochonanga which is believed to have been located at the confluence of Wiley and Towsley Canyons; and the very large village of Chaguibit, the center of which is buried under the Rye Canyon exit of I-5. The Tataviam also lived where Saugus, Agua Dulce, and Lake Elizabeth are located today. This places the Serrano among the larger "Shoshonean" migration into southern California that occurred 2,000 to 3,000 years ago (Ventura County Resource Conservation District 2005, Higgins 1996).

The Tataviam people lived primarily on the upper reaches of the Santa Clara River drainage system, east of Piru Creek, but they also marginally inhabited the upper San Fernando Valley, including present day San Fernando and Sylmar (which they shared with their inland Tongva/Gabrieleño neighbors). The traditional Tataviam territory lies primarily between 1,500 and 3,000 feet above sea level. Their territory also may have extended over the Sawmill Mountains to include at least the southwestern fringes of the Antelope Valley, which they apparently shared with the Kitanemuk, who occupied the greater portion of the Antelope Valley. The Tataviam were hunters and gatherers who prepared their foodstuffs in much the same way as their neighbors. Their primary foods included yucca, acorns, juniper berries, sage seeds, deer, the occasional antelope, and smaller game such as rabbits and ground squirrels. There is no information regarding Tataviam social organization, though information from neighboring groups shows similarities among Tataviam, Chumash, and Gabrieleño ritual practices. Like their Chumash neighbors, the Tataviam practiced an annual mourning ceremony in late summer or early fall which would have been conducted in a circular structure made of reeds or branches. At first contact with the Spanish in the late 18th century, the population of this group was estimated at less than 1,000 persons. However, this ethnographic estimate of the entire population is unlikely to be accurate, since it is based only on one small village complex and cannot necessarily be indicative of the entire population of Tataviam. Given the archaeological evidence at various Tataviam sites, as well as the numbers incorporated into the Spanish Missions, pre-contact population and early contact population easily exceeded 1,000 persons (Blackburn 1962, Johnston 1962).

The Tataviam people lived in small villages and were semi-nomadic when food was scarce. The Tataviam were hunter-gathers who were organized into a series of clans throughout the region. Jimsonweed, native tobacco, and other plants found along the local rivers and streams provided raw materials for baskets, cordage, and netting. Larger game was generally hunted with the bow and arrow, while snares, traps, and pits were used for capturing smaller game. At certain times of the year, communal hunting and gathering expeditions were held. Faunal resources available to the desert dwelling Serrano included deer, mountain sheep, antelope, rabbit, small rodents, and several species of birds (quail being their favorite). Meat was generally prepared by cooking in earth ovens, boiling, or sun-drying. Cooking and food preparation utensils consisted primarily of lithic (stone) knives and scrapers, mortars and metates, pottery, and bone or horn utensils. Resources available to the desert dwelling Tataviam included honey mesquite, piñon nuts, yucca roots, mesquite and cactus fruits.

These resources were supplemented with roots, bulbs, shoots, and seeds that, if not available locally, were traded for with other groups. Labor was divided between the sexes. Men carried out most of the heavy but short-term labor, such as hunting and fishing, conducted most trading ventures, and had as their central concerns the well being of the village and the family. Women were involved in collecting and processing most of the plant materials and basket production. The elderly of both sexes taught children and cared for the young.

2.6.2 The Kitanemuk

The Kitanemuk belonged to the northern section of the people known as the "Serrano." The name, "Serrano," however, is only a generic term meaning "mountaineers" or "those of the Sierras." Ethnographers group the Kitanemuk with the Serrano based on linguistic similarities though the Kitanemuk did not identify themselves as Serrano.

The Kitanemuk lived on the upper Tejon and Paso Creeks and also held the streams on the rear side of the Tehachapi Mountains, the small creeks draining the rear slope of the Liebre and Sawmill Range, with Antelope Valley and the westernmost part of the Mojave Desert. The extent of their territorial claims in the desert region is not certain.

The Kitanemuk, lived in permanent winter villages of 50 to 80 people or more. During the late spring, summer, and fall months they dispersed into smaller, highly-mobile gathering groups. They followed a seasonal round, visiting different environmental regions as the important food producing plants became ready for harvest. Some staple foods important to the Kitanemuk include acorns and piñon (Antelope Valley Indian Museum) and yucca, elderberries, and mesquite beans were available as well (Duff 2004).

While travelling in the Antelope Valley in 1776, Spanish explorer and Franciscan priest Francisco Garcés encountered the Kitanemuk living in a communal tule house. His written account describes that dwelling as consisting of a series of individual rooms surrounding a central courtyard. Each room housed a family and its own door and hearth.

Garc□s also relates that the Kitanemuk had extensive trade relations with sometimes distant groups. For example, he writes that the Kitanemuk traded with the □Canal□(Chumash of the Santa Barbara Channel region) and describes wooden vessels with inlays of haliotis that bore stylistic similarities to decorations found on the handles of Chumash knives and other objects (Kroeber 1953).

2.7 REGIONAL HISTORIC CONTEXT

The sporadic settlement of the Mojave Desert was prompted by its close proximity to Los Angeles as well as its valuable mineral deposits. It also served as a crossing point for people traveling west during the period of exploration and settlement. Since much of the Mojave Desert is uninhabitable in the hot summer months, the availability of water, typically supplied to the desert regions by shipment in tanks and barrels during historic times, was a critical factor in the settlement of the Mojave Desert.

2.7.1 Spanish Period

2.7.1.1 <u>Spanish Exploration, Mexican Settlement, and American Occupancy</u>

Exploration of California first occurred in 1540 when a land expedition under the command of Hernando de Alarcon traversed inland along the Colorado River in an attempt to meet up with the party of Francisco Vasquez de Coronado, who was searching the Southwest for the legendary Seven Cities of Cibola (Gold). Two years later, Juan Rodriguez Cabrillo was commissioned by the Spanish government to investigate the western shores of the newly acquired territory. His investigation was restricted to the southern California coast, with only brief stops onshore to gather water and supplies. The first documented description of Los Angeles County comes from Juan Rodriguez Cabrillo in 1542. Apparently, his ship made land fall at what is today San Pedro, taking on fresh water and other supplies. He did not explore the area, but sailed on (Beck □ Hasse 1974).

During the early decades of the 19th century, independence groups sprang up throughout the Spanish Empire. Like the American colonists, the citizens of these Spanish colonies thought it was time for self-rule and abolition of the Viceroy system. At that time, California was considered a province of Mexico. Throughout the Spanish Period, California remained largely unsettled.

The first Spanish encounter with the Tataviam occurred when Gaspar de Portola□s expedition arrived in Castaic Junction on August 8, 1769, on their way north from Los Angeles. It is recorded that the Tataviam gave the Spanish explorers food and ate with them. On September 8, 1797, Father Lasuen, accompanied by Father Francisco Dumetz, arrived in the San Fernando Valley and assembled a small arbor for a temporary church. A cross was raised and mass was celebrated as the official San Fernando Rey de Espana Mission.

2.7.1.2 <u>San Fernando Mission</u>

On the afternoon of the founding day of the San Fernando Mission, 10 native children, 5 boys and 5 girls, were baptized; the first boy baptized was named Fernando Maria. This was the beginning of the end of the villages in the San Fernando and Santa Clarita Valleys; the Spaniards soon gathered the inhabitants to work on the construction of the San Fernando Mission. It was on August 28, 1795, that the Spaniards forced themselves to climb and descend the sharpest mountain ridges north into Newhall Valley (Santa Clarita Valley), reaching Castaic Lake.

The Spanish government subsequently established missions and military outposts to facilitate colonization of the area and to keep rival European nations out of the area. By the early 1800s, the Estancia de San Francisco Xavier, an outpost of the Mission San Fernando, was established in the fertile Santa Clara River Valley. By 1810, all of the Tataviam in the area had been baptized and relocated to the mission or the estancia and the Kitanemuk were taken to Mission San Fernando by the early 1800s (Duff 2004). Eventually, the estancia was reclassified as an asistencia, or sub-mission. The Native Americans soon became referred to as Fernandeños, to reflect the Spanish Mission to which they were associated. The introduction of disease was disastrous to the native people. Well over 2,000 natives were interred in the San Fernando Mission cemetery between 1798 and 1852.

Mexico gained independence from Spain in 1822, and on July 25, 1826, Governor Jose Maria Echeandía issued a decree beginning the secularization of the California missions. However, because many Native Americans failed to leave the missions, Echeandía issued a second decree on 6 January 1831 encouraging the Native Americans to leave the missions. Many of the Tataviam left the mission and began their own ranches in the San Fernando Valley in the 1800s, when the mission system was in decline. El Rancho Encino was one of many, while some went up north to El Tejon to work. When John Harrington interviewed the last Fernandeños that lived on or near the mission, they told how the mission was in ruins in the late 1880s and described it as a ghost cemetery. After secularization the Kitanemuk joined Tatavium, Vanume, and Inland Chumash groups in the Tejon Ranch area and are now organized as the San Fernando Band of Mission Indians.

In August 1834, secularization became official under Governor Jose Figueroa. The Spanish mission system was largely abandoned, and the Mexican government bestowed land grants or ranchos on those loyal to the Mexican government and to some Anglo settlers. In the Santa Clara River Valley, Governor Juan B. Alvarado granted the deed to the former Asistencia de San Francisco Xavier lands to Lt. Antonio del Valle (Solis 2008).

2.7.2 Mexican Period

New Spain (present-day Mexico and California Territory) won independence from Spain in 1821. Following the Secularization Act of 1833 the missions were converted to parish churches and their vast land holdings were privatized via a series of substantial land grants. The new landowners focused primarily on cattle ranching. Despite native resistance, the new government reopened the deAnza trail, which accommodated tremendous traffic after the 1840s and inadvertently fostered disastrous impacts on indigenous people. The influx of non-native peoples between 1834 and 1848 contributed to the rise of diseases that decimated native populations (Martinez et al. 2008).

On January 13, 1847, Captain John C. Fremont accepted the surrender of Governor Pio Pico and Commander Jose Maria Fores. In 1847, the final terms of surrender were signed at Campo de Cahuenga Adobe in the Cahuenga Pass. The Treaty of Guadalupe Hidalgo formally annexed California to the United States in early 1848, ending the Mexican War and beginning the American Period.

2.7.2.1 <u>The Rancho Period</u>

The Rancho movement in California began in the fall of 1784, when three Spanish soldiers were given permits to graze their cattle on certain tracts of land by Pedro Fages, then governor of Alta California. These land grants were given mostly to soldiers or ex-soldiers during the Spanish Period, which ended in 1822. Formal grants by governors became common during the Mexican Period which followed.

2.7.2.1.1 <u>Old Spanish and Mexican Ranchos</u>. Though the rancho system was central to themes in early California history, there are no formal reservations or rancherias in the Antelope Valley area (Antelope Valley Indian Museum).

The oldest of the San Fernando Valley ranchos is the 36,000-acre San Rafael, in the present day area of Glendale and Burbank. It was granted by Governor Fages to a young Spanish soldier, Corporal Jose Maria Verdugo, on October 20, 1784. This rancho later became the site of the San Fernando Mission.

The rest of the ranchos of the San Fernando Valley were granted by the Mexican government after 1834 (the Mexican Period). The largest of these was the Rancho Ex-Mission de San Fernando, which occupied most of the San Fernando Valley, but several peripheral ranchos did exist. On December 5, 1845, the San Fernando Mission was leased to Andres Pico (brother of Governor Pio Pico) and Juan Manso for nine years. On June 17, 1846, the land was sold to Eulogio de Celis. By the time the United States took control of California in 1849, the Rancho Ex-Mission de San Fernando, owned by Eulogio de Celis and Pico, was the single largest land grant in California. Andres Pico handed his portion of the rancho over to his brother Pio, who in turn sold out the mission to the now established □San Fernando Farm Homestead Association□in 1869 for □115,000. With this final conveyance, the Spanish and Mexican rancho days came to an end.

The San Fernando Farm Homestead Association turned the former mission land into a large and profitable wheat ranch. In 1874, Eulogio F. Celis (son of de Celis) sold his remaining land holdings of the former mission lands to George K. Porter and Senator Charles Maclay. Both Maclay and Porter's lands would eventually become fields of barley and wheat. In 1876, with the completion of the San Fernando railroad tunnel connecting northern and southern California, a period of rapid growth followed in southern California. In the 1880s a real estate boom occurred, and large properties, such as Maclay's and Porter's, were subdivided into lots for housing tracts and small businesses. Citrus groves for oranges and lemons also were established, and a rapid population growth in the Valley began. It has never ceased (Robinson 1930, Robinson 1939, Robinson 1961).

2.7.3 American Period

The American period began in 1848; less than a year later gold was discovered in the northern California Sierra Nevada foothills. During that period, the lure of mining and free land for homesteading encouraged the trails to be opened and railroads to be built. The great influx of Americans and Europeans that resulted quickly overwhelmed many of the Spanish and Mexican cultural traditions and eliminated many remaining vestiges of Native American Culture.

2.7.4 Antelope Valley History

During the latter half of the 19th century, several factors contributed to Antelope Valley's growth. Those factors included gold mining in the Kerns and Owens rivers; cattle ranching; the start of a Butterfield stagecoach route in 1858; construction of the Los Angeles-to-San Francisco telegraph line in 1860; completion of the Southern Pacific Railroad line in 1876; and ample rainfall during the 1880s and early 1890s, which improved agricultural productivity, attracting many farmers.

Antelope valley's first agricultural boom occurred in the late 19th century when homesteaders began cultivating alfalfa, barley, wheat, and a variety of fruits and nuts. However, beginning in 1894 the Lancaster area was devastated by a decade-long drought and agriculture was not re-established until 1905. Agriculture in the Palmdale area flourished in the early 20th century through the application of irrigation and dry farming and became known for its alfalfa, apples, and pears.

Cattle ranching began in Antelope Valley in the 1840s and the industry flourished in subsequent decades fueled by the increased demand for beef that resulted from the influx of miners and settlers during the California gold rush. The Cattle industry slowed beginning in the 1920s due to growing local populations which reduced the amount of available land, as well as disputes with sheep herders and alfalfa farmers (Pacific Legacy, Inc. 2007).

Contrary to common knowledge, prior to the discovery of gold at Sutter's Mill in northern California, a smaller gold rush began southwest of the Antelope Valley. The big discovery occurred in 1842 at what was then called Live Oak Canyon when Francisco Lopez, stopping for lunch while searching for stray cattle, pulled some wild onions and found flakes of gold clinging to their roots. In the subsequent gold rush, the canyon was named Placeritas, meaning "Little Placers," and today is called Placerita Canyon. Gold rushers soon flocked to the canyon and took an estimated $100,000 of gold from the region before heading north to the more exciting discovery at Sutter's Mill.

Mining changed the region's history in profound ways. Some prospectors settled permanently in the valley's southwestern corner during the 1850s and 1860s. The area further grew during the Civil War as gold, silver, and copper were extracted from the Soledad Canyon region and Fremont's Pass was enlarged to facilitate and speed up ore shipments.

The region suffered economic setbacks when, in 1894, began the decade-long drought that was the worst in southern California's recorded history. It decimated the regional economy and forced many settlers to abandon their homesteads. However, mining helped valley residents survive the drought and the Great Depression of the 1930s. In addition, twentieth century irrigation methods and electricity brought back local farming.

Mining continues today in and around the Antelope Valley, where besides gold, silver, and copper, the ores and minerals extracted over the years include antimony, borax, calcium, chloride, feldspar, granite, gypsum, iron, lead, lime, limestone, marble, potash, rotary mud, salt, silica, tungsten, uranium, volcanic rock, and zinc (County of Los Angeles Public Library).

2.8 CURRENT LAND USE

The Project area was formerly used for agricultural purposes. Currently, land use in the Project location is cleared but uncultivated.

SECTION 3.0
RESEARCH DESIGN

The environmental history of the Mojave Desert is one of substantial change. Over the past 12,000 years of human habitation in the Mojave, conditions have changed between long periods of wetter conditions to periods of virtually xeric conditions much like those we see in the region today. With each of those changes, the availability of water and the types and ranges of food resources have changed dramatically, requiring human populations to change adaptive strategies. Therefore, many of the questions posed by archaeologists working in the Mojave Desert have concerned human adaptations to changing environmental conditions.

Current environmental conditions at the project location would not seem to support or be attractive to human habitation, but may have been more conducive to human habitation in the past. Much of the project area has been cleared of standing vegetation at some time in the past and therefore some of native plant communities and habitat regions have been disrupted. The land adjacent to the northern and eastern boundaries of the project area are covered in dense stands of Joshua Tree (*Yucca brevifolia).* Yucca was an important food source to the prehistoric people of the Mojave region.

Perhaps the single most important resource to human habitation is the availability of reliable water sources. Though no water sources were observed within the project boundaries, there is one deep water-cut channel that is marked on U.S. Geological Survey (USGS) 7.5 minute topographic quad map as a perennial stream. Though that drainage is clearly not perennial in all years, it may have been more reliable in the past during times of generally wetter conditions, making the project area more conducive to settlement. It is noteworthy that one of the largest known prehistoric village sites within Antelope Valley (CA-LAN-268) is located approximately one mile to the southeast of the project location. The water source that likely supplied that village was likely a perennial stream that was disrupted by the building of the Fairmont Reservoir in the early 1900s (Robinson, No Date).

Regardless of the presence of reliable water sources, inhabitants could have staged logistical forays into the project area in order to procure resources unique to that environment. In addition, the prehistoric residents of CA-LAN-268, which has evidence of both intense habitation and a prehistoric quarry, could have used the project area as a travel route to and from resource patches.

A second era of habitation occurred with the influx of American settlers in response to discoveries of silver, gold and other mined resources in the region in the late 19th and 20th centuries and to establish homestead claims. Those settlers would likely have made use of the project area for agriculture, hunting, resource procurement, grazing, or refuse disposal.

3.1 EXPECTED ARCHAEOLOGICAL SITE TYPES

3.1.1 Prehistoric

Over the past 12,000 years of prehistory, subsistence and settlement systems in the Mojave seem to have transitioned from forager-like strategies to more collector-like systems. From the sparse evidence that exists, Paleoindian groups seem to have been highly mobile, small groups living in temporary camps near then reliable water sources (Sutton et al. 2007). Early Holocene groups, such as those exemplified by the Lake Mojave pattern, also reflect forager-like subsistence and settlement strategies organized around relatively small social units. During the middle Holocene, the settlement strategy represented by the Pinto Complex was more of a collector type, with site complexes being centralized in favorable locations in order to stage logistical forays into surrounding resource patches (Sutton et al. 2007).

Based on those patterns, the following site types might be found within the project area:

3.1.1.1 Temporary Camps/Resource Processing Sites

These sites would likely have been centered around rich resource patches which may or may not exist today such as Joshua Tree Woodlands and stands of *Yucca brevifolia*. In that the project area has been subject to land clearing it must be assumed that any part of the project area may have had such resources and therefore resource procurement sites could occur virtually anywhere within the boundaries.

In addition, sites may be encountered where lithic resources such as locally available rhyolite may have been heat treated to make their characteristics more conducive to flaking. That operation may have been done separately or along with the process of roasting yucca. Temporary camps and food processing sites would be evidenced by the presence of hearths, lithic scatters, artifact assemblages with fewer functional types of artifacts represented, and midden soils more poorly developed or absent.

Because much of the project area has been subject to intensive agricultural activities in the past, such as plowing and discing, the surface evidence of temporary camps and resource procurement sites may be highly disrupted, and therefore may appear on the surface as amorphous scatters of fire-affected rock, groundstone, and rhyolite flakes, cores, and shatter.

3.1.1.2 Lithic Reduction Sites

Based on soils profiles, it seems unlikely that lithic material for the production of flaked stone tools would have been procured within the site boundaries. It is possible that such materials were brought onto the site and that finished tools were sharpened, reused, or finished as needed. The resulting sites could be found virtually anywhere within the project boundaries and would be characterized by flake scatters of crypto-crystalline silicate or other tool-grade lithic materials.

3.1.1.3 Transportation Routes, Trails, and Linear Features

These could be expected to be found in areas of relatively stable desert surfaces. They would be evidenced by the presence of roughly linear areas about 30 to 50 centimeters (cm) wide that have surfaces that differ from the surrounding soils. Many have rough alignments on both sides of stones cleared from the path.

3.1.2 Historic

Based on patterns of historic settlement and land use in Antelope Valley, historic era subsistence and settlement activities in the project area would be relative to ranching, mining, agriculture, or homesteading. Whereas there has been known homesteading, ranching, and agriculture in the project area, ephemeral evidence such as refuse scatters left by ranchers or homesteaders may be found within the project area.

The expected historic era site types include:

- *Refuse Deposits* □ Refuse deposits would have resulted from dumping and would therefore be more likely to occur on the valley floor due to its greater accessibility. These sites would be evidenced by the presence of dense concentrations of cans, bottles, and/or worn out or broken tools and household implements.
- *Ephemeral Evidence of Hunting or Recreational Use* □ These sites could occur virtually anywhere within the project boundaries. They would be evidenced by the presence of hearths and/or low-density scatters of refuse with relatively uniform artifact assemblages consisting of beverage cans, liquor bottles, food tins, and spent ammunition.
- *Roads and Trails* □ Roads and trails would be evidenced by linear areas measuring between 30 cm and three meters wide that are relatively clear of vegetation and obstacles. They may have alignments on both sides of stones cleared from the path.

3.2 RESEARCH QUESTIONS

Based on the archaeological expectations listed above, the data collected during this Phase I investigation has the potential to provide evidence regarding a number of research questions. Some of those research questions might include:

- Prehistoric Era:
  - *Lithic Scatters* □ Can they be classified according to the site types previously mentioned? What information can be derived from these sites that can contribute to the body of knowledge of prehistory in the region?

  - O*ther Site Types* Can the temporal context or the specific activity involved be identified?
  - *Settlement Patterns* Is there evidence present that would indicate that more intensive occupation occurred at sites within the project area? If a classification of prehistoric site types can be identified, is there a localized settlement pattern definable within the Project APE or can project-specific model(s) be developed that could potentially explain the relationship between sites within the project area and those in surrounding regions? Can paleo-environmental factors be observed in the current setting that might explain the location of prehistoric archaeological sites, such as the existence of formerly unidentified prehistoric lakes, fossilized stream channels, or springs or an abundance of material sources for procurement?
  - C*hronology* – If present, do any of the styles of artifacts discovered correspond with any of the prehistoric complexes described in this report? How does the chronology of artifacts within the project area fit into current models of Mojave Desert settlement patterns at those times?

- Historic Era:

  - S*ettlement* – If historic era refuse deposits are discovered, what does the artifact collection reveal about the nature of the settlement it came from? Are there temporally diagnostic artifacts that can provide further information about the chronology of historic era activity within the project area and the region as a whole? What information can be determined regarding the lifestyles and standards of living of historic era settlers and miners based on the types and diversity of artifacts?
  - *Recreational Activity* If evidence of ephemeral recreational activity is found, are there temporally diagnostic artifacts present that can provide information about the chronology of recreational activity in the project area? What information can be derived about the types of recreational activities that are represented?

SECTION 4.0
METHODS

4.1 RECORD SEARCH

An archaeological records search was undertaken by URS staff archaeologist, Suzanne Black, B.A., at the California OHP designated archaeological record repository of the SCCIC housed at California State University, Fullerton. This record search was undertaken on December 4, 2008 and included a search of the Project site, including a portion of the transmission line located in Los Angeles County. Additionally, a record search was performed by SSJVIC at California State University, Bakersfield on January 16, 2009 for portions of the proposed transmission line located in Kern County. Both record searches examined relative archaeological investigations within the proposed Project site and within a 0.5-mile radius and for previously identified archaeological sites within the proposed Project site and those identified within a 0.5-mile radius of the proposed Project site.

The National Register of Historic Places (NRHP), CRHR, California Historic Landmarks (CHL), Historic Property Data File, California Inventory of Historic Resources and the California Points of Historical Interest were reviewed for the presence of listed properties within the Project site. The records search also included a review of all recorded historic sites within a 0.5-mile radius of the proposed Project area, as well as a review of all relevant cultural resource and survey reports. In addition, a review of the USGS 7.5 minute series Fairmont Butte topographic quadrangle was completed, including a visual search for both the small and large cemetery icons for the presence of historic period former formal cemeteries.

4.2 PALEONTOLOGICAL RECORD SEARCH

Paleontology is a branch of geology that studies prehistoric life forms other than humans through the analysis of plant and animal fossils. Fossils are the remains of organisms that lived in the region in the geologic past; therefore, they preserve an aspect of Southern California prehistory that is of scientific importance, since many species are now extinct. Fossils are found embedded in geologic formations that range in thickness from a few feet to hundreds of feet. These formations form a complex relationship below the surface. Sedimentary formations are layered atop one another, and over time the layers have been squeezed, tilted, folded, and shaped by fault activity. Sensitive fossil-bearing formations found at the surface also may extend from just below the surface to many miles below the surface. Consequently, the task of predicting paleontologically sensitive areas is difficult.

Dr. Samuel McLeod, Director of Vertebrate Paleontology at the Natural History Museum of Los Angeles County, conducted a paleontological records check for the proposed project area on May 6, 2009. This search included a review of all recorded fossil records for locality and specimen data in the Museum's permanent paleontology collection records. A geologic map for the Project region is presented on Figure 5 and shows the area as being Quaternary Alluvium.

4.3 NATIVE AMERICAN CONSULTATION

As part of the research efforts undertaken for this project, the NAHC was contacted on December 2, 2008 (response received on December 3, 2008) to ascertain the presence of known sacred sites and/or the potential presence of Native American cultural resources within the project site. A response from the NAHC indicated there was no known presence of such resources. Native American individuals and organizations potentially familiar with the project site were contacted on December 29, 2008, and a self-addressed stamped envelope was enclosed for reply. To date, we have not had any response regarding the Project site□s potential for sacred sites (Singleton 2009). The project site is not anticipated to impact Native American sacred sites (see Appendix C of this Phase I Report).

On January 23, 2000, URS archaeologist Laurie Solis, M.A. conducted on-site consultation with representative Native American individuals. Native American individuals recommended that a Native American monitor be present during the Phase I Archaeological survey and during any subsequent ground disturbance activities.

Randy Guzman-Folkes a member of the Tataviam/Fernadeno Band of Mission Indians performed archaeological survey and monitoring with URS archaeological field crew for the duration of the Phase I Archaeological survey. Based on the tribal monitoring of the Phase I, Mr. Guzman-Folkes recommends Phase II Testing of sites in the Project area. A summary of tribal monitoring activity and recommendations are provided in Appendix C of this report.

4.4 PHASE I INTENSIVE FIELD SURVEY

The Phase I Archaeological survey of the APE was conducted by a team of eight URS archaeologists, including Laurie Solis (Principal Investigator/Task Leader), Mark Neal (Field Director and Crew Chief), Suzanne Black (Crew Chief), David Barklow, Mark Campbell, William Jenson, Nate Orsi, and Shane Wetherbee.

The survey was conducted on nine field days in two sessions. Session One began on May 4, 2009 and ended on May 7, 2009 when survey activities were suspended for two days due to extremely high winds. Session Two began on May 11, 2009 and ended on May 15, 2009, with a one-day suspension of survey on May 12, 2009 due to high winds.

An intensive pedestrian survey was conducted in all areas within the APE. Ground visibility varied considerably throughout the APE, and though some portions had excellent visibility (□70 percent), much of the project area had poor visibility (□10 percent) due to ground cover of short grasses, forbs, and desert scrub.

The survey was conducted by teams of three to four archaeologists walking parallel 15-meter transects and inspecting all visible ground surfaces. In addition, tailings from animal burrows were inspected for the presence of buried resources. A transmission corridor extending approximately 3.5 miles north along 170th Street West from the northwest corner of section 13 was also surveyed by a team of three archaeologists (Figure 6).

SECTION 5.0
REPORT OF FINDINGS

5.1 RESULTS OF RECORD SEARCH AND LITERATURE REVIEW

5.1.1 Previous Surveys within the Project Site

Two previous archaeological surveys have been undertaken within the boundaries of the proposed Project site. These previous surveys are identified as LA-8169 and KE-320. The methodology and results of the investigations are as follows.

5.1.1.1 LA-8169

URS Corporation (2006 Nilson et al., URS Corp) conducted an intensive archaeological survey along 170th Street West, which traverses the western portion of the Project site. No cultural materials were observed during survey.

5.1.1.2 KE-320

David Chavez and URS Corporation (1978 Chavez, URS Corp.) conducted a cultural resources evaluation along Avenue A, which intersects the proposed transmission line in Kern County, California. No cultural materials were observed during survey.

5.1.2 Previous Studies within 0.5 Mile of the Project Site

Two previous archaeological studies have been completed within 0.5 mile of the proposed Project site. These studies are identified in the archives as LA-2125, and LA-6604. The methodology and results of the two investigations are as follows.

5.1.2.1 LA-2125

Thomas King with UCLA (1968 King) conducted an archaeological survey adjacent to the southwestern portion of the Project site. Although the report is limited, no cultural materials were noted during a review of the report.

5.1.2.2 LA-6604

Albert Knight (1993) conducted a reevaluation of rock art of the Western Mojave Desert. A portion of this study was conducted within 0.5 mile east of the Project site within Fairmont Butte. This study included research of the known site CA-LAN-298, which consists of a single red pictograph. Knight noted that in 1989, all of the Fairmont Butte sites were consolidated under the new trinomial, CAL-LAN-1789/H. Knight concluded many other pictographs were probably present in the Fairmont Butte area in the past, and that perhaps some unrecorded elements may still exist today (Knight 1993). No archaeological survey was conducted.

5.1.3 Previously Recorded Archaeological Resources within the Project Site

Four archaeological sites have been recorded within the Project site. These archaeological sites are identified as CA-LAN-1776, CA-LAN-1777, CA-LAN-1780, and CA-LAN-1781. In addition, one archaeological resource (isolate), P-15-012781 has been recorded within the transmission line corridor. Archaeological resource descriptions are provided in Table 1 Previously Recorded Archaeological Resources within the Project Site.

TABLE 1
PREVIOUSLY RECORDED ARCHAEOLOGICAL RESOURCES WITHIN THE PROJECT SITE

Site Name	Author (Year)	Site description
CA-LAN-1776	Love (1990)	Extremely sparse lithic scatter consisting of fire affected rock, one piece of groundstone, a rhyolite flake, and various pieces of rhyolite shatter distributed over an area measuring 65m x 30m.
CA-LAN-1777	Love (1990)	Sparse lithic scatter consisting of fire affected rock, one piece of groundstone, one basalt pestle, one hopper mortar, rhyolite cores, flake, and shatter flake, distributed over an area measuring 120m x 110m.
CA-LAN-1780H	Love (1990)	Lithic scatter consisting of rhyolite flakes, cores, and debitage, a cutting tool, metate fragments, a basalt mano fragment, and a single flake of chert. Site measures 65m x 40m.
CA-LAN-1781	Love (1990)	Lithic scatter consisting of rhyolite flakes, one basalt bowl fragment, and a basalt metate distributed over an area measuring 65m x 60m.
P-15-012781	Arellano et. al. (2007)	A single, rhyolite core isolate.

5.1.4 Archaeological Sites within 0.5 Mile of the Project Site

Twelve archaeological sites have been recorded within a 0.5-mile radius of the proposed Project site. These archaeological sites are identified in the archives as CA-LAN-688, CA-LAN-1675H, CA-LAN-1710H, CA-LAN-1778, CA-LAN-1779, CA-LAN-1782, CA-LAN-1785, CA-LAN-1786, CA-LAN-1787, CA-LAN-1788, CA-LAN-1789/H, and CA-LAN-3127. A description of each site is described in Table 2, Previously Recorded Archaeological Sites within 0.5-Mile of the Project Site.

5.1.4.1 Historic Resources

There are no listed (NRHP, CRHR) historic properties located within, or in the vicinity of, the Project site. However, one listed CHL is located in the general Antelope Valley area, approximately 16 miles southeast of the Project site. This CHL is identified as the following.

TABLE 2
PREVIOUSLY RECORDED ARCHAEOLOGICAL SITES WITHIN 0.5 MILE OF THE PROJECT SITE

Site Name	Author (Year)	Site Description
CA-LAN-688	Love and De Witt (1990)	Lithic reduction site measuring 400 meters (m) by 200m. Site consists of all stages of lithic production from cores to finished bifaces. Also includes a basalt pestle, mano fragments, and a granite pestle.
CA-LAN-1675H	Norwood (1989)	Historic homestead site dating to the turn of the 20th Century. Measures 68 m by 42 m and includes four pit features, possible check-dam, and household and ranching refuse (glass, hole-in-cap cans, earthenware).
CA-LAN-1710H	Norwood (1990)	Probable homestead dating to 1900. Site measures 53m by 38m and consists of a shallow depression, granitic rock feature, and household refuse (glass, square nails, and cans).
CA-LAN-1778	Love (1990)	Prehistoric lithic scatter consisting of rhyolite cores, flakes, tools, and one schist metate fragment, and possible fire-affected rocks. Site measures 50m by 35m
CA-LAN-1779	Love (1990)	Prehistoric milling site consisting of 3 schist metate fragments, 1 basalt biface mano, and 1 rhyolite core. Site measures 55m by 7m.
CA-LAN-1782	Love (1990)	Prehistoric sparse lithic scatter measuring 55m by 40m. Artifacts consist of rhyolite flakes, 1 soapstone shaft-straightener, and possible fire-affected granitics.
CA-LAN-1785	Love and De Witt (1990)	Prehistoric lithic and milling site consisting of dozens of rhyolite flakes and debitage, 1 mano, 1 schist metate fragment and 1 core. Site measures 200m by 110m.
CA-LAN-1786	Love and De Witt (1990)	Prehistoric milling and lithic reduction site measuring 270m by 120m. Site consists of 1 rhyolite biface, schist metates, hammerstones, 1 hopper mortar with asphalt, 1 pestle, 1 mortar/bowl, flakes, cores and manos.
CA-LAN-1787	Love (1990)	Prehistoric sparse lithic scatter consisting of 1 rhyolite biface, one obsidian flake, and several rhyolite flakes. Site measures 90m by 25m.
CA-LAN-1788	Love and De Witt (1990)	Prehistoric lithic production and milling site. Site is situated at the confluence of two streams and measures 90m by 80m. Artifacts include 1 metate and metate fragment, hammerstones, flakes, and debitage.
CA-LAN-1789/H	Love et al. (1989)	Multi-component site consisting of lithic production materials, millingstones (manos, metates, mortars, pestles), rock features of unknown age, and a historic tuff mill. Site measures 3,500m by 1,500m.
CA-LAN-3172	Whitley (2004)	Prehistoric low-density lithic scatter measuring 1,000m by 330m. Artifacts include rhyolite flakes and shatter.

- Western Hotel California State Historical Landmark No. 658. Erected by the Gilroy family in 1876, this building was purchased in 1902 by George T. Webber, who operated it as the Western Hotel. The Lancaster Chamber of Commerce was organized in its dining room. Between 1905 and 1913, construction crews of the Los Angeles-Owens River Aqueduct were housed here, and it became a center of commercial and social activity in the early life of the community. Location: 557 W Lancaster Blvd, Lancaster (California Historic Landmarks 2008).

5.1.4.2 Existing Structure

The Larsen Ranch property contains several historic period structures. The Larsen Ranch property contains two residential structures and several associated out-buildings. The Brick Ranch House structure on the Project site consists of single story ranch style structure with a low pitched gable roof and deep-set eaves. It has large double-hung windows and a front facing open patio. The foundation is raised, and the building faces Avenue D. There is an enclosed wooden and screened porch. It is evident that there have been a number of brick repairs throughout the years. The house has two chimneys, one on the west side and one on the east side of the house. The roof is shingled. There is a rear porch that is made up of concrete and brick. The fencing is wrought iron, and there are concrete pathways along with a shed associated with the residence. There is plywood covering the windows and doors. A modern trailer is parked to the north of the house, see the sketch map (DPR form in Appendix A) for a more precise location. The information on the brick garage can be found in the continuation sheets. The south elevation has 7 windows and 1 door. The east elevation has 2 windows. The north elevation has 3 windows and 1 door. The west elevation has 4 windows and is obstructed by bushes. The house measures 49 feet by 49 feet.

There is an associated brick garage to the west of the house. It has space for two vehicles to fit side by side, and there is no garage door to speak of presently. There are two add-ons to the South that are smaller, and also made of brick. There is no door on the garage, just an opening to the east. It is pretty much a pole barn structure made of brick. There is one window on the east elevation, and the enclosed part of the garage has a stepped roof. The open part of the garage has a corrugated sheet metal roof, with 2”x4”s underneath. The floor is made up of poured concrete. There was a rabbit coop was attached at some point, along with another brick addition that is no longer standing, but the inside walls on the north and east side of it were painted white. Both additions were to the south, and separated from the garage by a common wall. It is of simple construction, dating from the 1940’s. The builder and the architect are unknown.

The Wood Frame Ranch House structure on the project site consists of an “A” Frame with two wings. One level is a detached home. Modifications include an additional entrance and covered patio. There are new shingles over an original wood roof, the shingles are seven inch boards. The house has an above ground concrete slab foundation. The original part of the structure has 4 inch siding and a raised foundation. The two wings were part of an addition. The front and rear patios are made of concrete. The structure measures 15 meters North South by 16 meters East/West. The East elevation has 4 windows and two doors. The North elevation has six windows. The West elevation has 4 windows and 1 door. The south elevation has 4 windows and 1 door.

Other associated structures consist of a brick pig pen, cistern, hay storage, a workshop, and a repair shop.

This style of architecture was popular from 1935 to 1970. Also, known as American Ranch, Western Ranch, or California Rambler, Ranch Style houses can be found in nearly every part of the United States. The mobile home was reportedly brought onto the property approximately 21 years ago, thought to be constructed in the 1970s (Michael Brandman Associates 2007).

Ranch Style houses have many of these features:

- Single story
- Low pitched gable roof
- Deep-set eaves
- Horizontal, rambling layout: Long, narrow, and low to the ground
- Rectangular, L-shaped, or U-shaped design
- Large windows: double-hung, sliding, and picture
- Sliding glass doors leading out to patio
- Attached garage
- Simple floor plans
- Emphasis on openness (few interior walls) and efficient use of space
- Built from natural materials: Oak floors, wood or brick exterior
- Lack decorative detailing, aside from decorative shutters

5.1.4.2.1 Variations on the Ranch Style. Although Ranch Style homes are traditionally one-story, Raised Ranch and Split-Level Ranch homes have several levels of living space. Contemporary Ranch Style homes are often accented with details borrowed from Mediterranean or Colonial styles.

5.1.4.2.2 Origins of the Ranch Style. The earth-hugging Prairie Style houses pioneered by Frank Lloyd Wright and the informal Bungalow styles of the early 20th century paved the way for the popular Ranch Style. Architect Cliff May is credited with building the first Ranch Style house in San Diego, California in 1932.

The California real estate developer Joseph Eichler popularized his own version of the Ranch Style, and Eichler Ranches were imitated across the USA. After World War II, simple, economical Ranch houses were mass-produced to meet the housing needs of returning soldiers and their families. Because so many Ranch Style homes were quickly built according to a cookie-cutter formula, the Ranch Style is often dismissed as ordinary or slipshod. Nevertheless, many homes built today have characteristics of the elegantly informal Ranch houses that Cliff May originated (Western Ranch Houses, by Cliff May 1997).

5.1.4.2.3 <u>Evaluation of Subject Property Structures</u>. The subject structure consists of a single story ranch style structure with a low pitched gable roof and deep-set eaves. It has large double-hung windows and a front facing open patio. Though ranch style structures are characteristically simplified compared with earlier ornate styles, the subject property is an even more simplified approach to the classic ranch style and is typical of ranch styles found in southern California constructed during this period.

***<u>Location</u>*.** No historic event has occurred at the project location.

***<u>Design</u>*.** The present buildings have a modest design that is not distinctive.

***<u>Setting</u>*.** The historic setting is the historic agricultural setting of the 1930s and 1940s. The rural character of the area and the present physical environment no longer reflects the historic land uses (agriculture) and the areas historic character.

***<u>Materials</u>*.** The subject property is approximately 62 years old and its physical elements represent building materials common during the mid-20th century. The property has retained many of its historic-period building elements, but it appears there have been some alterations and repairs and environmental effects that have impacted the historic-period materials.

***<u>Criterion A and 1 (Event)</u>*.** The subject property is associated with the Antelope Valley's mid-20th century transformation to an agricultural economy. Presently, many of the agricultural sites are no longer existent, and non-historic period structures are present in the property landscape. These changes to the area's setting reflect the decline of the Antelope Valley's agricultural economy. These events or pattern of events have not made a significant contribution to the history of the Antelope Valley, California, or the United States. The subject property does not have a direct association with any significant events. Therefore, the subject property does not possess the requisite significance to qualify for listing the NRHP or CRHR per Criterion A and 1.

***<u>Criterion B and 2 (Person)</u>*.** The subject property is not listed in the National Register of Historic Places or the California Register of Historic Resources. Research undertaken for the subject property did not yield the identification of any significant person or persons. Therefore, the subject property does not possess the requisite significance to qualify for listing in the NRHP or CRHR per Criterion B and 2.

***<u>Criterion C and 3 (Design/Construction)</u>*.** The subject property is a modest, simplified modern ranch style residence. The ranch style's period of significance in California from 1935 to the 1970s. The subject property exhibits some of the features associated with the ranch style. These include: one story, low horizontal scale, lack decorative detailing, aside from decorative shutters; and simple floor plan.

The subject property is a modest example of the ranch style and does not embody *distinctive* characteristics of a type, period, or method of construction. Also, the buildings do not represent the work of a master, or possess high artistic values. The structures are representative of a building type that has been widely documented throughout southern California. Therefore, the subject property does not possess the requisite significance to qualify for listing in the NRHP or CRHR per Criterion C and 3.

***Criterion D and 4 (Information Potential)*.** The subject property structures has not yielded or may be likely to yield information important in history. Therefore the property does not possess the requisite significance to qualify for listing in the NRHP or CRHR per Criterion D and 4 (Information Potential).

Therefore, the proposed project is not anticipated to impact registered or listed historic resources (built environment).

5.1.4.3 Cemeteries

The nearest cemetery to the proposed project site is located at 111 E. Lancaster Blvd, 21 miles of the proposed project site, and is known as Lancaster Cemetery. The Lancaster Cemetery started out as a Potter's Field on Benjamin Carter's property. The cemetery began in the early to late 1890s but was not officially founded as a cemetery until 1902. (California Historic Landmarks 2008).

Therefore, the proposed project is not anticipated to impact historic or former cemeteries.

5.1.4.4 Paleontological Resources

Dr. Samuel McLeod of the Vertebrate Paleontology Department of the Natural History Museum of Los Angeles County conducted a paleontological records search for the project area. Dr. McLeod was unable to locate any vertebrate fossil localities that lie directly within the proposed Project area boundaries. However, he did report that localities at some distance from the Project area do contain sedimentary deposits similar to those that as occur in the proposed Project area.

For the entire proposed project area the surficial exposures consist of younger Quaternary Alluvium, derived primarily as fan deposits from the mountains to the southwest (Figure 5). These deposits are usually coarse as derived from igneous rocks, and they typically do not contain significant vertebrate fossils, at least in the uppermost layers.

The closest vertebrate fossil locality from these Quaternary deposits is identified as LACM 3722, located north of the proposed Project area and found during excavation for a sewer line within the City of Tehachapi, that produced a specimen of fossil horse, *Equus*. There also are a series of fossil vertebrate localities, LACM 5942-5953, from similar deposits in the Antelope Valley, located east-southeast of the proposed Project site, east of Palmdale, along Avenue S from Little Rock. These localities were collected from the surface down to a depth of ten feet from pipeline excavations in younger Quaternary Alluvium and older Quaternary sediments. These localities produced a fauna of small vertebrates including gopher snake, *Pituophis*, kingsnake, *Lampropeltis*, leopard lizard, *Gambelia wislizenii*, cottontail rabbit, *Sylvilagus*, pocket mouse, *Chaetodipus*, kangaroo rat, *Dipodomys*, and pocket gopher, *Thomomys*.

5.2 PHASE I INTENSIVE FIELD SURVEY RESULTS

As a result of the survey, 21 archaeological sites and 41 isolates were identified and recorded. In addition, four previously recorded archaeological sites within the APE were re-recorded so that their site records can be updated. Table 3 Archaeological Sites Recorded, summarizes the sites identified during the Phase I Archaeological survey. Table 4 Archaeological Isolates Recorded, summarizes the isolated archaeological resources identified and recorded during the Phase I Archaeological survey (refer to Figures 6, 7, and 8).

5.3 SUMMARY AND CONCLUSIONS

A number of sites were recorded in the northeastern portion of the Project area. The artifact assemblages of virtually all the sites with prehistoric components were remarkably similar in that very few artifact types were represented and the same artifact types were found at nearly every site.

5.3.1 Prehistoric

5.3.1.1 Settlement Systems and Chronology

Of primary concern to the study of prehistoric people is an understanding of their settlement patterns and movement. Prehistoric settlements within the Mojave Desert varied in both permanence and function. More permanent settlements existed near or adjacent to reliable water sources such as pluvial lakes, fossilized stream channels, and streams. Large prehistoric villages with deep midden deposits and cemetaries have been located at LAN-488 along the southwest edge of the valley, at Ker-303 in the western valley, and at a complex of sites located in the eastern portion of the valley at Buckhorn Lake (Sutton 1980, 1981, cited in Moratto 1984: 389). More temporary seasonal campsites and resource procurement locations can be expected to radiate out from these settlements.

TABLE 3
ARCHAEOLOGICAL SITES RECORDED WITHIN THE PROJECT SITE AND TRANSMISSION LINE ROUTE

Trinomial	Acres	Area	Artifact Density	Site Classification(s)	Cultural Constituents	Integrity	Potential for Subsurface Deposits	Management Recommendation
Project Site								
CA-LAN-1776 Update	0.064	2,781 ft^2	0.0093/ft^2	AP2 (Lithic Scatter)	Concentration of fire-affected and fire-cracked rock and one rhyolite flake.	Fair	Unknown	Phase II Testing
CA-LAN-1777 Update	1.437	62,596 ft^2	0.032/ft^2	AP2 (Lithic Scatter)	Large scatter of rhyolite flakes, three biface fragments, one mano fragment, and scattered fire-cracked rock.	Fair	Unknown	Phase II Testing
CA-LAN-1780 Update	1.687	73,491 ft^2	0.002/ft^2	AP2 (Lithic Scatter)	Large scatter of fire-cracked rock, 30 plus groundstone fragments and a lithic scatter consisting of mostly rhyolite with two crypto-crystalline silicate (CCS) flakes.	Fair	Unknown	Phase II Testing
CA-LAN-1781 Update	2.520	109,762 ft^2	0.010/ft^2	AP2 (Lithic Scatter)	Large site consisting of 20 groundstone fragments, 25 pieces of fire-affected rock, several rhyolite cores, flakes and shatter, nine metate fragments, one groundstone fragment, and one CCS flake.	Fair	Unknown	Phase II Testing
URS-SB-1 19-003883	0.226	9,841 ft^2	0.005/ft^2	AH4 (Trash Scatter)	Historic trash scatter consisting of bottle glass shards, ceramic sherds, and unknown metal fragments.	Fair	No	Monitor during construction

TABLE 3 (CONTINUED)
ARCHAEOLOGICAL SITES RECORDED WITHIN THE PROJECT SITE AND TRANSMISSION LINE ROUTE

Trinomial	Acres	Area	Artifact Density	Site Classification(s)	Cultural Constituents	Integrity	Potential for Subsurface Deposits	Management Recommendation
URS-SB-2 19-003884	0.012	522 ft^2	0.011/ft^2	AP2 (Lithic Scatter)	Prehistoric lithic scatter consisting of six rhyolite flakes.	Fair	Unknown	Phase II Testing
URS-SB-3 19-003885	<0.01	6 ft^2	0.503/ft^2	AP2 (Lithic Scatter)	One portable schist metate fragment and two fire-affected schist fragments in association.	Fair	Unknown	Phase II Testing
URS-SB-4 19-003886	<0.01	3,684 ft^2	0.005/ft^2	AP2 (Lithic Scatter)	Prehistoric lithic scatter consisting of seventeen rhyolite flakes, one granitic mano, and two fire-affected rocks.	Fair	Unknown	Phase II Testing
URS-SB-5 19-003887	0.011	464 ft^2	0.009/ft^2	AP2 (Lithic Scatter)	Cluster of fifteen granitic fire-cracked rocks.	Fair	Unknown	Phase II Testing
URS-SB-6 19-003888	0.040	1,754 ft^2	0.032/ft^2	AP2 (Lithic Scatter)	Prehistoric lithic scatter consisting of rhyolite flakes and shatter, and one CCS flake.	Fair	Unknown	Phase II Testing
URS-MN-1 19-003868	0.017	756 ft^2	0.008/ft^2	AP2 (Lithic Scatter)	Prehistoric lithic scatter consisting of four rhyolite flakes, one rhyolite core, and one ground stone (metate) fragment.	Fair	Unknown	Phase II Testing
URS-MN-2 19-003869	0.036	1,547 ft^2	0.005/ft^2	AP2 (Lithic Scatter)	Lithic scatter consisting of rhyolite flakes and shatter.	Fair	Unknown	Phase II Testing
URS-MN-3 19-003870	<0.01	172 ft^2	0.017/ft^2	AP2 (Lithic Scatter)	Lithic scatter consisting of two rhyolite flakes and one rhyolite core.	Fair	Unknown	Phase II Testing

TABLE 3 (CONTINUED)
ARCHAEOLOGICAL SITES RECORDED WITHIN THE PROJECT SITE AND TRANSMISSION LINE ROUTE

Trinomial	Acres	Area	Artifact Density	Site Classification(s)	Cultural Constituents	Integrity	Potential for Subsurface Deposits	Management Recommendation
URS-MN-4 19-003871	0.102	4,478 ft^2	0.004/ft^2	AP2 (Lithic Scatter)	Lithic scatter consisting of five large rhyolite core fragments with shatter, fire-cracked rock, and four groundstone fragments.	Fair	Unknown	Phase II Testing
URS-MN-5 19-003872	0.214	9,311 ft^2	0.001/ft^2	AP2 (Lithic Scatter)	Lithic scatter consisting of three rhyolite core fragments and shatter, one groundstone fragment, two rhyolite flakes, and fire-cracked rock.	Fair	Unknown	Phase II Testing
URS-MN-6 19-003873	0.054	2,359 ft^2	0.009/ft^2	AP2 (Lithic Scatter)	Lithic scatter consisting of three rhyolite core fragments and shatter, five groundstone fragments, and ten pieces of fire-cracked rock.	Fair	Unknown	Phase II Testing
URS-MN-7 19-003874	0.204	8,880 ft^2	0.003/ft^2	AP2 (Lithic Scatter)	Lithic scatter consisting of seven groundstone fragments, one rhyolite flake, four pieces of rhyolite shatter, and fire-affected rock.	Fair	Unknown	Phase II Testing
URS-MN-9 19-003875	0.033	1,435 ft^2	0.005/ft^2	AP2 (Lithic Scatter)	Lithic scatter consisting of three rhyolite flakes, one piece of tabular rhyolite, and one groundstone fragment.	Fair	Unknown	Phase II Testing
URS-MN-10 19-003876	0.034	1,464 ft^2	0.008/ft^2	AP2 (Lithic Scatter)	Lithic scatter consisting of rhyolite cores, flakes and tools, two burned rhyolite metate fragments, and fire-affected rock.	Fair	Unknown	Phase II Testing

**TABLE 3 (CONTINUED)
ARCHAEOLOGICAL SITES RECORDED WITHIN THE PROJECT SITE
AND TRANSMISSION LINE ROUTE**

Trinomial	Acres	Area	Artifact Density	Site Classification(s)	Cultural Constituents	Integrity	Potential for Subsurface Deposits	Management Recommendation
URS-MN-11 19-003877	0.040	1,734 ft^2	0.010/ft^2	AP2 (Lithic Scatter)	Lithic scatter consisting of rhyolite cores, tools, and shatter, four groundstone fragments, and fire-affected rock.	Fair	Unknown	Phase II Testing
URS-MN-12 19-003878	0.007	295 ft^2	0.017/ft^2	AP2 (Lithic Scatter) AH4 (Trash Scatter)	One historic era glass bottle base and four other glass shards from the same bottle. Glass bottle base has been worked, possibly with the intention of making a projectile point preform.	Fair	Unknown	Monitor during construction
URS-MN-13 19-003879	0.033	1,441 ft^2	0.006/ft^2	AP2 (Lithic Scatter)	Sparse scatter of rhyolite flakes, groundstone fragments, and fire-cracked rock.	Fair	Unknown	Phase II Testing
URS-MN-15 19-003880	0.057	2,490 ft^2	0.007/ft^2	AP2 (Lithic Scatter)	Sparse lithic scatter consisting of rhyolite flakes and shatter.	Fair	Unknown	Phase II Testing
URS-MN-16 19-003881	0.055	2,381 ft^2	0.008/ft^2	AP2 (Lithic Scatter)	Scatter consisting of one large, shaped pestle fragment, seven groundstone fragments, rhyolite flakes and shatter, and fire-affected rock.	Fair	Unknown	Phase II Testing
URS-MN-17 19-003882	0.137	5,975 ft^2	0.007/ft^2	AP2 (Lithic Scatter)	Sparse scatter of groundstone fragments, fire-cracked rock, and rhyolite cores, flakes, and shatter.	Fair	Unknown	Phase II Testing

TABLE 3 (CONTINUED)
ARCHAEOLOGICAL SITES RECORDED WITHIN THE PROJECT SITE AND TRANSMISSION LINE ROUTE

Trinomial	Acres	Area	Artifact Density	Site Classification(s)	Cultural Constituents	Integrity	Potential for Subsurface Deposits	Management Recommendation
NL-Temp-Larsen Ranch	TBD	2,681 ft^2	N/A	HP2, HP4, HP30, HP32, HP33, HP36	The site contains two primary residences with several associated outbuildings. There is vehicle debris present associated with farming and ranching activities.	Fair	Unknown	Monitor during construction
Transmission Route								
NL-NO-Temp-1	.0009	2679 ft^2	TBD	AP2 (Lithic Scatter)	Sparse scatter of ground stone fragments. There is one possible mortar fragment, five small to medium size granite boulders, 2 quarts cores, 2 utilized quartz fragments, and one mano fragment.	Fair	Unknown	Monitor during construction

TABLE 4
ARCHAEOLOGICAL ISOLATES RECORDED WITHIN THE PROJECT SITE

Primary #	Description
ISO-SB-1 19-100676	Rhyolite secondary flake measuring 2.5 x 1.9 x 0.4 cm.
ISO-SB-2 19-100677	Green bottle base with embossing “PLUTO” with a man figure. Likely dates to the 1930s. Base measures 3 1/8” diameter.
ISO-SB-3 19-100678	Pink and white granitic mortar fragment. Has an estimated diameter of 19 cm.
ISO-SB-4 19-100679	Granitic mano with one area of use wear. Measures 13.7 x 10.2 x 6.9 cm.
ISO-SB-5 19-100680	Large rhyolite secondary flake measuring 7.6 x 6.7 x 2.4 cm.
ISO-SB-6 19-100681	One granitic mano fragment, slightly convex with a polished grinding surface. Measures 8.9 x 6.2 x 3.9 cm. Grinding surface measures 6.5 x 7.0 cm.
ISO-SB-7 19-100682	One rhyolite core measuring 6.9 x 6.2 x 5.8 cm.
ISO-SB-8 19-100683	One rhyolite tertiary flake.
ISO-SB-9 19-100684	One rhyolite tertiary flake measuring 3 x 2 x 0.5 cm.
ISO-SB-10 19-100685	One white/mottle purple rhyolite test cobble with 80 percent cortex and one flake removal scar. Test cobble measures 11.7 x 7.4 x 5.2 cm.
ISO-SB-11 19-100686	One piece of rhyolite debitage. Material is flow-banded brown to purplish-gray and measures 4.9 x 3.7 x 2.8 cm.
ISO-SB-12 19-100687	One secondary (15 percent cortex remaining) and one tertiary purple banded rhyolite flake.
ISO-SB-13 19-100688	One schist metate measuring 21.4 x 20.4 x 6.4 cm, and one rhyolite cobble.
ISO-SB-14 19-100689	One secondary (10 percent cortex remaining) rhyolite flake measuring 6.9 x 5.5 x 1.5 cm.
ISO-SB-15 19-100690	Two chunky rhyolite flakes. Material has a light cream and pinkish-tan banding. Flakes measure 5.1 x 3.3 x 1.8 cm and 3.6 x 2.2 x 0.9 cm.
ISO-SB-16 19-100691	One historic steel headed pick/hoe with a twisted steel to attach hoe end. Attached to a weathered wooden handle measuring 33 inches long. Pick/hoe head measures 14 inches.
ISO-SB-18 19-100692	One hand chopping tool. Tool is triangular in shape and is made of a grayish-white rhyolite. Tool measures 11.7 x 11.2 x 2.7 cm.
ISO-SB-19 19-100693	One schist unifacial metate fragment measuring 11.8 x 5.8 x 3.2 cm.
ISO-MN-1 19-100653	Tabular rhyolite fragment that is brownish-purple. Fragment measures 14 x 10 x 4 cm.

TABLE 4 (CONTINUED)
ARCHAEOLOGICAL ISOLATES RECORDED WITHIN THE PROJECT SITE

Primary #	Description
ISO-MN-2 19-100654	Rhyolite secondary flake, purplish-brown in color, measuring 10 x 22 x 5 millimeters (mm).
ISO-MN-3 19-100655	Small rhyolite flake, pinkish-brown in color. Flake measures 2.5 x 2.2 x 0.7 cm.
ISO-MN-4 19-100656	Ground and battered rhyolite cobble fragment measuring 9 x 9 x 9 cm.
ISO-MN-5 19-100657	Two rhyolite flakes (one whole, one fragment) measuring 3 x 2.2 x 0.5 cm and 1 x 2 x 1.2 cm.
ISO-MN-6 19-100658	One rhyolite flake fragment measuring 3.7 x 1.6 x 0.7 cm.
ISO-MN-7 19-100659	One secondary flake measuring 3.2 x 2.2 x 0.2 cm. Flake is CCS material and may have possibly been heat treated.
ISO-MN-8 19-100660	One rhyolite core measuring 9.2 x 5.0 x 5.4 cm.
ISO-MN-9 19-100661	One rhyolite core with a possible ground surface. Core measures 11.3 x 9.0 x 5.8 cm.
ISO-MN-10 19-100662	One purple rhyolite worked flake or tool fragment. Possibly heat treated with waxy appearance. Flake measures 2.5 x 1.3 x 0.4 cm.
ISO-MN-11 19-100663	One whole mano of fine-grained black granitic material. Mano measures 8.7 x 8.9 x 5.9 cm.
ISO-MN-12 19-100664	One groundstone fragment measuring 9.5 x 8.8 x 9.2 cm and one fragment of fire-cracked rock.
ISO-MN-13 19-100665	One rhyolite core measuring 10 x 5 x 3.5 cm. Two fire-cracked rocks are located 10 to 15 m east of the isolate.
ISO-MN-14 19-100666	One rhyolite core measuring 11 x 9 x 4 cm and one groundstone fragment measuring 5.8 x 6.7 x 4.7 cm. A piece of fire-cracked rock was noted in the area.
ISO-MN-15 19-100667	One large, primary decortification flake of rhyolite measuring 7 x 6 x 2.8 cm.
ISO-MN-16 19-100668	One piece of rhyolite shatter measuring 4.9 x 4.3 x 2.5 cm.
ISO-MN-17 19-100669	Partially buried metate measuring 20.3 x 23.2 x 9.4 cm.
ISO-MN-18 19-100670	Large rhyolite primary flake measuring 17.2 x 7.5 x 6.9 cm.
ISO-MN-19 19-100671	One rhyolite flake measuring 5.1 x 2.4 x 0.5 cm.
ISO-MN-20 19-100672	Well-shaped granitic pestle fragment (distal end) measuring 8.7 x 6.7 x 5.3 cm.

**TABLE 4 (CONTINUED)
ARCHAEOLOGICAL ISOLATES RECORDED
WITHIN THE PROJECT SITE**

Primary #	Description
ISO-MN-21 19-100673	One rhyolite core measuring 11.8 x 10.9 x 5.7 cm.
ISO-MN-22 19-100674	One rhyolite primary flake measuring 4.0 x 5.2 x 0.7 cm.
ISO-MN-23 19-100675	One rhyolite flake and one rhyolite flake fragment.
NO-ISO-1	One rhyolite flake measuring 7x4x2cm.
NO-ISO-2	One rhyolite flake measuring 4.5x2x2.1cm

The sites recorded within and near the project area demonstrate a strong local prehistoric settlement pattern composed of relatively low density assemblages characterized by a limited range of artifact types, including groundstone, chipped stone tool production debris dominated by locally available rhyolite, and fire-affected rocks. Other artifact types are rare or absent. The emphasis on groundstone tools coupled with the low density and diversity of artifacts suggest the sites represent brief occupations focused on the collection and processing of seasonally available plant foods. The prevalence of rhyolite at the sites may indicate a link with the rhyolite quarries at Fairmont Butte located less than a mile southeast of the project area (Sutton 1981).

The limited activity sites could reflect several resource procurement strategies. For example, they could reflect brief encampments of small task groups traveling to and from the Fairmont Butte area to procure chipped stone raw materials. Or, they could reflect plant food procurement by small task groups staying at Fairmont Butte for an extended period of time while collecting rhyolite. In this regard it is worth noting that Sutton's (1981) limited subsurface testing at Fairmont Butte site LAN-298 identified a 2 m deep cultural deposit indicating that rhyolite sources at Fairmont Butte had been a source of raw material for a long time, perhaps beginning as early as the Pinto Period (cited in Moratto 1984: 389). The exceptional depth of cultural materials at LAN-298 and the apparent lack of midden lends credence to the hypothesis that the site may have functioned as a field camp, a task group's temporary habitation site while away from the main residential site (e.g., village). Regardless, documenting the nature, content and age of the small sites on the valley floor though additional surface collection, subsurface excavations and analysis would help understand their relationships with the sites at Fairmont Butte and thus would contribute to the overall study of prehistoric settlement, subsistence, and resource procurement patterns throughout Antelope Valley.

5.3.2 Historic

Only two historic period sites and one historic period isolate were identified within the boundaries of the Project area. URS-SB-1 is a Historic Period Refuse Deposit (HPRD), comprised of a scatter of glass and ceramic shards with some pieces of metal. One glass base maker's mark was dated to 1883-1896; all other artifacts observed were too fragmented to be temporally diagnostic. Isolate ISO-SB-2 is identified as a bottle base part of a Pluto brand water bottle that dates from between 1905 to the 1930s. These artifacts hold little potential to produce data pertinent to questions about historic-period life in the Antelope Valley.

One site, URS-MN-12, consists of fragments of an historic-era bottle. Of particular interest is that the bottle base shows signs of being worked in a repetitive flaking technique that is common in Native American production of projectile points and other stone tools. This resource is indicative of a time period during the historic period when Native Americans interacted with American settlers arriving from the east and repurposed American manufactured items for traditional uses. However, the site holds little potential for further data to support the study of such cultural interactions.

SECTION 6.0
MANAGEMENT CONSIDERATIONS/RECOMMENDATIONS

6.1 ARCHAEOLOGICAL SITES RECOMMENDED FOR PHASE II SUBSURFACE TESTING

The recordation of the two historic scatters URS-SB-1 and URS-MN-12 appears to have exhausted their data potential and no additional testing is recommended at those sites. Neither is considered eligible for listing in the CRHR.

The prehistoric sites discovered have some potential to yield additional information regarding prehistory, including but not limited to such topics as prehistoric land use, settlement and subsistence patterns, toolstone procurement and use, and chronology. Therefore it is recommended that Phase II testing be conducted at the following sites to determine their potential to yield further data: CA-LAN-1776, CA-LAN-1777, CA-LAN-1780, CA-LAN-1781, URS-SB-2, URS-SB-3, URS-SB-4, URS-SB-5, URS-SB-6, URS-MN-1, URS-MN-2, URS-MN-3, URS-MN-4, URS-MN-5, URS-MN-6, URS-MN-7, URS-MN-9, URS-MN-10, URS-MN-11, URS-MN-13, URS-MN-15, URS-MN-16, URS-MN-17, and NL-NO Temp 1.

The prehistoric isolates identified during the survey include important tool types such as metates, pestles, and cores and can augment information from the sites and contribute to a better understanding of activities being conducted on the valley floor. The prehistoric isolates should be collected from the surface and analyzed during the Phase II project. No subsurface testing at isolate locations is recommended.

6.2 THE POTENTIAL FOR UNDISCOVERED SITES

The goal of a Phase I Cultural Resources Survey is to locate all visible cultural resources within the project boundaries. Confidence that the goal has been met in areas that could be surveyed is very good, but some areas could not be surveyed due to the presence of thick vegetation and rattlesnakes. In addition, many sites were located in areas of variable erosion, often at the bases of low mounds, indicating the potential for additional buried resources. Additional survey prior to construction and monitoring during construction are recommended. These and other measures designed to reduce potential impacts to less than significant levels are identified below.

6.3 RECOMMENDED MITIGATION MEASURES

<u>CUL-1: Avoid Archaeological Sites</u>. Archaeological sites within the proposed Project area shall be avoided and protected from future disturbance or evaluated for significance and mitigated, as appropriate, to the satisfaction of the Los Angeles County Department of Regional Planning (LACDRP).

CUL-2: Phase II Testing/Phase III Data Recovery. Prior to construction, Phase II testing and evaluation shall be conducted at all unavoidable prehistoric archaeological sites in the proposed Project area to determine their significance under Section 15064.5 of CEQA. Sites determined eligible for the California Register of Historic Resources (CRHR) shall either be avoided and protected from future disturbance, or a Phase III data recovery plan shall be prepared and implemented prior to construction to the satisfaction of LACDRP. All archaeological collections, technical reports and related documentation shall be curated at a curation facility approved by the County of Los Angeles.

CUL-3: Archaeological Monitoring. Prior to construction, an archaeological monitoring plan shall be prepared and implemented to the satisfaction of LACDRP. A qualified archaeological monitor shall be present during all ground disturbing activities, including vegetation clearing, grubbing, grading, filling, drilling, and trenching. In the event that any prehistoric or historic cultural resources (chipped or ground stone lithics, animal bone, ashy midden soil, structural remains, historic glass or ceramics, etc.) are discovered during the course of construction, all work in the vicinity shall halt, and the archaeologist shall record the resources on the appropriate California Department of Parks and Recreation (DPR) 523 Series Forms, evaluate the significance of the find, and if significant, determine and implement the appropriate mitigation, including but not limited to Phase III data recovery and associated documentation to the satisfaction of LACDRP. Such activities may result in the preparation of additional Phase II and Phase III technical reports. After ground-disturbing construction activities have been completed, an archaeological construction monitoring report shall be completed and submitted to the LACDRP.

CUL-4: Native American Monitor. A Native American monitor (Tataviam/Fernadeno Band of Mission Indians) shall be notified prior to construction and allowed the opportunity to be present during all ground disturbing activities, including vegetation clearing, grubbing, grading, filling, drilling, and trenching. In the event that any sacred site or resource is identified, the Native American monitor, or archaeologist if the Native American monitor is unavailable, shall be on-site to divert construction activities to another area of the Project site while a proper plan for avoidance or removal is determined to the satisfaction of the LACDRP.

CUL-5: Human Remains. In the event human remains are encountered, construction in the area of the finding shall cease, and the remains shall stay in situ pending definition of an appropriate plan. The Los Angeles County Coroner (Coroner) shall be contacted to determine the origin of the remains. In the event the remains are Native American in origin, the NAHC shall be contacted to determine necessary procedures for protection and preservation of the remains, including reburial, as provided in the State of California Environmental Quality Act

(CEQA) Guidelines, Section 15064.5(e), "CEQA and Archaeological Resources," CEQA Technical Advisory Series.[2]

<u>CUL-6: Paleontological Resources Protection</u>. In the event paleontological discoveries are encountered by the cultural monitors, all excavation shall cease in the area of the find and a paleontologist shall be retained, who shall devise a plan for recovery in accordance with standards for such established by the Society of Vertebrate Paleontology. At least one of the on-site cultural monitors during construction shall have familiarity and expertise in paleontological resources and have the ability to recognize significant vertebrate paleontological resources. Any paleontological resources shall be documented and submitted to the Natural History Museum of Los Angeles County, or any other accredited institution (i.e., San Bernardino County Museum, UCLA Dept of Earth and Space Sciences) that will accept paleontological resources for curation.

<u>CUL-7: Construction Worker Training</u>. Prior to construction, the qualified archaeological monitor or qualified designee shall conduct a brief educational workshop such that all construction personnel understand monitoring requirements, roles and responsibilities of the monitors, and penalties for unauthorized artifact collecting or intentional disturbance of archaeological resources. The construction worker training shall include an overview of potential cultural and paleontological resources that could be encountered during ground disturbing activities to facilitate worker recognition, avoidance, and subsequent immediate notification of a designated on-site cultural monitor for further evaluation and action, as appropriate.

6.3.1 Level of Significance after Mitigation

Implementation of the above mitigation measures would reduce potential cultural resource impacts associated with construction and operation of the proposed Project to less-than-significant levels.

---

[2] California Resources Agency. 16 September 2004. California Environmental Quality Act, Article 5, §15064.5(e): "Determining the Significance of Impacts to Archaeological and Historical Resources." Available at: "http://ceres.ca.gov/topic/env_law/ceqa/guidelines/art5.html".

SECTION 7.0
REFERENCES

Antelope Valley Indian Museum. *Antelope Valley Indian Peoples, The Late Prehistoric Period, Kitanemuk.* http://www.avim.parks.ca.gov/people/ph□kitanemuk.shtml.

Basgall, Mark E. 2004. *Further Archaeological Assessments in Deadman Lake Basin, Marine Corps Air Ground Combat Center, Twentynine Palms, California*. United States Marine Corps, Marine Corps Air Ground Combat Center, Twentynine Palms, California.

Basgall, Mark E. and M.C. Hall. 1992. Fort Irwin Archaeology: Emerging Perspectives on Mojave Desert Prehistory. *Society for California Archaeology Newsletter* 26(5):1-7.

Beck, Warren A. and Ynez D. Haase. 1974. *Historical Atlas of California*, University of Oklahoma Text, Norman.

Blackburn, Thomas C. 1962□63. Ethnohistoric Descriptions of Gabrielino Material Culture. *Annual Reports of the University of California Archaeological Survey* 5: 1-50. Los Angeles.

Brunzell, David. 2007. Cultural Resources Assessment: Hacienda at Fairview Valley, San Bernardino County, California. Prepared for Strata Equity Group, San Diego, California. Prepared by LSA Associates, Inc., Riverside, California.

California Gap Analysis. 1998. *Land Cover for California*. GIS database published by the Biogeography Lab, University of California, Santa Barbara. http://www.biogeog. ucsb.edu/projects/gap/gap□data.html.

California Historical Landmarks. 2008. Office of Historic Preservation, California State Parks. Available at: http://ohp.parks.ca.gov/default.asp?page□id□21427.

California Resources Agency. 2003. *California Environmental Quality Act, Chapter 2.6, ‘21084.1: Historical Resource; Substantial Adverse Change.* http://ceres.ca.gov/ceqa/ stat/Ch□2-6.html.

Cleland, J. H. and W. G. Spaulding. 1994. An Alternative Perspective on Mojave Desert Prehistory. *Society for California Archaeology Newsletter* 26(6):1-6.

County of Los Angeles Public Library. Community History in Words and Pictures: Antelope Valley. http://www.colapublib.org/history/antelopevalley/.

Duff, Gabriele. 2004. *Archaeological Survey of the Tehachapi East Afterbay Enlargement Project, Kern County, California.* Unpublished report prepared by Statistical Research

Incorporated for the Department of Water Resources. http://wwwdpla.water.ca.gov/ sd/environment/tehachapi/deir/app 20d.pdf.

Higgins, Paul. 1996. *Tataviam Indians, Early Newhall Residents*. Available at: http://www.scvleon.com/newhall/tataviam.htm.

Johnston, B.E. 1962. California s Gabrieli o Indians. Frederick Webb Hodge Anniversary Publication Fund, vol.VII. Los Angeles: Southwest Museum.

King, Thomas Jackson. 1976. Late Pleistocene Early Holocene History of Coniferous Woodlands in the Lucerne Valley Region, Mohave Desert, California. *Great Basin Naturalist* 36(2):227-235.

Knight, Albert. 1993. *Rock Art of the Western Mojave Desert: a Reevaluation,* Western Mojave Survey Association.

Kroeber, A. L. 1953. *Handbook of the Indians of California*. California Book Co., Berkeley, California.

Lechner, T. M. and M. A. Giambastiani. 2008. *An Evaluation of Six Prehistoric Archaeological sites in the Lavic Lake Training Area, Marine Air Ground Combat Center, Twentynine Palms, California*. United States Marine Corps, Marine Air Ground Task Force Training Command.

Martinez, Amanda L., Nancy E. Sikes and Cindy J. Arrington. 2008. *Cultural resources Inventory for the Bureau of Land Management California Desert District in Imperial, Riverside, and San Bernardino Counties, California.* Bureau of Land Management, California Desert District, 1661 South 4th Street, El Centro, California 92243.

National Park Service 1998. How to Apply the National Register Criteria for Evaluation. *National Register Bulletin 15.* http://www.cr.nps.gov\nr\publications\bulletins\nrb15\.

1990. *Native American Graves, Protection and Repatriation Act of 1990*. Washington D.C.: National Park Service. http://www.cr.nps.gov/nagpra/MANDATES/25USC3001 etseq.htm.

Office of Historic Preservation. 2002. *About OHP*. http://ohp.parks.ca.gov/default.asp? page id 1066.

1992. *California Register of Historical Resources.* http://ohp.parks.ca.gov/ ?page id 21238.

Pacific Legacy Inc. 2007. Cultural Resources Inventory of the Southern California Edison Company Tehachapi Renewable Transmission Project, Kern, Los Angeles, and San

Bernardino Counties, California. Unpublished report submitted to Southern California Edison Company, PO Box 800, Rosemead, California 95062.

Robinson, Roger. No Date. *CA-LAN-298: The “History” of an Archaeological Site*.

Robinson, William Wilcox. 1961. *The Story of the San Fernando Valley*. Title Insurance and Trust Company, Los Angeles California.

1939. *Ranchos Become Cities*. San Pasqual Press, Pasadena, CA.

1930. The *Spanish and Mexican Ranchos of San Fernando Valley*. Southwest Museum Papers No. 31, Southwest Museum, Los Angeles, California.

Singleton, Dave. 2008. *Native American Heritage Commission Sacred Sites Record Search for the Proposed NextLight Antelope Valley Solar Ranch 1 Project*. Available at: URS Corporation, 915 Wilshire Blvd. Suite 700, Los Angeles, CA 90017.

Solis, Laurie A. 2006. *The Tataviam: People who Face the Sun.* Unpublished literature excerpt. Publishing information: iUniverse Publishing. www.iuniverse.com.

Southern California Association of Governments. 2001. *SCAG Growth Management Chapter (GMC) Policy No. 3.21*. Contact: 818 West Seventh Street, 12th Floor Los Angeles, CA 90017-3435.

Stickel, E. Gary and Lois J. Weinman. 1980. *An overview of the cultural resources of the Western Mojave Desert*. Eric Ritter, Ed. The California Desert Planning Program and United States Bureau of Land Management Cultural Resources Publications, Riverside, CA.

Sutton, Mark Q. 1996. The Current Status of Archaeological Research in the Mojave Desert. *Journal of California and Great Basin Archaeology* 18(2):221-257.

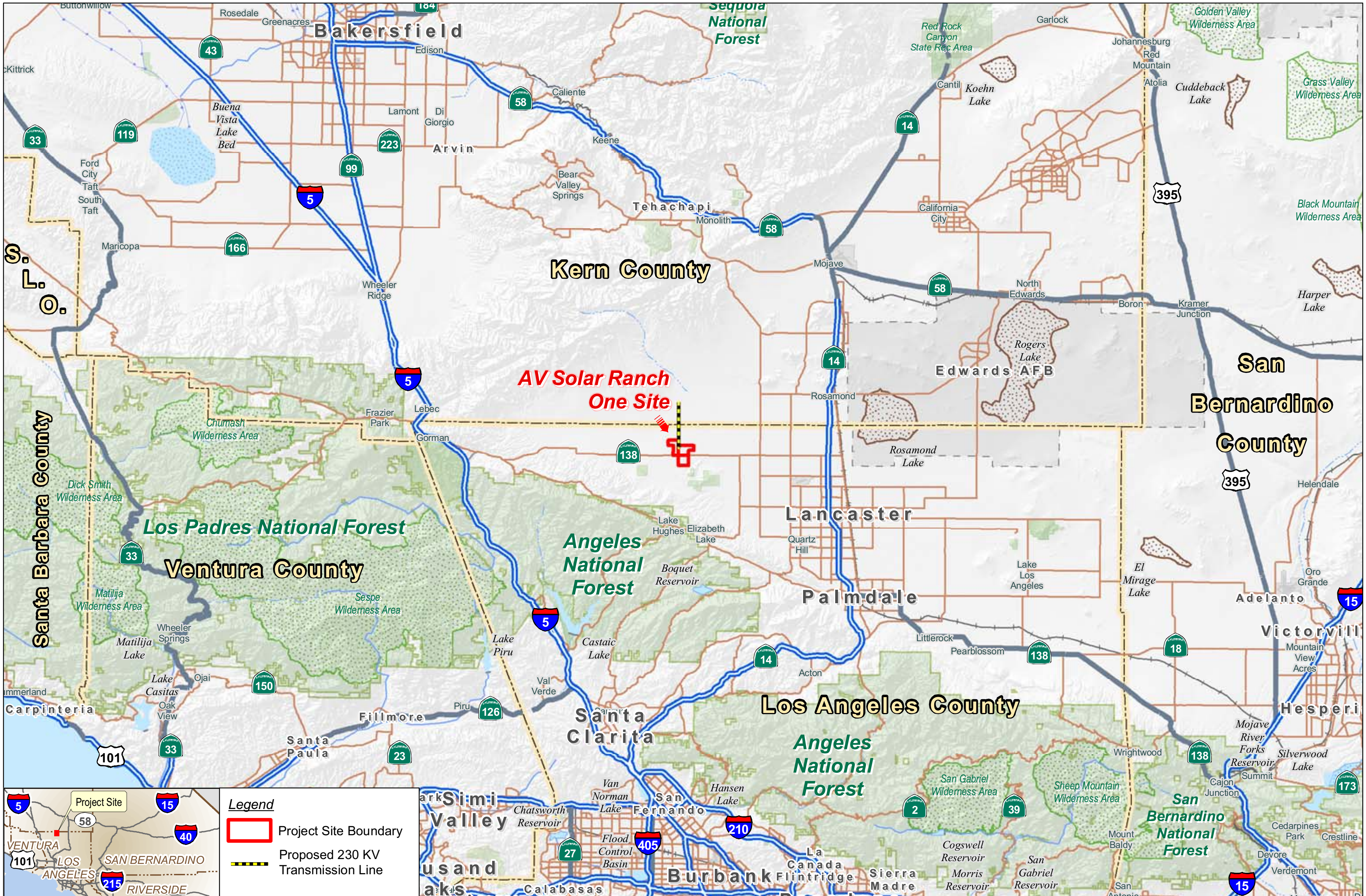
Sutton, Mark. Q., Mark E. Basgall, Jill K. Gardner, and Mark W. Allen. 2007. Advances in Understanding Mojave Desert Prehistory. In *California Prehistory: Colonization, Culture, and Complexity*, edited by T. L. Jones and K. Klar. AltaMira Press, Lanham, MD.

Terracon Consultants, Inc. 2009. *Geotechnical Desktop Study Antelope Valley Solar Ranch 1, 170th Street West and Avenue D, City of Lancaster, County of Los Angeles, California.* Prepared for NextLight Renewable Power, LLC.

U.S. Department of Agriculture, Natural Resources Conservation Service. 2008. Soil Survey Geographic (SSURGO) database for San Bernardino County, California, Mojave River Area. http://www.ftw.nrcs.usda.gov/ssur□data.html.

Ventura County Resource Conservation District. 2005. Upper Santa Clara River Watershed Arundo/Tamarisk Removal Plan Environmental Impact Report/Environmental Assessment. Available at: http://www.vcrcd.org/files/eir/SCARP-EIR-Ch3.6.pdf.

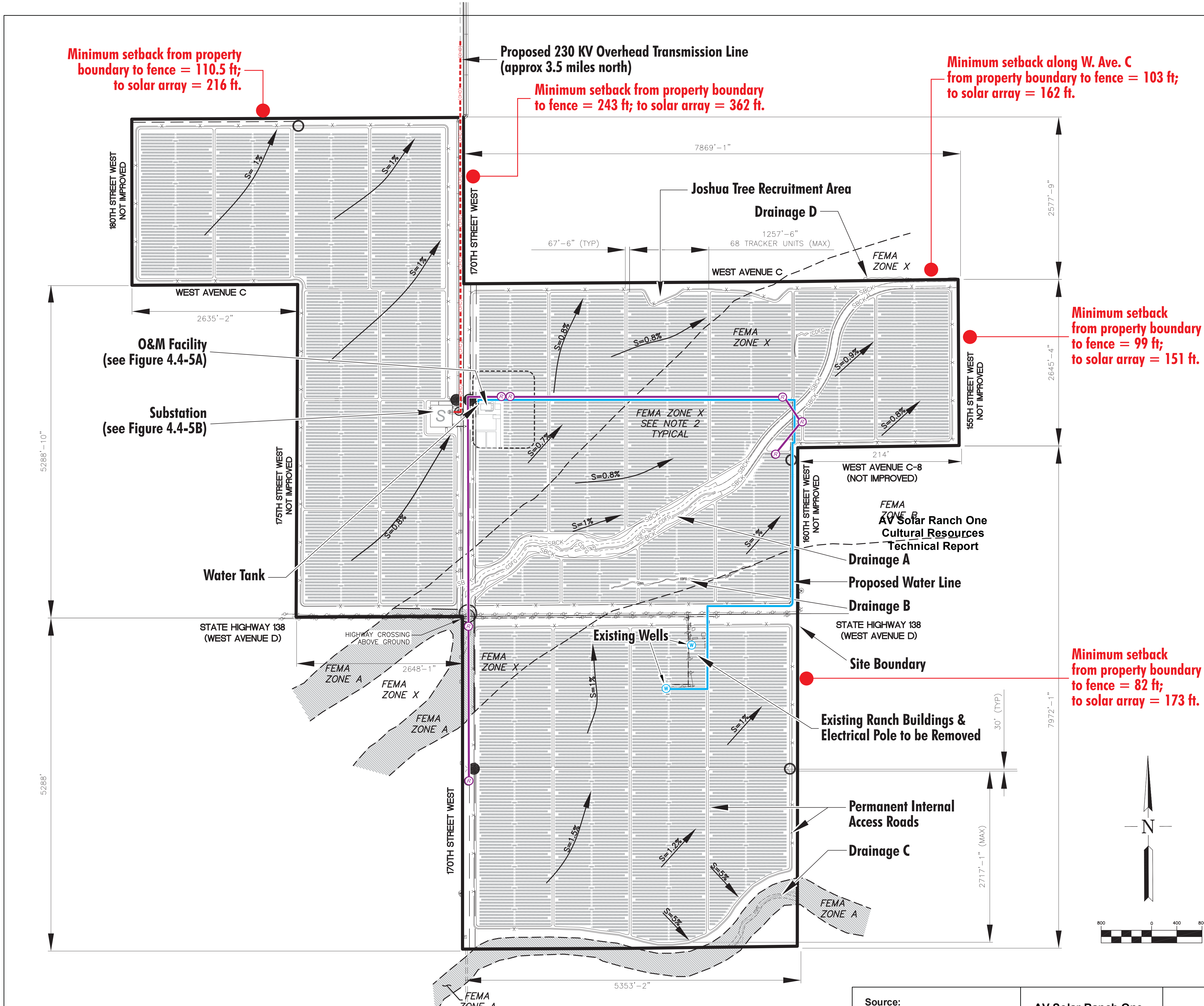
FIGURES 1-6



N 1:823,680 0 5 10 15 20 Miles	**Source:** Source: [1] ESRI StreetMap USA (2006). [2] Hillshade, 30 Meter Resolution (based on the National Elevation Dataset (NED) - U.S. Geological Survey, Teale Data Center GIS Solutions Group, USFS Region 5.	**AV Solar Ranch One Cultural Resources Technical Report**	**Figure 1.** VICINITY MAP	2010

T:\NextLight_AV_EIR\deliverables\AVSR1_EIR\Cultural\Fig1_Vicinity_Map.mxd

T/Ladd/NextLight/ADEIR`3/AppendixF/209-019D



SETBACKS

DISTANCE FROM	TO ARRAY		TO FENCE	
	REQUIRED(MIN)	PROVIDED(MIN)	REQUIRED(MIN)	PROVIDED(MIN)
HWY 138 (NORTH)	NA	105 FT	NA	68 FT
HWY 138 (SOUTH)	NA	134 FT	NA	57 FT
160TH NORTH OF HWY 138 (WEST)	NA	96 FT	NA	51 FT
160TH SOUTH OF HWY 138 (WEST)	NA	141 FT	NA	50 FT
170TH NORTH OF HWY 138 (EAST)	NA	200 FT	NA	44 FT
170TH NORTH OF HWY 138 (WEST)	NA	109 FT	NA	40 FT
170TH SOUTH OF HWY 138 (EAST)	NA	220 FT	NA	126 FT
WEST AVE E (NORTH)	NA	119 FT	NA	40 FT
WEST AVE C (SOUTH)	NA	130 FT	NA	71 FT
180TH (WEST)	NA	114 FT	NA	30 FT
175TH (EAST)	NA	110 FT	NA	30 FT
155TH (WEST)	NA	119 FT	NA	67 FT

* – SETBACK DISTANCES ARE MEASURED FROM THE EXISTING OR PROPOSED EDGE OF ROW AS APPLICABLE

NOTES:

1. THE PROPOSED ARRAY LAYOUT SHOWN IS SUBJECT TO FINAL DESIGN & VERIFICATION OF ACTUAL SITE CONDITIONS.
2. ZONE X AREA BETWEEN LIMITS ARE AREAS OF 0.2% ANNUAL CHANCE FLOOD WITH AVERAGE DEPTHS OF LESS THAN 1 FOOT. OUTSIDE LIMIT AREAS, ARE AREAS DETERMINED TO BE OUTSIDE THE 0.2% ANNUAL CHANCES FLOOD PLAIN
3. ZONE A AREAS WITH A 1% ANNUAL CHANCE OF FLOODING AND A 26% CHANCE OF FLOODING OVER THE LIFE OF A 30–YEAR MORTGAGE. BECAUSE DETAILED ANALYSES ARE NOT PERFORMED FOR SUCH AREAS; NO DEPTHS OR BASE FLOOD ELEVATIONS ARE SHOWN WITHIN THESE ZONES
4. DECLINATION AT THE INTERSECTION OF HWY 138 & 170TH W. STREET
5. THIS DRAWING IS A REVISION TO SUNPOWER AV SOLAR RANCH ONE FACILITY SITE PLAN, AND MADE PER THE DIRECTION OF NEXTLIGHT RENEWABLE POWER, LLC

LEGEND

FEMA FLOOD PLAIN. THIS SURVEY IS BASED ON GRID COORDINATES DERIVED FROM A GPS SURVEY PROVIDED BY **WESTWOOD PROFESSIONAL SERVICES**

FENCE

34.5 KV OVERHEAD LINE 160' POLE SPACING

(OHD) 230 KV OVERHEAD LINE

PROPOSED 8" WATERLINE

LOS ANGELES COUNTY EASEMENT

DEVELOPMENT SETBACK AND SHEET PILING

CDFG CALIFORNIA DEPARTMENT OF FISH AND GAME JURISDICTIONAL DRAINAGE AREA

S=0.9% POST-DEVELOPMENT DRAINAGE FLOW DIRECTION AND SLOPE

W EXISTING WATER WELL TO REMAIN

R ELECTRICAL RISER

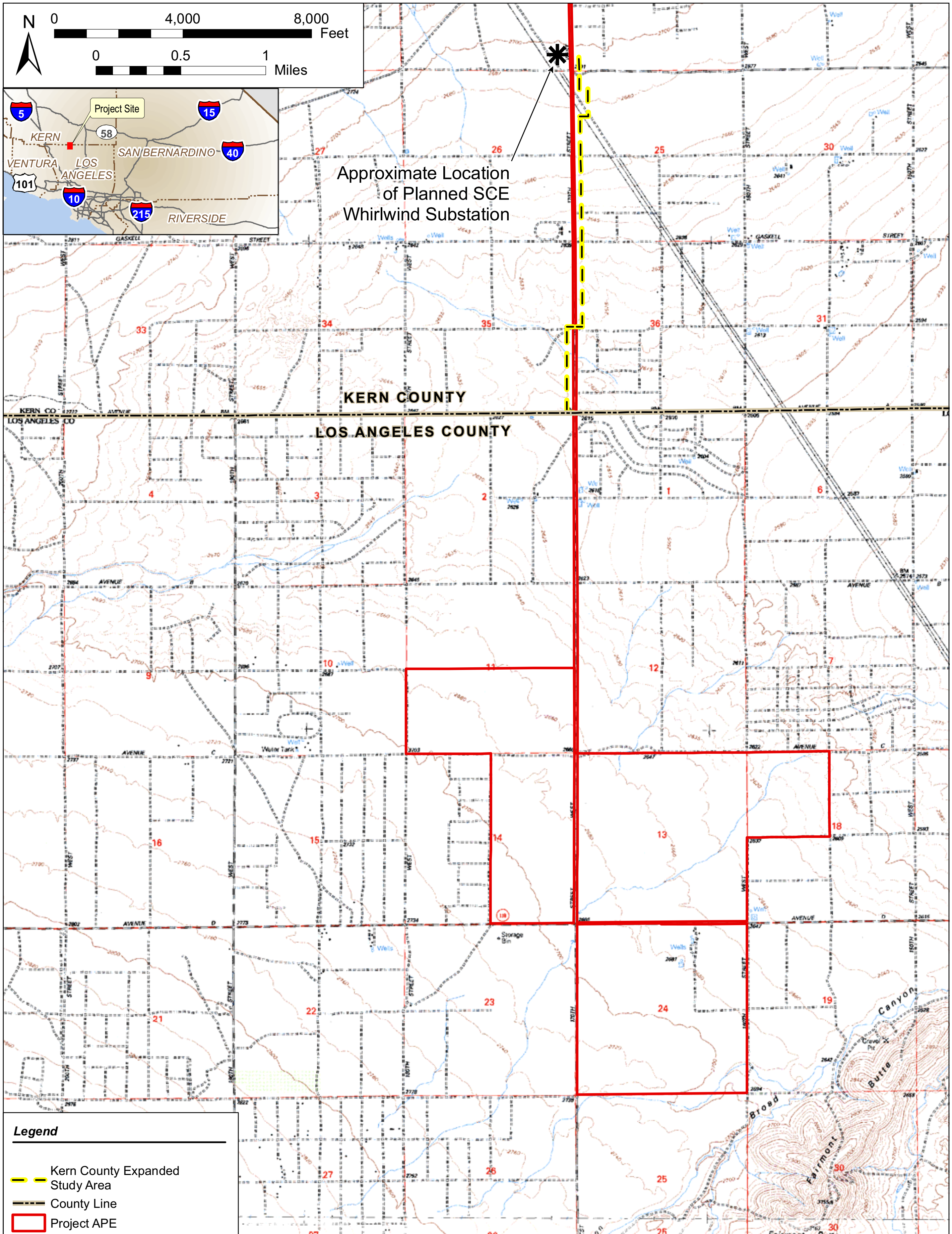
MAIN PROJECT ENTRY

SECONDARY PROJECT ENTRY

S SUBSTATION

SOLAR ARRAY (PV PANELS)

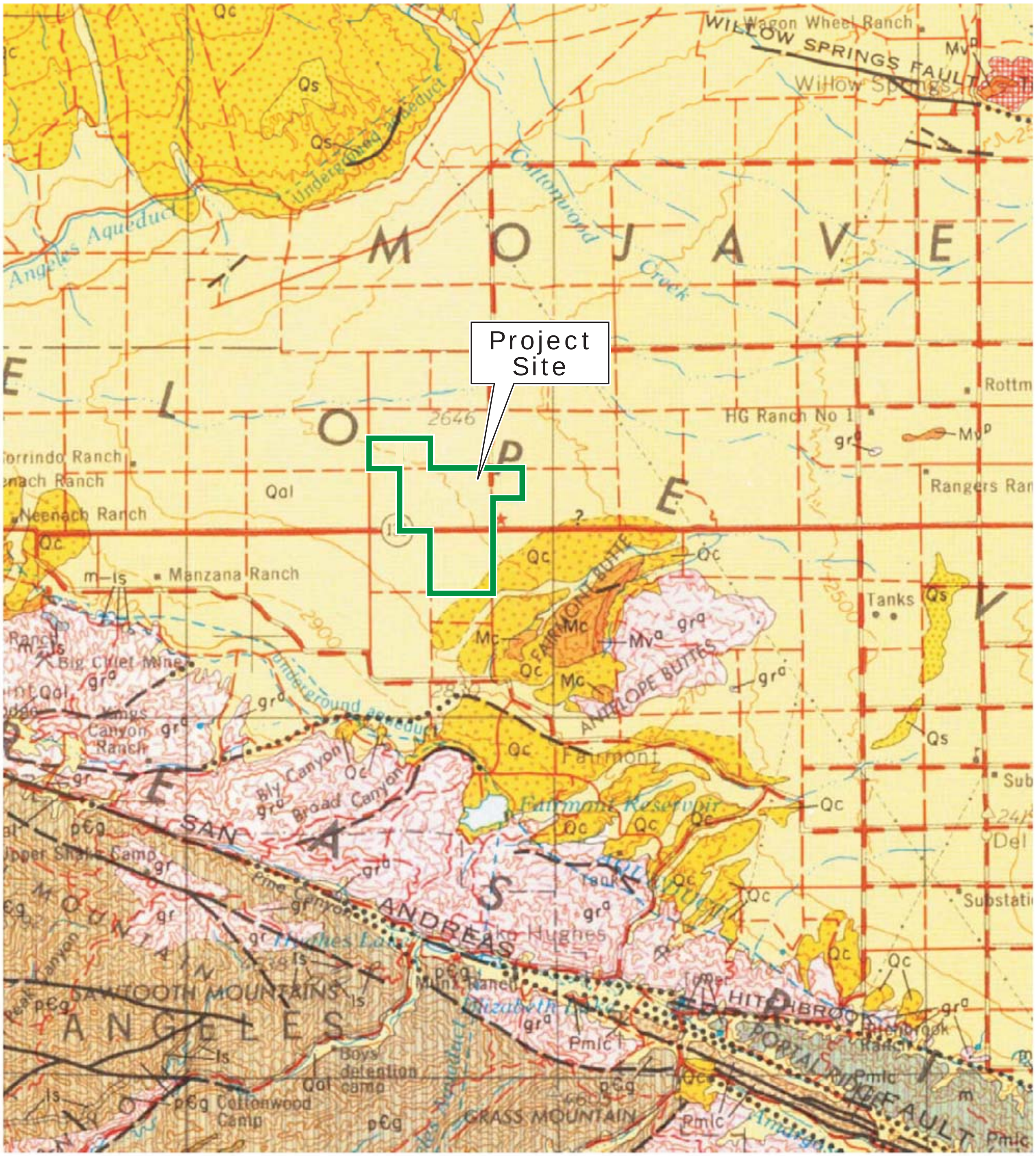
Source: Psomas and Patch Services Dated 2010 Patch Drawing D-5408-2014	AV Solar Ranch One Cultural Resources Technical Report	**Figure 2.** SITE LAYOUT	2010



Source: CA DRG, 7.5 Minute (O) Series, scanned USGS topographic maps from CA Spatial Information Library (CaSIL): Map Name: FAIRMONT BUTTE (1974)	**AV Solar Ranch One Cultural Resources Technical Report**	**Figure 3.** PROJECT APE MAP	2010

T:\NextLight_AV_EIR\deliverables\AVSR1_EIR\Cultural\Fig3_Project_APE_Map.mxd

T/Ladd/NextLight/ADEIR 3/AppendixF/709-116A



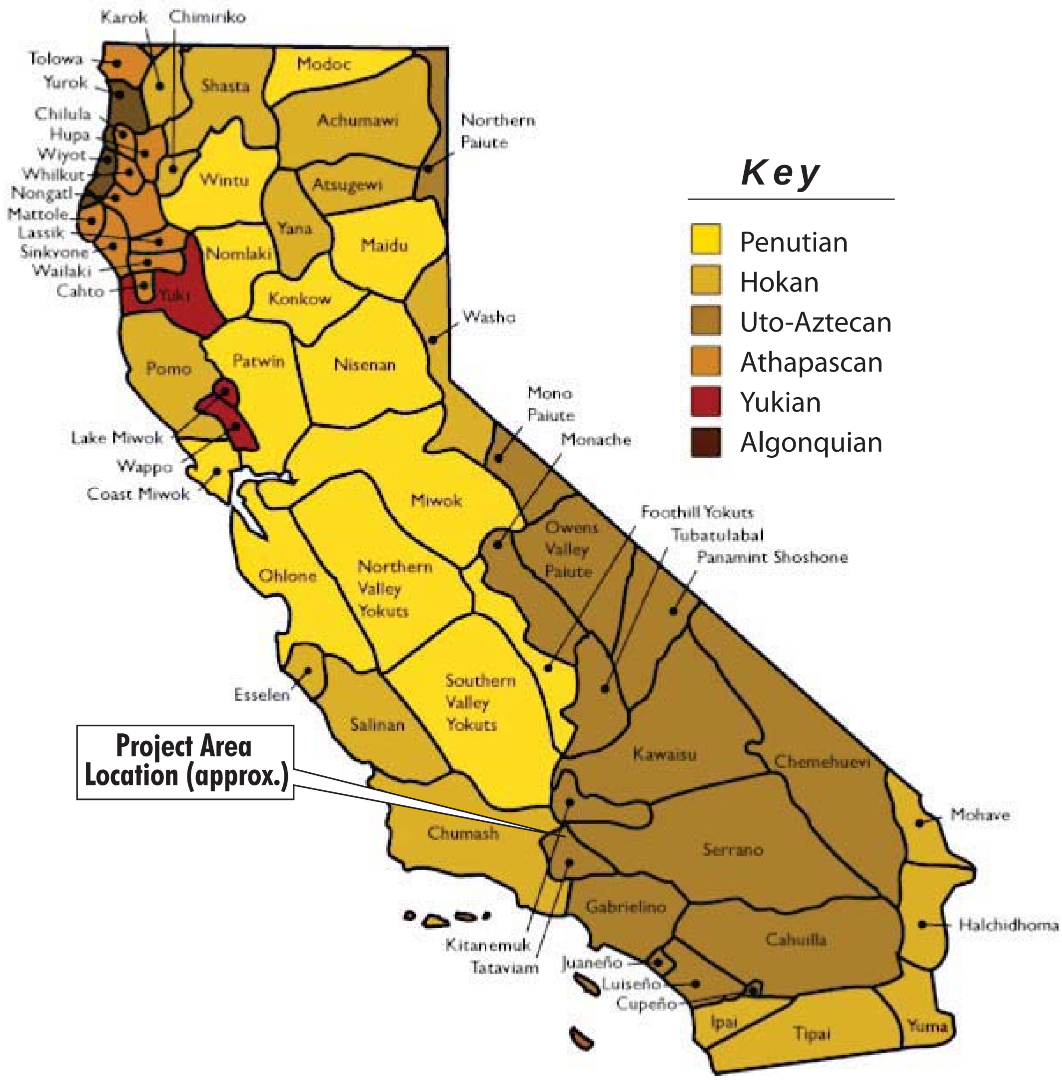
Key

Qc	Pleistocene nonmarine
Qal	Alluvium

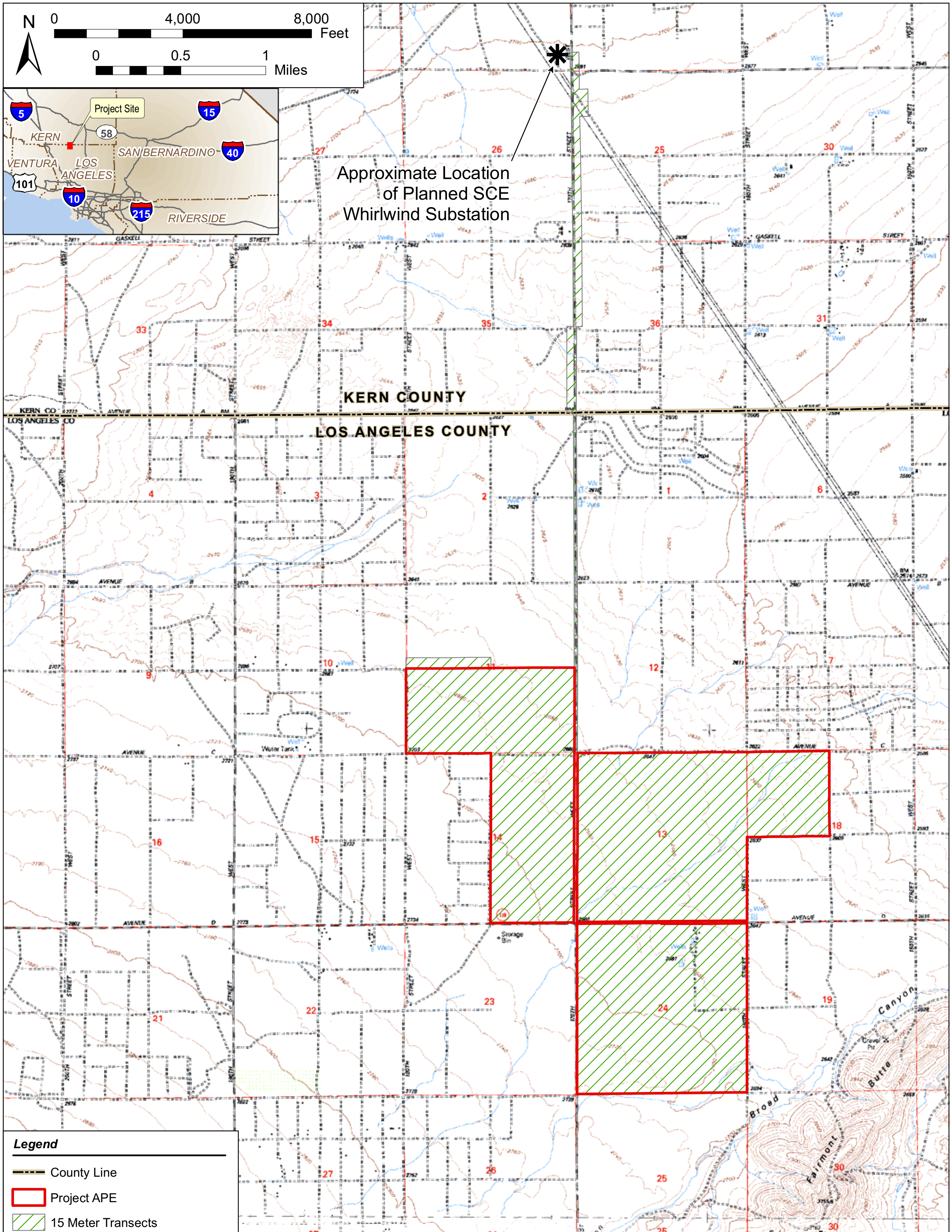
NOT TO SCALE

Source: CDMG, Geologic Map of the Santa Ana Sheet, California, 1992	**AV Solar Ranch One Cultural Resources Technical Report**	**Figure 4.** GEOLOGIC MAP OF PROJECT AREA	2010

T/Ladd/NextLight/ADEIR 3/AppendixF/609-113A



Source: California Native American Heritage Commission 2009	**AV Solar Ranch One Cultural Resources Technical Report**	**Figure 5.** CALIFORNIA TRIBAL AREA MAP	2010



T:\NextLight_AV_EIR\deliverables\AVSR1_EIR\Cultural\Fig6_SurveyCoverageMap.mxd

Source: CA DRG, 7.5 Minute (O) Series, scanned USGS topographic maps from CA Spatial Information Library (CaSIL): Map Name: FAIRMONT BUTTE (1974)

AV Solar Ranch One Cultural Resources Technical Report

Figure 6. SURVEY COVERAGE MAP

2010

CONFIDENTIAL APPENDIX A
ARCHAEOLOGICAL SITE RECORD FORMS

This appendix contains confidential archaeological site records information and is not appropriate for public distribution. The Los Angeles County Department of Regional Planning will consider requests for this information from individuals that meet the U.S. Secretary of the Interior's Professional standards or California State Personnel Board criteria for Associate State Archaeologist or State Historian II. Disclosure to individuals not meeting these criteria violates the California Office of Historic Preservation's records access policy.

APPENDIX G
TRAFFIC IMPACT ANALYSIS REPORT

This appendix presents the Traffic Impact Analysis (TIA) prepared for the AV Solar Ranch One Project. This TIA supports the traffic impact assessment presented in Section 5.11 of the Draft EIR.

TRAFFIC IMPACT ANALYSIS

FOR THE

AV SOLAR RANCH ONE PROJECT
LOS ANGELES COUNTY, CALIFORNIA

Prepared for:

Los Angeles Department of Regional Planning

and

AV Solar Ranch 1, LLC
353 Sacramento Street, Suite 2100
San Francisco, CA 94111

Prepared by:

URS
2020 East First Street, Suite 400
Santa Ana, California 92705

March 2010

TABLE OF CONTENTS

Section **Page**

Section **Page**

List of Tables **Page**

List of Tables (Continued) **Page**

List of Figures

List of Appendices

EXECUTIVE SUMMARY

ES.1 INTRODUCTION

The purpose of this Traffic Impact Analysis (TIA) Report is to document the traffic analysis conducted for the AV Solar Ranch One Project (Project), identify potential traffic impacts and recommend mitigation measures to reduce those impacts to levels of insignificance. This traffic study was prepared according to the County of Los Angeles Traffic Impact Analysis Report Guidelines and consistent with the Los Angeles County Congestion Management Program (CMP). This TIA Report updates and supersedes the TIA Report submitted to the County of Los Angeles in March 2009 associated with the Zoning/Conditional Use Permit Application for the Project.

In summary, the proposed Project (refer to Figure 1-1) consists of a 230-megawatt (MW) solar photovoltaic (PV) facility on approximately 2,100 acres of former agricultural land in northern Los Angeles County along State Route 138 (West Avenue D). The proposed Project is designed to meet the increasing demand for clean, renewable electrical power. The proposed Project includes a 230-kilovolt (kV) transmission line for interconnecting the electrical output of the Project to the regional transmission system. The off-site portion of the proposed transmission line is approximately 3.5 miles long, and is proposed to interconnect to Southern California Edison□s (SCE) planned Whirlwind Substation north of the Project site in southern Kern County. The proposed Project is currently planned to begin construction in 2010 and to be fully completed in 2013.

The proposed Project is located in the Antelope Valley area in an unincorporated portion of Los Angeles County, approximately 15 miles northwest of downtown Lancaster. The property consists of approximately 2,100 acres occupying an area both north and south of State Route 138 (SR-138). The Project site can be accessed from Interstate 5 (I-5) or State Route 14 (SR-14) via SR-138 (West Avenue D) from the west and east, respectively. The primary facility access points will be from 170th Street West, north and south of SR-138. The majority of the Project site has been undeveloped or used for agricultural production since the 1940s, and currently includes a residential ranch area. The Project site is surrounded by undeveloped and agricultural land in all directions.

During the construction phase of the Proposed Project, the construction workforce is expected to peak at approximately 906 daily one-way trips (this includes 92 daily one-way trips generated by 46 on-site management and staff and 814 daily one-way trips generated by 407 construction and manufacturing workers). The construction delivery truck traffic during construction is estimated to peak at 90 daily one-way trips based on a peak of 15 truck deliveries per day. The trip generation assessment for the construction truck deliveries have been Passenger Car Equivalent (PCE) adjusted for this analysis in the peak month where one truck is considered to be equivalent to three passenger cars. Hence, the total peak daily one-way trips generated during the construction phase of the 8-10 MW of installed output capacity per month, is 996 daily trips. The traffic impact analysis includes consideration of the combined effects of construction workers and delivery truck traffic. Subsequently following the completion of the construction phase, the operational workforce is expected to generate approximately 32 daily one-way trips for 16 operations phase workers.

Additionally, the analysis assumes that construction traffic would occur during the a.m. (7:00 a.m. to 9:00 a.m.) and p.m. (4:00 p.m. to 6:00 p.m.) peak periods i.e., worst-case analysis. This approach overestimates Project impacts since the currently planned construction start time is 7:00 a.m., which essentially avoids the a.m. peak commute hours. The traffic analysis assumes that approximately 30 and 20 percent of the construction delivery trucks would enter the site during the morning and evening peak hours, respectively. The analysis also assumes that 20 and 30 percent of the construction delivery trucks would exit the site during the morning and evening peak hours, respectively. The balance of the truck trips (50 percent) are assumed to occur during off-peak hours of the day.

The traffic impact analysis for the proposed Project addresses the following items:

- Existing Conditions
- Year 2013 Baseline No Project Conditions
- Year 2013 Baseline No Project plus Project Construction Conditions
- Year 2014 Baseline No Project Conditions
- Year 2014 Baseline No Project plus Project Operations Conditions

ES.2 INTERSECTION ANALYSIS SUMMARY

Table ES-1 summarizes the results of the level of service (LOS) analyses conducted for the study intersections according to the County of Los Angeles Traffic Impact Analysis Report Guidelines and consistent with the Los Angeles County Congestion Management Program (CMP).

For Year 2013 with Project (8-10 MW) scenario, all study area intersections are projected to operate at LOS C or better in both the a.m. and p.m. peak hour conditions.

ES.3 ROADWAY SEGMENT ANALYSIS

Table ES-2 summarizes the results of the roadway analyses conducted for the study roadway and freeway segment locations according to Los Angeles County and California Department of Transportation (Caltrans) analysis procedures and guidelines.

TABLE ES-1
SUMMARY OF PEAK HOUR INTERSECTION LEVEL OF SERVICE ANALYSIS

	Existing		2013 No Project		2013 Project Construction		2014 No Project		2014 Project Operations	
Intersection Location	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.
SR-138/SR-14 northbound ramps	A	A	A	A	B	B	A	A	A	A
SR-138/SR-14 southbound ramps	A	A	A	A	B	B	A	A	A	A
SR-138/90th Street West	B	B	B	B	C	C	B	B	B	B
SR-138/110th Street West	A	B	B	B	B	B	B	B	B	B
SR-138/160th Street West	A	A	A	B	B	B	A	B	A	B
SR-138/170th Street West[1]	A	B	A	B	C	C	B	B	B	B
SR-138/170th Street West[2]	A	B	A	B	C	C	B	B	B	B
SR-138/La Petite Avenue	A	A	A	A	A	B	A	A	A	A
SR-138/270th Street West	A	A	A	A	A	A	A	A	A	A
SR-138/Old Ridge Route	A	B	A	B	A	B	A	B	A	B

[1] Assumes all construction traffic is accessing portion of Project site north of SR-138 via 170th Street West until northern Project area is built out (prior to start of southern Project area).

[2] Assumes all construction traffic is accessing portion of Project site south of SR-138 through Project completion.

TABLE ES-2
SUMMARY OF ROADWAY SEGMENT LEVEL OF SERVICE ANALYSIS

	Existing		2013 No Project		2013 Project Construction		2014 No Project		2014 Project Operations	
Roadway Segment	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.
I-5 (North of SR-138)	B	B	B	B	B	B	B	B	B	B
SR-14 (South of SR-138)	B	B	B	B	B	B	B	B	B	B
SR-14 (North of SR-138)	B	B	B	B	B	B	B	B	B	B
SR-138 (East of 170th Street West)	B	B	B	B	C	C	B	B	B	B
170th Street West (North of SR-138) (North Construction Only)	A	A	A	A	A	A	A	A	A	A
170th Street West (South of SR-138) (South Construction Only)	A	A	A	A	A	A	A	A	A	A

As shown in Table ES-2 under all traffic analysis scenarios, all study roadway segments are similarly forecast to operate at acceptable LOS C or better under all project analysis scenarios resulting in no significant roadway or freeway segment impacts.

ES.4 CONCLUSION

The proposed Project is anticipated to contribute added traffic volume to the surrounding roadway circulation system during its construction and subsequent project operations. During the 8-10 MW per month construction development scenario, all study area intersections are anticipated to operate at LOS C or better during both the a.m. and p.m. peak hour hours.

Roadway segments during the same scenario are anticipated to operate at LOS C or better during both the a.m. and p.m. peak hours.

It should be noted that the LOS analysis for Year 2013 with Project for 8-10 MW per month of installed capacity, indicates no permanence in LOS degradation, and subsequent to completion of construction of the proposed Project, LOS is anticipated to be significantly better than shown. In short, during project operations, which immediately follows Proposed Project construction completion, the combination of low project trip generation (16 operation staff on-site plus minimal, periodic truck deliveries) and adequate intersection and roadway segment capacities will result in findings of no significant traffic impacts at all study intersections and roadway segment locations for post-construction scenarios.

SECTION 1.0
INTRODUCTION

1.1 STUDY PURPOSE

The purpose of this Traffic Impact Analysis (TIA) Study is to identify and document potential traffic impacts related to the development of the AV Solar Ranch One Project, as well as to recommend mitigation for any identified transportation and circulation deficiencies associated with construction and operation of the proposed project. For brevity, the AV Solar Ranch One Project will be synonymously referred to as the proposed “Project” through the succeeding discussions in this document.

1.2 STUDY AREA AND PROJECT BACKGROUND

The proposed project is located in unincorporated Los Angeles County (Figure 1-1, Regional Vicinity Map).

The following scenarios were analyzed as a part of this study:

- Existing Conditions – utilized to establish the current level or existing baseline of traffic operations within the study area.
- Future Year (2013) Base Conditions – establishes a future baseline scenario against which traffic generated by the various project construction development scenarios was compared.
- Future Year (2013) Base with Project Construction Conditions – represents future base traffic conditions with the addition of projected trip generation associated with the proposed 8-10 MW per month project construction option development scenario.
- Future Year (2014) Base Conditions – establishes a future baseline scenario against which traffic generated by project operations was compared.
- Future Year (2014) Base with Project Operations Conditions – represents future base traffic conditions with the addition of projected trip generation associated with the operation of the project.

The traffic analyses prepared for this study were performed in accordance with County of Los Angeles Traffic Impact Analysis Report Guidelines, the California Environmental Quality Act (CEQA) project review process, and the Los Angeles County Congestion Management Program (CMP) requirements. Figure 1-2 shows the project study area.

1.3 REPORT ORGANIZATION

Following this Introduction chapter, this report is organized into the following sections:

- 2.0 Analysis Methodology: This section describes the methodologies and standards utilized to analyze roadway and intersection traffic conditions.
- 3.0 Existing Conditions: This section describes the existing traffic network within the study area and provides analysis results for existing traffic conditions.
- 4.0 Project Description: This section describes the project traffic generation, trip distribution patterns and project trip assignment.
- 5.0 Year 2013 Traffic Conditions: This section describes future base and with project construction conditions. Analysis results are provided for the Year 2013 Base (No Project) and with Project construction conditions for the 8-10 MW per month construction development scenario. Mitigation measures, if necessary, for project-related construction impacts are identified for Year 2013 Base with Project construction conditions.
- 6.0 Future (2014) Traffic Conditions: This section describes future base and with project operations conditions. Analysis results are provided for the Future (2014) Base (No Project) and with Project operations conditions. There are no anticipated project-related operation phase impacts.
- 7.0 Findings and Recommendations: Outlines overall study findings and describes recommended project-related mitigation measures, and summarizes site access, circulation, and on-site parking issues.

SECTION 2.0
ANALYSIS METHODOLOGY

The traffic analyses conducted for this study were performed in accordance with County of Los Angeles traffic impact analysis guidelines, the California Environmental Quality Act (CEQA) project review process, and the Los Angeles County Congestion Management Program (CMP) requirements. Detailed information on intersection analysis methodologies, standards, and thresholds are discussed in the following sections.

2.1 LEVEL OF SERVICE DESCRIPTIONS

Level of Service (LOS) is an indicator of operating conditions on a roadway or at an intersection and is defined in categories ranging from A to F. These categories can be viewed much like school grades, with A representing the best traffic flow conditions and F representing poor conditions. LOS A indicates free-flowing traffic and LOS F indicates substantial congestion with stop-and-go traffic and long delays at intersections. Table 2-1 provides definitions of level of service for signalized intersections using the Intersection Capacity Utilization (ICU) methodology.

TABLE 2-1
LEVEL OF SERVICE DESCRIPTIONS

Level of Service	Description of Operation	Range of V/C Ratios[1]
A	Describes primarily free-flow conditions at average travel speeds. Vehicles are seldom impeded in their ability to maneuver in the traffic stream. Delays at intersection are minimal.	0.00 – 0.60
B	Represents reasonably unimpeded operations at average travel speed. The ability to maneuver in the traffic stream is slightly restricted and delays are not bothersome.	0.61 – 0.70
C	Represents stable operations, however, ability to change lanes and maneuver may be more restricted than LOS B and longer queues are experienced at intersections.	0.71 – 0.80
D	Congestion occurs and a small change in volumes increases delays substantially.	0.81 – 0.90
E	Severe congestion occurs with extensive delays and low travel speeds occur.	0.91 – 1.00
F	Characterizes arterial flow at extremely low speeds and intersection congestion occur with high delays and traffic queuing.	>1.00

[1] V/C = volume to capacity.

2.2 PEAK HOUR INTERSECTION LEVEL OF SERVICE STANDARDS AND THRESHOLDS

This section presents the methodologies used to perform peak hour intersection capacity analysis, and considers both signalized and unsignalized intersections, as applicable. Currently there are no signalized intersections in the study area.

2.2.1 Signalized Intersection Analysis

The analysis of signalized intersections utilizes the analysis procedure as outlined in the *County of Los Angeles Department of Public Works Traffic Impact Analysis Guidelines and the Los Angeles County CMP Guideline.* This procedure is known as Intersection Capacity Utilization (ICU) methodology and defines LOS in terms of Volume-to-Capacity (V/C) ratio. This technique uses 1,600 vehicles per hour per lane (VPHPL) and 2,880 (VPHPL) for dual left turn lanes as the maximum saturation volume of intersections. The LOS criteria used for this technique was earlier described in Table 2-1. As noted previously, there are no signalized intersections in the Project study area. Additionally, the traffic levels associated with the proposed Project do not warrant the installation of new signals at existing intersections, therefore, no actual analysis of signalized intersections was performed for this Project.

2.2.2 Unsignalized Intersection Analysis

Unsignalized intersections, including two-way and all-way stop controlled intersections were analyzed using the 2000 Highway Capacity Manual (Section 10) unsignalized intersection analysis methodology. The LOS for a two-way stop controlled (TWSC) intersection is determined by the computed or measured control delay and is defined for each minor movement. Table 2-2 summarizes the Level of Service criteria for unsignalized intersections. The computerized analysis of intersection operations was performed utilizing *Traffix 7.6* traffic analysis software (Dowling Associates 2003).

TABLE 2-2
LEVEL OF SERVICE CRITERIA FOR STOP CONTROLLED UNSIGNALIZED INTERSECTIONS

Average Control Delay (Sec/Veh)	Level of Service (LOS)
<10	A
>10 and <15	B
>15 and <25	C
>25 and <35	D
>35 and <50	E
>50	F

Source: 2000 Highway Capacity Manual, TRB Special Report 209.

The County of Los Angeles considers LOS D or better during the a.m. and p.m. peak hours to be the maximum acceptable intersection LOS. This is consistent with the approach outlined in the Los Angeles County CMP. The traffic impact analysis presented herein uses this criteria (i.e., LOS D or better) for determining the significance of Project traffic levels.

2.3 DETERMINATION OF SIGNIFICANT IMPACTS

2.3.1 Intersections

A project is considered to have an individually significant impact on the operation of an intersection if the project related increase in Volume to Capacity (V/C) ratio equals or exceeds the following thresholds shown in Table 2-3.

TABLE 2-3
SIGNIFICANT IMPACT THRESHOLDS FOR INTERSECTIONS

Pre-project Conditions		With Project V/C Increase
LOS	V/C	
C	0.71 to 0.80	0.04 or more
D	0.81 to 0.90	0.02 or more
E/F	0.91 or more	0.01 or more

Source: County of Los Angeles Department of Public Works Traffic Impact Analysis Guidelines.

2.3.2 State Highways

Based on the Caltrans Guide for the Preparation of Traffic Impact Studies, "Caltrans endeavors to maintain a target LOS at the transition between LOS "C" and LOS "D" on State Highway Facilities, however, Caltrans acknowledges that this may not always be feasible and recommends that the lead agency consult with Caltrans to determine the target LOS. If an existing State highway facility is operating at less than the appropriate target LOS, the existing LOS should be maintained."

The study freeways and state highway are also within the jurisdiction of Los Angeles County and are also subject to County significant impact thresholds.

2.3.3 County Roadways

According to the Los Angeles County Traffic Impact Analysis Report Guidelines, a project is deemed to have a significant impact on roadways when it adds set percentages of traffic based on the LOS of the pre-project conditions shown in Table 2-4.

TABLE 2-4
SIGNIFICANT IMPACT THRESHOLDS FOR TWO-LANE ROADWAYS

		Percentage Increase in Passenger Car Per Hour (PCPH) by Project, Pre-project LOS		
Directional Split	Total Capacity (PCPH)	C	D	E/F
50/50	2,800	4	2	1
60/40	2,650	4	2	1
70/30	2,500	4	2	1
80/20	2,300	4	2	1
90/10	2,100	4	2	1
100/0	2,000	4	2	1

Source: County of Los Angeles Department of Public Works Traffic Impact Analysis Guidelines.

SECTION 3.0
EXISTING CONDITIONS

This section describes key roadways segments and intersections, existing daily roadway and peak hour intersection traffic volume information and LOS analysis results for existing conditions in the Project study area.

3.1 EXISTING ROADWAY NETWORK

Several regionally and locally significant roadways traverse the study area. Each of the key roadways, as well as associated study intersections within the study area, is discussed below.

3.1.1 North-south Facilities

3.1.1.1 Interstate 5

I-5 is a major north-south interstate freeway through Los Angeles County and the length of California, extending from San Diego County towards the states of Oregon and Washington. Located 22 miles west of the Project Site, I-5 provides for 4 mainline lanes in each direction with wide shoulders and a center median.

3.1.1.2 State Route 14

The Antelope Valley (AV) Freeway (State Route 14 [SR-14]) is a north-south regional roadway approximately 15 miles east of the project site. SR-14 provides regional access from the cities of Lancaster, Palmdale and unincorporated areas within the AV. Near the vicinity of the project site, the freeway generally provides two lanes per direction then widens to three lanes in each direction with high occupancy vehicle (HOV) lanes to the south towards I-5. Full ramp access is provided at the SR-14 and SR-138 interchange.

3.1.1.3 170th Street West

This is a north-south local roadway that provides primary north-south access to the project site. 170th Street West is currently configured with one travel lane in each direction.

3.1.1.4 160th Street West

This is a north-south local roadway that provides alternate north-south access to the project site. The north and south leg of 160th Street West at SR-138 are currently unpaved. The north leg shows more prominent use as manifested by more defined vehicle track marks while the south leg has fainter tracking indicating less frequent vehicular activity. Currently, 160th Street West is not passable to the north within the site boundary.

3.1.2 East-west Facilities

3.1.2.1 State Route 138

SR-138 is an east-west oriented regional facility that traverses and provides direct access to the Project site. SR-138 generally runs east-west from SR-14 to I-5 Freeway with one travel lane in each direction. Full ramp access is provided at both the I-5 and SR-14 interchanges.

3.2 STUDY INTERSECTIONS

Based on the result of the traffic study field review, the following nine key study area intersections were identified for analysis in the traffic study, as shown in Table 3-1. The existing intersection geometrics are shown on Figure 3-1.

TABLE 3-1
STUDY INTERSECTIONS

ID	Intersection	Jurisdiction
1	State Route 14 NB Ramps/State Route 138	Los Angeles County
2	State Route 14 SB Ramps/State Route 138	Los Angeles County
3	90th Street West/State Route 138	Los Angeles County
4	110th Street West/State Route 138	Los Angeles County
5	160th Street West/State Route 138	Los Angeles County
6	170th Street West/State Route 138	Los Angeles County
7	La Petite Avenue/State Route 138	Los Angeles County
8	270th Street West/State Route 138	Los Angeles County
9	Ridge Road/State Route 138	Los Angeles County

Note: All study intersections are currently unsignalized.

3.3 EXISTING TRAFFIC VOLUME

The traffic data collected includes 24-hour roadway segment counts and a.m. and p.m. peak hour study intersection counts to be used in the traffic impact analysis.

For analysis purposes peak hour data were collected during the 7:00 a.m. to 9:00 a.m. and 4:00 p.m. to 6:00 p.m. peak hours. These peak hours are the standard adjacent street traffic peak hours used in the ITE Trip Generation Manual and the majority of traffic analyses in Los Angeles County.

Figure 3-2 shows existing a.m./p.m. peak hour traffic volumes for the key study area intersections. The 24-hour traffic data and a.m./p.m. peak hour intersection turning movement counts are provided in Appendix A.

3.4 EXISTING LEVEL OF SERVICE ANALYSIS

LOS analyses under existing conditions were conducted using the methodologies described in Section 2.0. The intersection LOS results are discussed below.

3.4.1 Intersection Analysis

Table 3-2 displays intersection LOS and average delay results for the key study area intersections under Existing conditions. All intersections in the Project study area are unsignalized.

TABLE 3-2
PEAK HOUR INTERSECTION LEVEL OF SERVICE RESULTS, EXISTING CONDITIONS

	AM Peak Hour		PM Peak Hour	
Intersection	LOS	Average Delay (Sec/Veh)	LOS	Average Delay (Sec/Veh)
State Route 14 NB Ramps/State Route 138	A	9.1	A	9.6
State Route 14 SB Ramps/State Route 138	A	9.4	A	9.4
90th Street West/State Route 138	B	10.5	B	11.1
110th Street West/State Route 138	A	10.0	B	10.1
160th Street West/State Route 138	A	0.0	A	0.0
170th Street West/State Route 138	A	9.7	B	10.3
La Petite Avenue/State Route 138	A	9.2	A	9.4
270th Street West/State Route 138	A	0.0	A	7.4
Ridge Road/State Route 138	A	7.4	B	10.3

Source: URS Corp.; February 2009.
Notes:
Unsignalized intersections – LOS calculated in delay (seconds) not V/C.
All intersections are unsignalized two-way stop controlled. SR-138 is the major roadway.

The detailed LOS calculation worksheets for existing conditions are provided in Appendix B.

As shown in Table 3-2, all nine study area intersections are currently operating at acceptable LOS B or better under existing conditions.

3.4.2 Roadway Analysis

The analysis described below summarizes the result of the roadway segment level of service analysis conducted for the existing conditions. Table 3-3 displays roadway volume and segment LOS under existing conditions. The LOS calculation worksheets are provided in Appendix B.

TABLE 3-3
ROADWAY SEGMENT LEVEL OF SERVICE RESULTS,
EXISTING CONDITIONS

Roadway	Segment	Cross-section Classification	Time Period	Traffic Volume	Level of Service (A.M./P.M.)
I-5	North of SR-138	Freeway	Daily	71,000[1]	B/B[3,4]
SR-14	South of SR-138	Freeway	Daily	37,500[1]	B/B[3,4]
SR-14	North of SR-138	Freeway	Daily	36,000[1]	B/B[3,4]
SR-138	East of 170th Street West	2-lane Collector	AM/PM	151/210[2]	B/B[4]
170th Street West	North of SR-138	2-lane Collector	AM/PM	19/23[2]	A/A[4]
170th Street West	South of SR-138	2-lane Collector	AM/PM	6/8[2]	A/A[4]

1 Average Daily Traffic (ADT).

2 Peak Hour Volume.

3 ADT volumes were converted to a.m./p.m. peak hours volumes using K and D factors obtained from Caltrans' Traffic Data Branch website. http://traffic-counts.dot.ca.gov/.

4 Peak Hour LOS.

As shown in Table 3-3, all study roadway segment are currently operating at acceptable LOS B or better under existing conditions.

SECTION 4.0
PROJECT DESCRIPTION

4.1 INTRODUCTION

In summary, the proposed AV Solar Ranch One Project (Project) (refer to Figure 1-1) consists of a 230-megawatt (MW) solar photovoltaic (PV) facility on approximately 2,100 acres of former agricultural land in northern Los Angeles County along State Route 138 (West Avenue D). The proposed Project is designed to meet the increasing demand for clean, renewable electrical power. The proposed Project includes a 230-kilovolt (kV) transmission line for interconnecting the electrical output of the Project to the regional transmission system. The off-site portion of the proposed transmission line is approximately 3.5 miles long, and is proposed to interconnect to Southern California Edison's (SCE) planned Whirlwind Substation north of the Project site in southern Kern County. The proposed Project is currently planned to begin construction in 2010 and to be fully completed in 2013. The overall construction period is planned to be 38 months.

The proposed Project is located in the Antelope Valley area in an unincorporated portion of Los Angeles County, approximately 15 miles northwest of downtown Lancaster. The property consists of approximately 2,100 acres occupying an area both north and south of SR-138. The Project site can be accessed from I-5 or SR-14 via SR-138 (West Avenue D) from the west and east, respectively. The primary facility access points will be from 170th Street West, north and south of SR-138 (refer to Figure 4-1). The majority of the Project site has been undeveloped or used for agricultural production since the 1940s, and currently includes a residential ranch area. The Project site is surrounded by undeveloped and agricultural land in all directions.

As part of the proposed Project, on-site road improvements would include perimeter roads around the site and internal circulation roads to serve the Project site.

Construction activities are proposed to occur between 7:00 a.m. and 5:00 p.m. The traffic analysis assumes that construction traffic would occur during the a.m. (7:00 a.m. to 9:00 a.m.) and p.m. (4:00 p.m. to 6:00 p.m.) peak periods — i.e., worst-case analysis. This approach overestimates Project impacts since the currently planned construction start time is 7:00 a.m., which would essentially avoid the a.m. peak commute hours.

Construction activities would consist of site mobilization, site grading, construction of on-site substation, construction of the 230-kV transmission line, construction of medium voltage infrastructure, construction of various facilities, utilities and civil engineering works, relocation of drainage, and development of solar fields.

The traffic impact analysis for the proposed Project addresses the following items:

- Existing Conditions
- Year 2013 Baseline No Project Conditions
- Year 2013 Baseline No Project plus Project Construction Conditions
- Year 2014 Baseline No Project Conditions
- Year 2014 Baseline No Project plus Project Operations Conditions

4.2 PROJECT TRIP GENERATION, DISTRIBUTION, AND ASSIGNMENT

This section describes the proposed AV Solar Ranch One Project construction and operation trip generation, trip distribution, and trip assignment.

4.2.1 Project Trip Generation

A forecast of the expected traffic volumes to be generated from the site was calculated based upon information provided by the project proponent.

The traffic impact analysis evaluated both peak project construction and project operations scenarios. Based on the anticipated higher level of trip making during peak project construction, the peak construction trip generation is considered the worst case condition that will occur during the lifespan of the proposed Project.

During the construction phase of the Proposed Project, the construction workforce is expected to peak at approximately 906 daily one-way trips (this includes 92 daily one-way trips generated by 46 on-site management and staff and 814 daily one-way trips generated by 407 construction and manufacturing workers). The construction delivery truck traffic is estimated to peak at 90 daily one-way trips based on a peak of 15 truck deliveries per day. The trip generation assessment for the construction truck deliveries have been Passenger Car Equivalent (PCE) adjusted for this analysis where one truck is considered to be equivalent to three passenger cars. Hence, the total peak daily one-way trips generated during the construction phase of the 8-10 MW of installed output capacity per month, is 996 daily trips (refer to Table 4-1). The traffic impact analysis includes consideration of the combined effects of construction workers and delivery truck traffic. Following completion of the construction phase, the operational workforce is expected to be approximately 32 daily one-way trips for 16 workers over the life of the Project (30 years).

The vehicular trips traveling to and from the project the site would be composed primarily of construction staff, trade workers and material and equipment deliveries to support the construction activities. To estimate the vehicular trips generated during construction, the key terminologies used in the development of the trip generation tables include:

TABLE 4-1
PEAK PROJECT CONSTRUCTION TRIP GENERATION
(8-10 MW SCENARIO)

Category	Actual Number of Vehicles	Daily Trips (One-way Trips)	A.M. Peak-hour Trips (7:00 A.M. – 9:00 A.M.)		P.M. Peak-hour Trips (4:00 P.M. – 6:00 P.M.)		Non-peak-hour Trips	
			In	Out	In	Out	In	Out
On-site Management and Staff (Individual Vehicles)[1]	46	92	46	0	0	46	0	0
Construction and Manufacturing Workers[1]	407	814	407	0	0	407	0	0
Construction Deliveries[2,3]	15 (45 PCE)[2,3]	90[2,3]	14	9	9	14	22	22
Total Trips	498	996	467	9	9	467	22	22

1 On-site Management and Staff will use 46 individual vehicles (92 daily round trips) during Peak Project Construction Month in Year 2013. Based on the information provided by the project proponent, there will be 407 construction and manufacturing workers (i.e., total of 453 management/staff and construction workers). It is assumed conservatively that all the workers and staff trips will enter and exit the site during morning and evening peak-hours, respectively.

2 Construction Deliveries were converted to Passenger Car Equivalent (PCE), assuming 1 Truck equal to 3 Passenger Cars, 15 Trucks = 45 PCE.

3 Approximately 30 percent of the Construction Deliveries are assumed to enter the site during the morning peak-hour and approximately 20 percent of the Construction Deliveries are assumed to exit the site during the morning peak hours. Approximately 20 percent of the Construction Deliveries are assumed to enter the site during the evening peak hours and approximately 30 percent of the Construction Deliveries are assumed to exit the site during the evening peak hour. The remaining 50 percent of the truck trips will operate during the off-peak hours of the day.

- Individual Vehicles – would represent cars, worker pickups and sport utility vehicles (SUV).
- Trucks – would be characterized as non personal (car or worker pickup, SUV) vehicles that are intended to transport heavy, bulky, loose materials and fluid products/materials that cannot be reasonably carried by personal or lighter vehicles. For the proposed project's use, they have been predefined to serve a purpose; i.e., delivering/hauling construction materials and equipment as well as to support project operational needs.
- PCE – stands for Passenger Car Equivalent and is used to convert trucks and other larger vehicle types into equivalent passenger car unit. Typically, a PCE factor of 3 is used to convert one truck into 3 passenger equivalent. This assumption is conservative and is a generally accepted practice and approved by reviewing agencies.

During construction, the proposed Project is planned to progress at a construction development rate that provides 8-10 MW of installed generation capacity per month.

4.2.1.1 8-10 MW Peak Construction Trip Generation

Table 4-1 shows the 8-10 MW peak project construction trip generation forecast.

4.2.1.2 Project Operations Trip Generation

Table 4-2 shows the project operations trip generation forecast after construction and represents the normal day to day operational trips at the project site. Additional operations related and trips including material deliveries and maintenance trips at the Project site are anticipated to be minimal and infrequent.

TABLE 4-2
PROJECT OPERATIONS TRIP GENERATION

Description	Daily Round Trips	A.M. Peak Hour Trips		P.M. Peak Hour Trips	
		In	Out	In	Out
Operational Workforce[1]	32	16	0	0	16
Total Trips	32	16	0	0	16

[1] Approximately 32 daily one-way trips are expected during the operations period.

4.2.2 Project Trip Distribution

Consistent with the geographical location of the Project site, Project construction and operations generated trips were assigned to the surrounding local and regional roadway system based on the projected manpower labor pool and material and equipment source and origin. Table 4-3 shows the project construction and operation trip distribution assignment used in the traffic analysis.

TABLE 4-3
PROJECT CONSTRUCTION AND OPERATIONS
TRIP DISTRIBUTION ASSUMPTIONS

Land Use Trip Category	To SR-14 South (Percent)	To SR-14 North (Percent)	To SR-138 West (Percent)
Construction Worker	70	5	25
Construction Delivery	100	0	0
Operations and Maintenance Trips	90	0	10

4.2.2.1 Trip Assignment and Routing to and from the Proposed Project

Based on the proposed site development plan, the traffic analysis assumed that the intersection of SR-138/170th Street West will be used as the primary access point to the Project site.

During the initial stages of project construction, all projected construction traffic will access the project site north of SR-138. Upon completion of the northern project area it is assumed that all construction will commence on the project site to south of SR-138. These assumptions present a worst-case traffic assessment scenario since it is assumed the entire peak construction workforce and associated truck deliveries would be accessing either the Project area north of SR-138 or south of SR-138 at one particular time.

SECTION 5.0
YEAR 2013 TRAFFIC CONDITIONS

This section provides an analysis of Future Year 2013 traffic conditions both with and without the proposed Project construction traffic. The traffic analysis conducted includes the following construction scenarios:

- Year 2013 Base Traffic Conditions (No Project)
- Year 2013 Base Traffic Conditions Plus Project Construction (8-10 MW per Month)

Section 5.2.3 (Impact Significance [Project Construction]) presents impact discussions for Project utility roadway crossings and off-site transmission line construction impacts on local roadways. Mitigation measures are proposed in Section 5.2.4 to reduce potentially significant impacts to less than significant levels.

5.1 YEAR 2013 BASE TRAFFIC CONDITIONS

To establish future baseline or no project conditions, a review was performed of planned and approved cumulative development projects within the City of Lancaster, the closest jurisdiction to the proposed Project. The result of the proposed developments review shows that identified future projects will contribute negligible trips to the Project study area. In addition, the Los Angeles County Department of Regional Planning was also contacted to identify any regionally significant projects that could potentially contribute cumulative traffic trips within the Project study area. The initial results have indicated that some planned developments are either located far away or have low trip generation potential that would not contribute any significant amount of trips to the Project study area. One nearby project, the proposed Fairmont Butte Motorsport Project does not have sufficient traffic information to determine its trip generation potential. For analysis purposes, it was conservatively assumed that to account for ambient traffic growth and for yet to be identified and/or approved cumulative development projects that could potentially occur within the Project study area, an ambient traffic growth of four percent per year was used to develop future baseline conditions from existing intersection traffic count data. This traffic growth assumption was based on the growth forecast for the North County Area from the Los Angeles County Congestion Management Program (CMP).

Figure 5-1 shows the Year 2013 Base No Project Traffic Volume.

5.1.1 Intersection Analysis

Table 5-1 displays the results of intersection LOS and average delay analysis under Year 2013 Base conditions. The detailed LOS calculation worksheets for the Year 2013 Base conditions are provided in Appendix C.

TABLE 5-1
PEAK HOUR INTERSECTION LEVEL OF SERVICE RESULTS,
YEAR 2013 NO PROJECT CONDITIONS

	A.M. Peak Hour		P.M. Peak Hour	
Intersection	LOS	Average Delay (Sec/Veh)	LOS	Average Delay (Sec/Veh)
State Route 14 northbound ramps/State Route 138	A	9.3	A	9.8
State Route 14 southbound ramps/State Route 138	A	9.6	A	9.6
90th Street West/State Route 138	B	11.0	B	11.7
110th Street West/State Route 138	B	10.2	B	10.4
160th Street West/State Route 138	A	9.7	B	10.0
170th Street West/State Route 138	A	10.0	B	10.6
La Petite Avenue/State Route 138	A	9.3	A	9.6
270th Street West/State Route 138	A	9.3	A	7.4
Ridge Road/State Route 138	A	7.4	B	10.6

Notes:
Unsignalized intersections – LOS calculated in delay (seconds) not V/C.
All intersections are unsignalized two-way stop controlled. SR-138 is the major roadway.

As shown in Table 5-1, all study area intersections are forecast to operate at acceptable LOS B or better under Year 2013 Base No Project conditions.

5.1.2 Roadway Analysis

The results of the roadway analysis presented in Table 5-2 show the roadway volume and segment LOS under Year 2013 No Project Construction conditions. The LOS calculation worksheets are provided in Appendix C.

As shown in Table 5-2, all study area roadway segments are forecast to operate at acceptable LOS B or better under Year 2013 Base No Project conditions.

5.2 YEAR 2013 BASE PLUS PROJECT CONSTRUCTION ANALYSIS

The Year 2013 Base Plus Project Construction analysis builds upon the Year 2013 Base No Project conditions and incorporates all applicable roadway and intersection improvements that are either constructed or planned for completion by 2013. Project-related improvements at Project access points along 170th Street West are also assumed incorporated and in place during the start of Project construction.

The net trip increases associated with the Project Construction were then distributed to the surrounding local and regional roadway circulation system based on the most reasonable construction trip distribution patterns for both construction workers and material deliveries.

TABLE 5-2
ROADWAY SEGMENT LEVEL OF SERVICE RESULTS,
YEAR 2013 NO PROJECT CONDITIONS

Roadway	Segment	Cross-section Classification	Time Period	Traffic Volume	Level of Service (A.M./P.M.)
I-5	North of SR-138	Freeway	Daily	80,200[1]	B/B[3,4]
SR-14	South of SR-138	Freeway	Daily	42,375[1]	B/B[3,4]
SR-14	North of SR-138	Freeway	Daily	40,680[1]	B/B[3,4]
SR-138	East of 170th Street West	2-lane collector	a.m./p.m.	177/246[2]	B/B[4]
170th Street West	North of SR-138	2-lane collector	a.m./p.m.	22/27[2]	A/A[4]
170th Street West	South of SR-138	2-lane collector	a.m./p.m.	7/9[2]	A/A[4]

1 Average Daily Traffic (ADT).

2 Peak Hour Volume.

3 ADT volumes were converted to a.m./p.m. peak hours volumes using K and D factors obtained from Caltrans' Traffic Data Branch website. http://traffic-counts.dot.ca.gov.

4 Peak Hour LOS.

5.2.1 Intersection Analysis

The analysis described below summarizes the results of the intersection level of service analysis conducted for the 8-10 MW construction development scenario.

5.2.1.1 8-MW Construction Development Scenario (Intersection)

Table 5-3 presents intersection LOS and average delay results under Year 2013 Base with Project (8-10 MW) Construction Conditions. The LOS calculation worksheets are provided in Appendix B. Figure 5-2 shows the Year 2013 Base with Project (8-10 MW) Construction Traffic Volume.

As shown in Table 5-3, all study area intersections are forecasts to operate at acceptable LOS C or better under Year 2013 Base with Project (8-10 MW) Construction Conditions.

5.2.2 Roadway Analysis

The analysis described below summarizes the result of the roadway segment level of service analysis conducted for the 8-10 MW construction development scenario.

5.2.2.1 8-10 MW Construction Development Scenario (Roadway)

Table 5-4 displays roadway volume and segment LOS under Year 2013 Base with Project (8-10 MW) Construction Conditions. The LOS calculation worksheets are provided in Appendix C.

TABLE 5-3
PEAK HOUR INTERSECTION LEVEL OF SERVICE RESULTS, YEAR 2013 8-10 MW PROJECT CONSTRUCTION CONDITIONS

Intersection	A.M. Peak Hour		P.M. Peak Hour	
	LOS	Average Delay (Sec/Veh)	LOS	Average Delay (Sec/Veh)
State Route 14 northbound ramps/State Route 138	B	13.5	B	10.0
State Route 14 southbound ramps/State Route 138	B	12.7	B	10.2
90th Street West/State Route 138	C	18.0	C	17.8
110th Street West/State Route 138	B	14.3	B	14.6
160th Street West/State Route 138	B	13.7	B	13.7
170th Street West/State Route 138 (North Project Access Only)	C	17.0	C	22.0
170th Street West/State Route 138 (South Project Access Only)	C	15.1	C	16.6
La Petite Avenue/State Route 138	A	9.7	B	10.4
270th Street West/State Route 138	A	9.8	A	7.7
Ridge Road/State Route 138	A	7.7	B	11.6

Notes:
Unsignalized intersections – LOS calculated in delay (seconds) not V/C.
All intersections are unsignalized two-way stop controlled. SR-138 is the major roadway.

TABLE 5-4
ROADWAY SEGMENT LEVEL OF SERVICE RESULTS, YEAR 2013 8-10 MW PROJECT CONSTRUCTION CONDITIONS

Roadway	Segment	Cross-section Classification	Time Period	Traffic Volume	Level of Service (LOS)
I-5	North of SR-138	Freeway	Daily	80,307[1]	B/B[3,4]
SR-14	South of SR-138	Freeway	Daily	43,118[1]	C/C[3,4]
SR-14	North of SR-138	Freeway	Daily	40,721[1]	B/B[3,4]
SR-138	East of 170th Street West	2-lane collector	a.m./p.m.	539/610[2]	C/C[4]
170th Street West (North Access Only)	North of SR-138	2-lane collector	a.m./p.m.	491/500[2]	A/A[4]
170th Street West (South Access Only)	South of SR-138	2-lane collector	a.m./p.m.	479/491[2]	A/A[4]

1 Average Daily Traffic (ADT).

2 Peak Hour Volume.

3 ADT volumes were converted to a.m./p.m. peak hours volumes using K and D factors obtained from Caltrans' Traffic Data Branch website. http://traffic-counts.dot.ca.gov/.

4 Peak Hour LOS.

As shown in Table 5-4, all study roadway segments are forecast to operate at acceptable LOS C or better under Year 2013 Base with Project (8-10 MW) Construction Conditions.

5.2.3 Impact Significance (Project Construction)

5.2.3.1 Project Site – Construction Traffic

The addition of Project traffic would not significantly impact any of the study area intersections or roadway segments under the 8-10 MW construction development scenario. The study intersections and roadway segments have sufficient capacities to handle short-term peak project construction traffic.

5.2.3.2 Project Utility Roadway Crossings

Construction of the proposed AV Solar Ranch One facility includes the following utility crossings of roadways: 1) water supply pipeline under SR-138; 2) 34.5-kV electric line over SR-138; and 3) 34.5-kV lines across 170th Street West from the east side to the proposed on-site substation on the west side.

The proposed water line crossing of the SR-138 would be performed by horizontal directional drilling or jack-and-bore under the two lane SR-138. It is currently expected that the installation under SR-138 would not require any traffic control or delays as traffic could continue in both directions unimpeded. The water pipeline crossing of SR-138 will require an Encroachment Permit from Caltrans and it is expected that compliance with the terms of the Encroachment Permit would avoid any potentially significant traffic impacts.

The construction envelope to erect the 34.5-kV transmission lines across SR-138 and 170th Street West may require work on public road rights-of-way. If there is insufficient area in which to work, the construction may encroach beyond the roadway shoulders into the traveled roadway requiring limited closures of roadway segments in the construction zones causing short-duration traffic impacts.

Should erection of the poles require work near or on the roadway, flagmen would be used as required during construction to ensure traffic safety and uninterrupted flow. During the planned 34.5-kV transmission line construction periods, it is expected that traffic flow may need to be intermittently restricted to allow stringing and tensioning of the transmission lines across the roadways in a safe manner. Transmission line crossings of SR-138 and 170th Street West would require Encroachment Permits from Caltrans and LACDPW, respectively. This impact is considered to be potentially significant. With implementation of Mitigation Measure Traffic-1 in Section 5.2.4 (Mitigation Measures), this potentially significant traffic impact would be less than significant.

5.2.3.3 Parking and Access

The proposed Project is not anticipated to generate any parking issues relative to existing traffic conditions. All equipment and construction worker, truck delivery and on-site construction vehicles would be contained within the 2,100-acre site, thus no parking issues would arise. Potential impacts would be less than significant.

The traffic generated by construction at the proposed Project site is not anticipated to create any access issues for emergency vehicles or residents/employees in the area during an emergency. Access along SR-138 and 170th Street West, including the Project site entrance, would be kept clear of obstructions and all safety requirements and safety monitoring on-site would be regulated according to standards set by the construction contractor. The proposed facility would have an emergency response plan which would provide set procedures for employees to follow in the event of an on-site emergency. Potential impacts would be less than significant.

5.2.3.4 Off-site Transmission Line

Construction of the proposed 230-kV transmission line along or adjacent to 170th Street West is expected to take place over a period of 4 months. The proposed transmission line is expected to require a total of approximately 43 poles. The proposed transmission line route and pole locations within the Los Angeles County portion are located approximately 5 feet inside of the edge of the public road ROW. Pole holes would be approximately 6 to 10 feet in diameter, 20 to 30 feet deep, and set in poured concrete foundations. Structures and conductor support hardware would be assembled at each pole location. The transmission line route in Kern County would be in the public road ROW or adjacent private land.

The construction envelope to erect the transmission poles is expected to require work on public ROW and private properties. If there is insufficient area in which to work, the construction may encroach beyond the roadway shoulders into the traveled roadway requiring limited closures of roadway segments in the construction zones causing short-duration traffic impacts. However, no more than one lane along 170th Street West would be blocked at any one time.

Should erection of the poles require work near or on the roadway, flagmen would be used as required during construction to ensure traffic safety and uninterrupted flow. During the planned transmission line construction period of approximately 4 months, it is expected that traffic flow could be intermittently restricted to one paved lane (plus use of the adjacent shoulder where practical and safe) at each applicable pole location for 1 to 2 days while that pole is being installed.

Additionally, the proposed Project includes two overhead 230-kV transmission line crossings of 170th Street West in Los Angeles County as well as two overhead crossings in Kern

County, which would require a short term closure (several hours maximum) of the entire roadway while the transmission lines (conductors) were tensioned and elevated to a safe distance above the roadway. Similarly, the 230-kV transmission line route crosses multiple County roads in Los Angeles County on the west side of 170th Street West (West Avenue C, West Avenue B, West Avenue 12, West Avenue A8, Avenue A4, West Avenue A [County Line]), and then Kern County (Kingbird Avenue, Gaskell Road, and then east side across Patterson Road, and Astoria/Holiday Avenue).

These roadway crossing impacts are considered to be potentially significant relative to creation of hazards to motorists. Roadway crossings would require encroachment permits from the LACDPW and the Kern County Resource Management Agency, Roads Division for roads within their respective jurisdictions. With implementation of Mitigation Measure Traffic-1 in Section 5.2.4 (Mitigation Measures), this potentially significant traffic impact would be less than significant.

5.2.4 Mitigation Measures

5.2.4.1 AV Solar Ranch One Facility

The traffic analysis indicates that there are no potentially significant construction traffic related impacts identified for construction of the AV Solar Ranch One Facility.

5.2.4.2 Transmission Roadway Encroachments

As discussed in Sections 5.2.3.2 and 5.2.3.4, potentially significant traffic and access related impacts have been identified for the construction phase of the proposed AV Solar Ranch One facility and the off-site 230-kV transmission line relative to potential traffic access and hazards associated with overhead transmission construction along and/or across SR-138, 170th Street West, and multiple County roads crossed by the transmission line route along 170th Street West.

The following mitigation measure is proposed to reduce potential impacts associated with construction of overhead 34.5-kV crossings of SR-138 and 170th Street West and cross streets as well as the off-site transmission line in the public road ROW along 170th Street West in northern Los Angeles and southern Kern Counties. The mitigation measure provided herein will not require any permanent improvements.

MM Traffic-1: Provide Adequate Worksite Traffic Control. Construction of the transmission line will require a laydown area at each pole location for use as temporary laydown or as a staging area for equipment, poles, and hardware. Transmission pole installation may require an area of approximately 100 feet by 150 feet. If there is insufficient ROW and private property permissions, the pole installation activities may need to encroach beyond the roadway shoulder and may require closure of up to one traffic lane of 170th Street West.

Additionally, the proposed Project includes overhead 34.5-kV transmission line crossings of SR-138 and 170th Street West, and multiple County roads that are crossed by the proposed off-site 230-kV transmission line along 170th Street West.

The Project proponent shall prepare and provide worksite traffic control plans in association with required encroachment permits from Los Angeles and Kern counties. Contained within the worksite traffic control plans will be location and usage of appropriate advance warning signs with adequate distances between signs based on local speed limits, proper merging taper and/or shifting lane schematics, adequate work area and buffer zone designation as well as proper location and conduct of flaggers and the traffic management supervisor at the installation worksite area. The Project proponent shall keep in mind that the worksite traffic control plans will be coordinated with driver and worker safety in mind. The observed speed limit on 170th Street West is 55 MPH and thus, for such traffic control scenarios, the minimum standard requirements per the Work Area Traffic Control Handbook (WATCH) are:

- A Type C flashing arrow pane shall be used for each closed lane.
- The minimum height for traffic cones shall be 28 inches.
- A minimum of three advance warning signs shall be posted.
- Consideration of advanced safety enhancement measures shall be taken into account for workers in the work zones.

Where needed at pole installation sites and/or roadway crossings, it is required that all proper spacing between signs, buffer zone within the construction and work area, safety within construction and work area as well as the position of flaggers be properly installed to adequately accommodate all the safety requirements for worksite area traffic control.

5.2.5 Level of Significance after Mitigation

The proposed Project would not result in any potentially significant long-term operational phase traffic impacts.

With implementation of the mitigation measure presented above, potential project-related traffic impacts during construction of the AV Solar Ranch One facility (including 34.5-kV lines) and the off-site 230-kV transmission line would all be expected to be reduced to less-than-significant levels.

5.3 CONGESTION MANAGEMENT PROGRAM ANALYSIS

The Congestion Management Program (CMP) was created statewide as a result of Proposition 111 that included a gas tax increase to fund both regional and local transportation improvements. The CMP implementing arm is usually the local congestion management agency and in this region the Los Angeles County Metropolitan Transportation Authority (LACMTA) is the implementing agency. The CMP for Los Angeles County requires that the traffic impact of individual development projects of potentially regional significance will be analyzed for CMP traffic impacts. A specific system of arterial roadways plus all freeways comprise the CMP system. A total of 161 intersections had been identified for monitoring throughout the Los Angeles County CMP system. This section describes the project-related analysis of the CMP system. The analysis has been conducted according to the guidelines set forth in the 2002 Congestion Management Program for Los Angeles County. Per CMP Transportation Impact Analysis (TIA) Guidelines, a traffic impact analysis is conducted where:

- At CMP arterial monitoring intersections, including freeway on- or off-ramps, where the proposed project will add 50 or more trips during either mid-day or p.m. weekday peak hours.
- At CMP mainline freeway monitoring locations, where the project will add 150 or more trips, in either direction, during the either the a.m. or p.m. weekday peak hours.

5.3.1 Intersection Analysis

Based on the review of the Los Angeles CMP intersection list it was determined that none of the project study intersections are CMP monitoring intersection; therefore, no further analysis is needed for CMP intersections.

5.3.2 Freeway Segment Analysis

Two CMP freeway systems currently provide regional freeway access to the project site. Interstate 5 (I-5) is a north/south oriented facility located approximately 22 miles west of the project site. State Route (SR-14) is a north/south regional facility approximately 15 miles to the east of the project site.

The nearest CMP freeway monitoring locations at these two freeways are located further downstream of the project site. In addition, since the detailed freeway segment traffic impact analysis conducted for the above freeways are in compliance with CMP traffic analysis guidelines. Therefore, no further CMP freeway analysis is needed beyond those presented in the roadway segment analysis in this study.

5.3.3 Impact Significance (Congestion Management Plan Analysis)

The addition of project traffic will not significantly impact any of the Congestion Management Plan (CMP) freeway monitoring locations. The CMP freeway segments have sufficient capacities to handle short term peak project construction traffic.

SECTION 6.0
FUTURE (2014) TRAFFIC CONDITIONS

This section provides an analysis of Future Year 2014 traffic conditions both with and without the proposed Project. The traffic analysis conducted includes the following scenarios:

- Year (2014) Base Traffic Conditions (No Project)
- Year (2014) with Project Operations Traffic Conditions

The operational workforce for the Project is estimated at 16 workers.

6.1 FUTURE (2014) BASE TRAFFIC CONDITIONS

Future (2014) Base Traffic Volumes were developed consistent with the process and methodology described in Section 5.1, Year 2013 Base Traffic Conditions. For analysis purposes, it was conservatively assumed that to account for ambient traffic growth and for currently unidentified cumulative development projects that could potentially occur within the project study area, an ambient traffic growth rate of four percent per year was used to develop future baseline conditions from existing intersection traffic count data. The traffic growth assumption was based on the growth forecast for the North County Area from the Los Angeles County CMP.

Figure 6-1 shows the Future (2014) Base (No Project) Traffic Volume.

6.1.1 Intersection Analysis

Table 6-1 displays the results of intersection LOS and average delay analysis under Future (2014) Base conditions. The detailed LOS calculation worksheets for the Future (2014) Base conditions are provided in Appendix B.

As shown in Table 6-1, all of the study area intersections are forecast to operate at acceptable LOS B or better under Future (2014) Base conditions.

6.1.2 Roadway Segment Analysis

The analysis described below summarizes the result of the roadway segment level of service analysis conducted for Future (2014) No Project conditions. Table 6-2 displays the roadway volume and segment LOS under Future (2014) Base conditions. The LOS calculation worksheets are provided in Appendix C.

As shown in Table 6-2, all of the study roadway segments are forecast to operate at acceptable LOS B or better under Future (2014) Base conditions.

TABLE 6-1
PEAK HOUR INTERSECTION LEVEL OF SERVICE RESULTS,
FUTURE (2014) NO PROJECT CONDITIONS

	A.M. Peak Hour		P.M. Peak Hour	
Intersection	LOS	Average Delay (Sec/Veh)	LOS	Average Delay (Sec/Veh)
SR-14 northbound Ramps/SR-138	A	9.3	A	9.9
SR-14 southbound Ramps/SR-138	A	9.6	A	9.6
90th Street West/SR-138	B	11.1	B	11.9
110th Street West/SR-138	B	10.3	B	10.5
160th Street West/SR-138	A	9.8	B	10.1
170th Street West/SR-138	B	10.1	B	10.7
La Petite Avenue/SR-138	A	9.4	A	9.6
270th Street West/SR-138	A	9.4	A	7.5
Ridge Road/SR-138	A	7.4	B	10.8

Unsignalized intersections – LOS calculated in delay (seconds) not V/C.
All intersections are unsignalized two-way stop controlled. SR-138 is the major roadway.

TABLE 6-2
ROADWAY SEGMENT LEVEL OF SERVICE RESULTS,
FUTURE (2014) NO PROJECT CONDITIONS

Roadway	Segment	Cross-Section Classification	Time Period	Traffic Volume	Level of Service (A.M./P.M.)
I-5	North of SR-138	Freeway	Daily	81,650[1]	B/B[3,4]
SR-14	South of SR-138	Freeway	Daily	43,125[1]	B/B[3,4]
SR-14	North of SR-138	Freeway	Daily	41,400[1]	B/B[3,4]
SR-138	East of 170th Street West	2-lane collector	a.m./p.m.	185/256[2]	B/B[4]
170th Street West	North of SR-138	2-lane collector	a.m./p.m	23/28[2]	A/A[4]
170th Street West	South of SR-138	2-lane collector	a.m./p.m	8/10[2]	A/A[4]

1 Average Daily Traffic (ADT).

2 Peak Hour Volume.

3 ADT volumes were converted to a.m./p.m. peak hours volumes using K and D factors obtained from Caltrans' Traffic Data Branch website. http://traffic-counts.dot.ca.gov/.

4 Peak Hour LOS.

6.2 FUTURE (2014) BASE PLUS PROJECT ANALYSIS

The Future (2014) Base Plus Project analysis builds upon the Future (2014) Base conditions and incorporates all applicable roadway and intersection improvements that are either constructed or planned for completion by 2014. Project-related improvements at project access points are also incorporated.

The project operational trips associated with the proposed project were then distributed to the surrounding local and regional roadway circulation system based on anticipated operational worker trip distribution patterns. Figure 6-2 shows the Future (2014) Base Plus Project Operations traffic volume.

6.2.1 Intersection Analysis

Table 6-3 displays intersection LOS and average delay results under Future (2014) Base Plus Project Operations conditions. The LOS calculation worksheets for the Future (2014) Base Plus Project Operations conditions are provided in Appendix B.

TABLE 6-3
PEAK HOUR INTERSECTION LEVEL OF SERVICE RESULTS, FUTURE (2014) PROJECT OPERATIONS CONDITIONS

	A.M. Peak Hour		P.M. Peak Hour	
Intersection	LOS	Average Delay (Sec/Veh)	LOS	Average Delay (Sec/Veh)
SR-14 northbound Ramps/SR-138	A	9.4	A	9.9
SR-14 southbound Ramps/SR-138	A	9.7	A	9.7
90th Street West/SR-138	B	11.3	B	12.0
110th Street West/SR-138	B	10.4	B	10.6
160th Street West/SR-138	A	9.9	B	10.2
170th Street West/SR-138	B	10.2	B	10.7
La Petite Avenue/SR-138	A	9.4	A	9.7
270th Street West/SR-138	A	9.4	A	7.5
Ridge Road/SR-138	A	7.4	B	10.8

Notes:
Unsignalized intersections – LOS calculated in delay (seconds) not V/C.
All intersections are unsignalized two-way stop controlled. SR-138 is the major roadway.

As shown in Table 6-3, all study area intersections are forecast to operate at acceptable LOS B or better under Future (2014) Project Operations conditions.

6.2.2 Roadway Segment Analysis

The analysis described below presents the results of the roadway segment LOS analysis conducted for Future (2014) Project Operations conditions. Table 6-4 presents the roadway volume and segment LOS under Future (2014) Project Operations conditions. The LOS calculation worksheets are provided in Appendix C.

TABLE 6-4
ROADWAY SEGMENT LEVEL OF SERVICE RESULTS,
FUTURE (2014) PROJECT OPERATIONS CONDITIONS

Roadway	Segment	Cross-section Classification	Time Period	Traffic Volume	Level of Service (A.M./P.M.)
I-5	North of SR-138	Freeway	Daily	81,654[1]	B/B[3,4]
SR-14	South of SR-138	Freeway	Daily	43,153[1]	B/B[3,4]
SR-14	North of SR-138	Freeway	Daily	41,400[1]	B/B[3,4]
SR-138	East of 170th Street West	2-lane collector	a.m./p.m	199/270[2]	B/B[4]
170th Street West	North of SR-138	2-lane collector	a.m./p.m	39/44[2]	A/A[4]
170th Street West	South of SR-138	2-lane collector	a.m./p.m	8/10[2]	A/A[4]

1 Average Daily Traffic (ADT).

2 Peak Hour Volume.

3 ADT volumes were converted to a.m./p.m. peak hours volumes using K and D factors obtained from Caltrans' Traffic Data Branch website. http://traffic-counts.dot.ca.gov/.

4 Peak Hour LOS.

As shown in Table 6-4, all study roadway segments are forecast to operate at acceptable LOS B or better under Future (2014) Project Operations conditions.

6.2.3 Impact Significance (Project Operation)

The addition of project operational traffic would not significantly impact any of the study area intersections and segments. The study intersections and roadway segments have sufficient capacities to handle future project operational traffic.

6.2.4 Mitigation (Operations)

No traffic mitigation measures are needed/warranted associated with the operational phase, thus, none are proposed.

SECTION 7.0
FINDINGS AND RECOMMENDATIONS

This section provides a summary of the key traffic findings and study recommendations, including the LOS results. Issues relating to site-access and on-site circulation requirements are also discussed.

7.1 ROADWAY SYSTEM

The existing roadway system is described in Section 3.1 (Existing Roadway Network). The applicant will construct the necessary roadways needed to construct, operate and maintain the Project and site.

7.2 SITE ACCESS

The AV Solar Ranch One Project is located in unincorporated Los Angeles County north and west of the City of Lancaster. The primary roadways serving the project site include the I-5 Freeway, SR-14 Freeway, SR-138, and 170th and 160th Street West. The primary site access would be provided by 170th Street West both north and south of SR-138.

Based upon information provided by the Applicant, review of the project site plan and conditions in the field, the following observations regarding site access are made:

- The main project access point is the intersection of SR-138 and 170th Street West.
- During development of the Project area north of SR-138, inbound project construction-related traffic from SR-138 would access the construction site via westbound right turns and eastbound left turns onto 170th Street West, while outbound traffic would exit the project site via either southbound right or left turns from 170th Street West to SR-138.
- During development of the Project area south of SR-138, inbound construction-related traffic from SR-138 would access the construction site via westbound left turns and eastbound right turns onto 170th Street West, while outbound traffic would exit the project site via either northbound right or left turns from 170th Street West to SR-138.

No associated site access issues have been identified for the construction or operational phases of the Project given LOS analysis results.

7.3 SUMMARY OF FINDINGS

7.3.1 Summary of Intersection Analyses

Table 7-1 displays modeled intersection Level of Service results. As shown in Table 7-1, under all traffic analysis scenarios, including both a.m. and p.m. peak hour analysis hours, all study intersections are forecast to operate at acceptable LOS C or better for Year 2013.

7.3.2 Summary of Roadway Segment Analysis

Table 7-2 displays roadway segment Level of Service results. As shown in Table 7-2, all study roadway segments are forecast to operate at acceptable LOS C or better.

7.4 CONCLUSIONS

The proposed AV Solar Ranch One Project is anticipated to contribute added traffic volume to the surrounding roadway circulation system during its construction and subsequent project operations. The combination of relatively low project trip generation and adequate intersection and roadway segment capacities results in findings of no significant traffic impacts at all study intersections and roadway segment locations at the proposed construction level.

During erection of the transmission lines along or across the public road ROW (SR-138 and 170th Street West plus cross streets), during off-site transmission line installation, flagmen will be used as required during construction to ensure traffic safety and maximize traffic flow. Refer to Section 5.2.4 (Mitigation Measures) for the proposed mitigation measure which would reduce potential impacts to less than significant.

TABLE 7-1
SUMMARY OF INTERSECTION PEAK HOUR LEVEL OF SERVICE RESULTS

Roadway Segment	Existing		2013 No Project		2013 Project Construction		2014 No Project		2014 Project Operations	
	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.
SR-138/SR-14 northbound ramps	A	A	A	A	B	B	A	A	A	A
SR-138/SR-14 southbound ramps	A	A	A	A	B	B	A	A	A	A
SR-138/90th Street West	B	B	B	B	C	C	B	B	B	B
SR-138/110th Street West	A	B	B	B	B	B	B	B	B	B
SR-138/160th Street West	A	A	A	B	B	B	A	B	A	B
SR-138/170th Street West (North Project Access Only)[1,2]	A	B	A	B	C	C	B	B	B	B
SR-138/170th Street West (South Project Access Only)[2]	A	B	A	B	C	C	B	B	B	B
SR-138/La Petite Avenue	A	A	A	A	A	B	A	A	A	A
SR-138/270th Street West	A	A	A	A	A	A	A	A	A	A
SR-138/Old Ridge Route	A	B	A	B	A	B	A	B	A	B

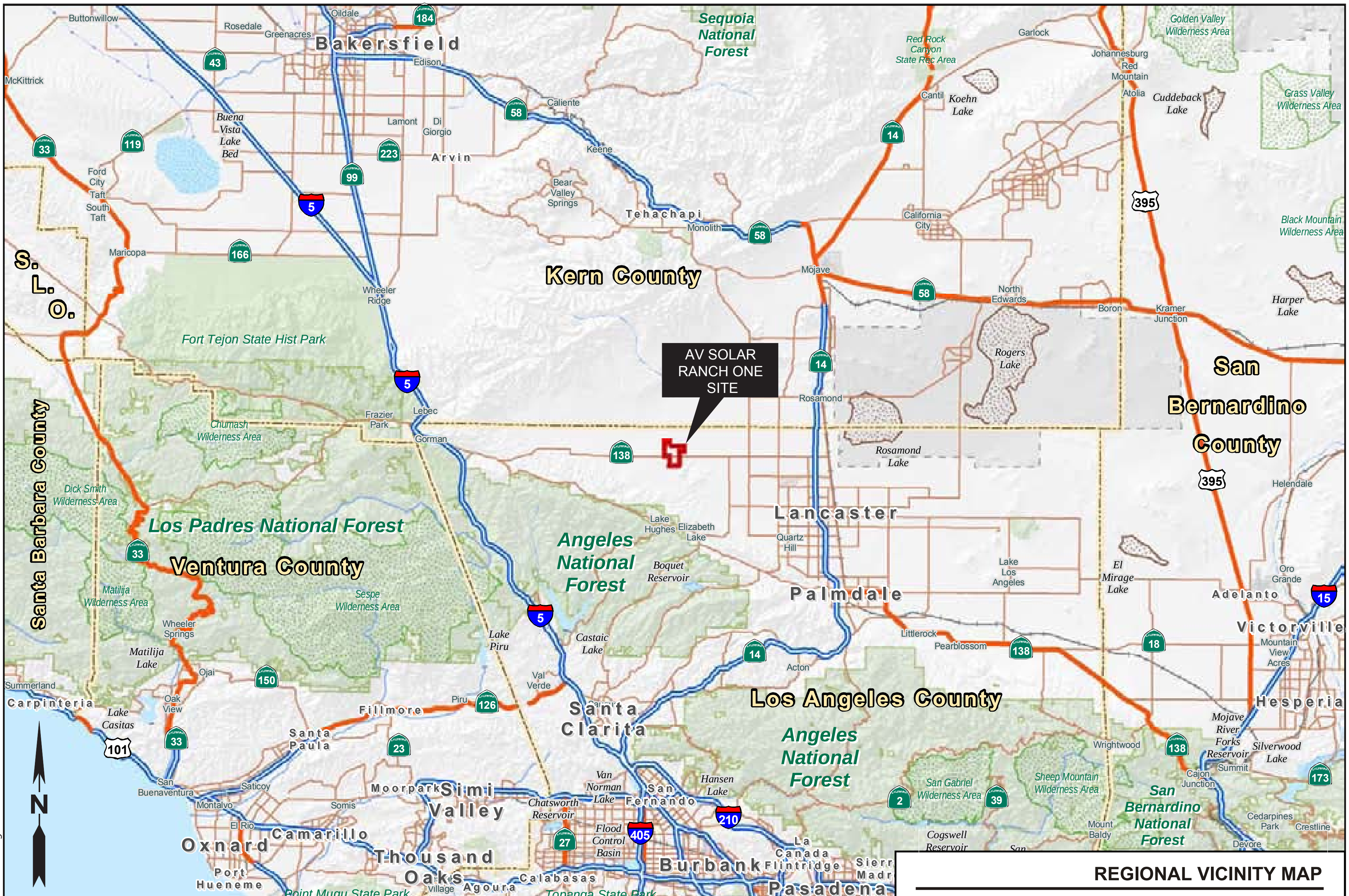
[1] Assumes all construction traffic is accessing portion of Project site north of SR-138 via 170th Street West until northern Project area is built out (prior to start of southern Project area).

[2] Assumes all construction traffic is accessing portion of Project site south of SR-138 through Project completion.

TABLE 7-2
SUMMARY OF ROADWAY SEGMENT LEVEL OF SERVICE RESULTS

	Existing		2013 No Project		2013 Project Construction		2014 No Project		2014 Project Operations	
Roadway Segment	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.
I-5 (North of SR-138)	B	B	B	B	B	B	B	B	B	B
SR-14 (South of SR-138)	B	B	B	B	B	B	B	B	B	B
SR-14 (North of SR-138)	B	B	B	B	B	B	B	B	B	B
SR-138 (East of 170th Street West)	B	B	B	B	C	C	B	B	B	B
170th Street West (North of SR-138) (North Construction Only)	A	A	A	A	A	A	A	A	A	A
170th Street West (South of SR-138) (South Construction Only)	A	A	A	A	A	A	A	A	A	A

FIGURES



0 5 10 15 20 25 Miles

1 inch equals 13 miles 1:823,680

REGIONAL VICINITY MAP

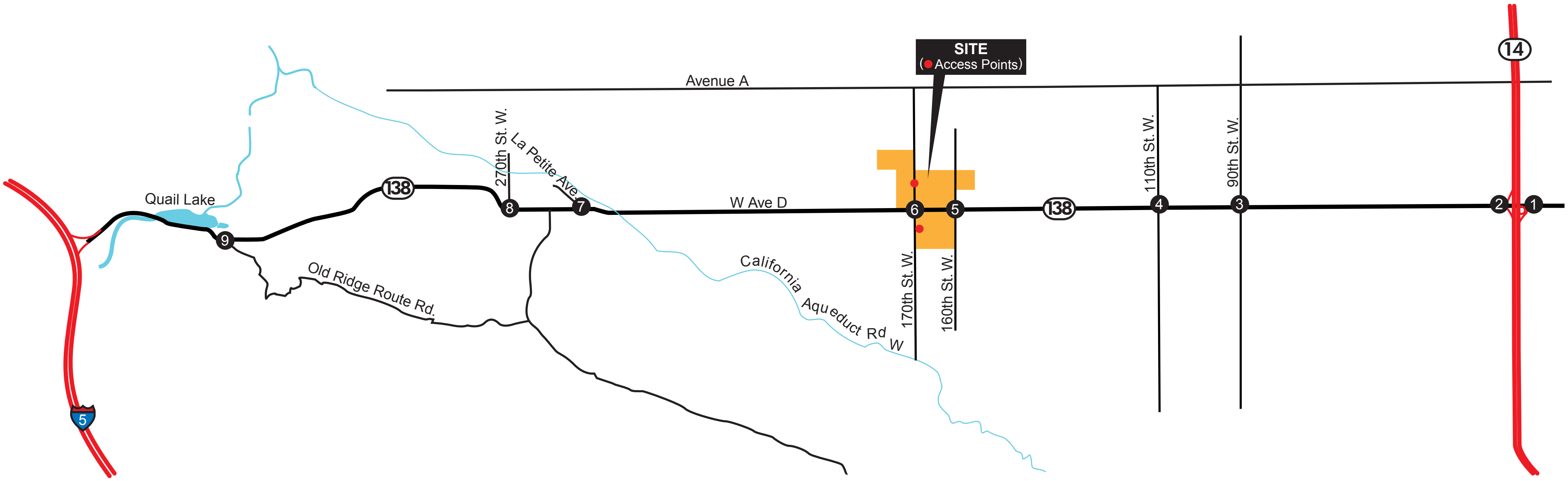
AV SOLAR RANCH ONE

2010

URS

FIGURE 1-1

K:\2008\Nexlight\AV Sloar 1\TIA\fig 1-1.ai



PROJECT STUDY AREA

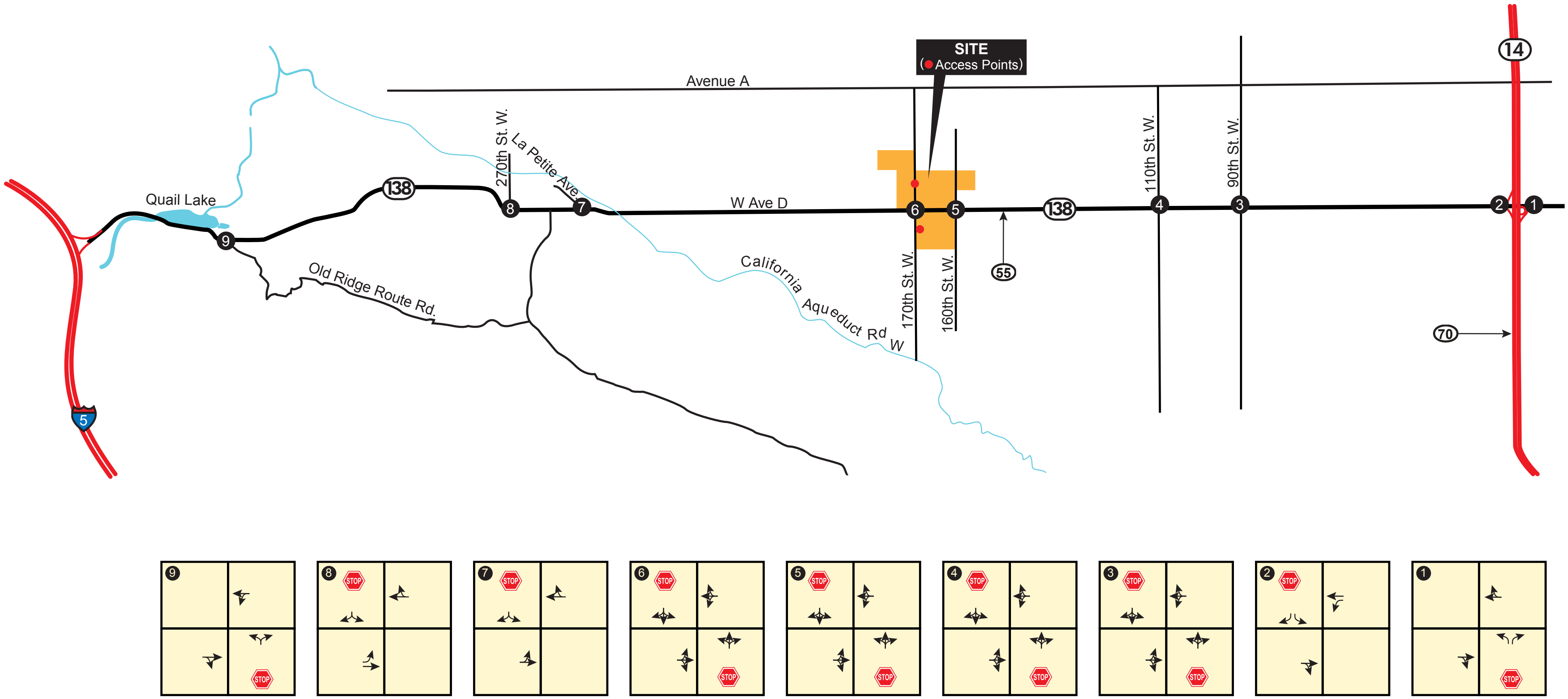
AV SOLAR RANCH ONE

2010

URS

FIGURE 1-2

K:\2008\Nexlight\AV Sloar 1\TIA\fig 1-2.ai



LEGEND

STOP Stop Sign

55 Posted Speed Limit, mph

EXISTING INTERSECTION GEOMETRICS

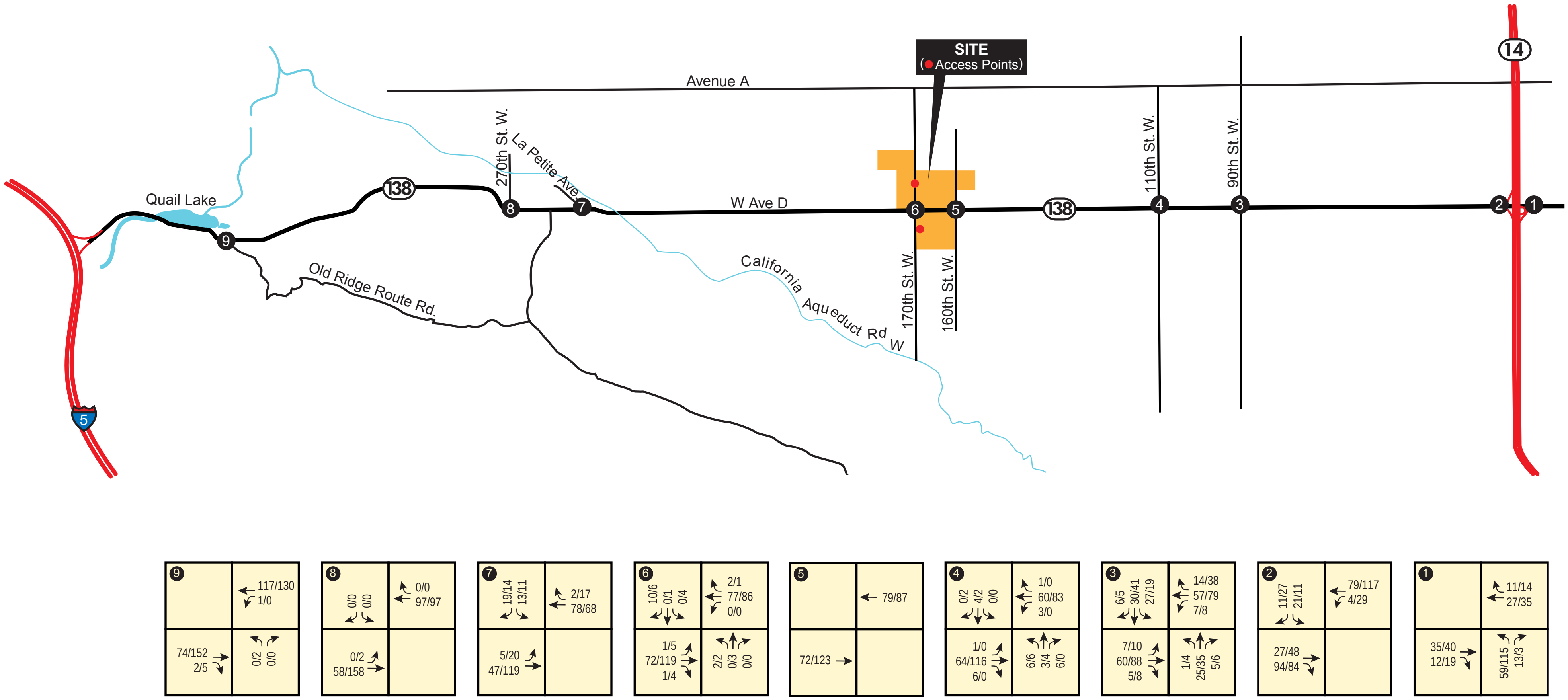
AV SOLAR RANCH ONE

2010

URS

FIGURE 3-1

K:\2008\Nexlight\AV Sloar 1\TIA\fig 3-1.ai



N

Not to Scale

LEGEND

AM/PM Peak Hour Volumes

NOTE: Intersection #5 was not counted due to minimum or no traffic activity on the side street.
Through traffic volumes shown in the figure were balanced from Intersection #6.

EXISTING TRAFFIC VOLUMES

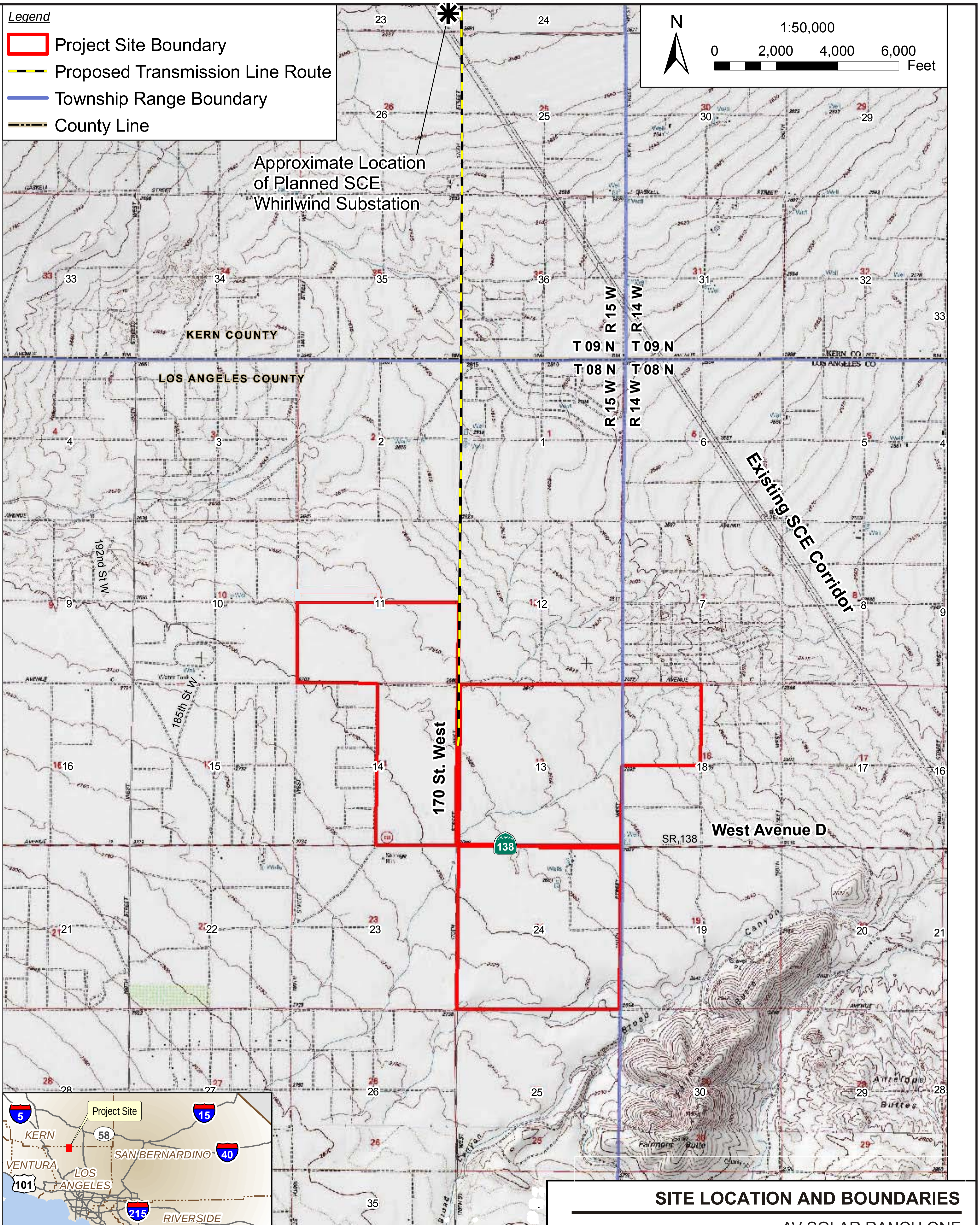
AV SOLAR RANCH ONE

2010

URS

FIGURE 3-2

K:\2008\Nexlight\AV Solar 1\TIA\fig 3-2.ai



Source:
Source: [1] U.S.G.S 7.5 topographic quadrangles (2005),
[2] ESRI StreetMap USA (2007).

SITE LOCATION AND BOUNDARIES

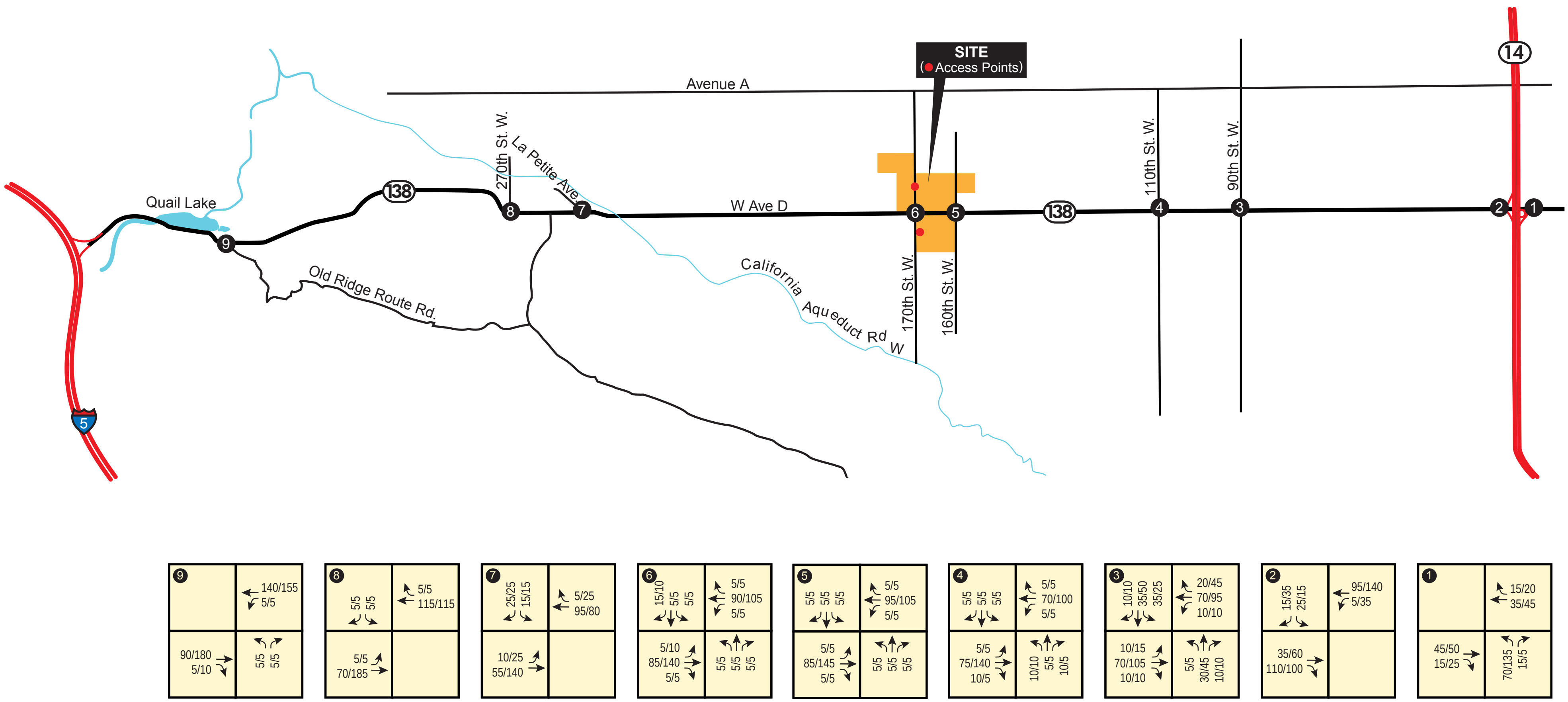
AV SOLAR RANCH ONE

2010

URS

FIGURE 4-1

K:\2008\Nexlight\AV Sloar 1\TIA\fig 4-1.ai



N

Not to Scale

LEGEND

AM/PM Peak Hour Volumes

NOTE: Volumes Rounded to the Nearest Five.

YEAR 2013
NO PROJECT TRAFFIC VOLUMES

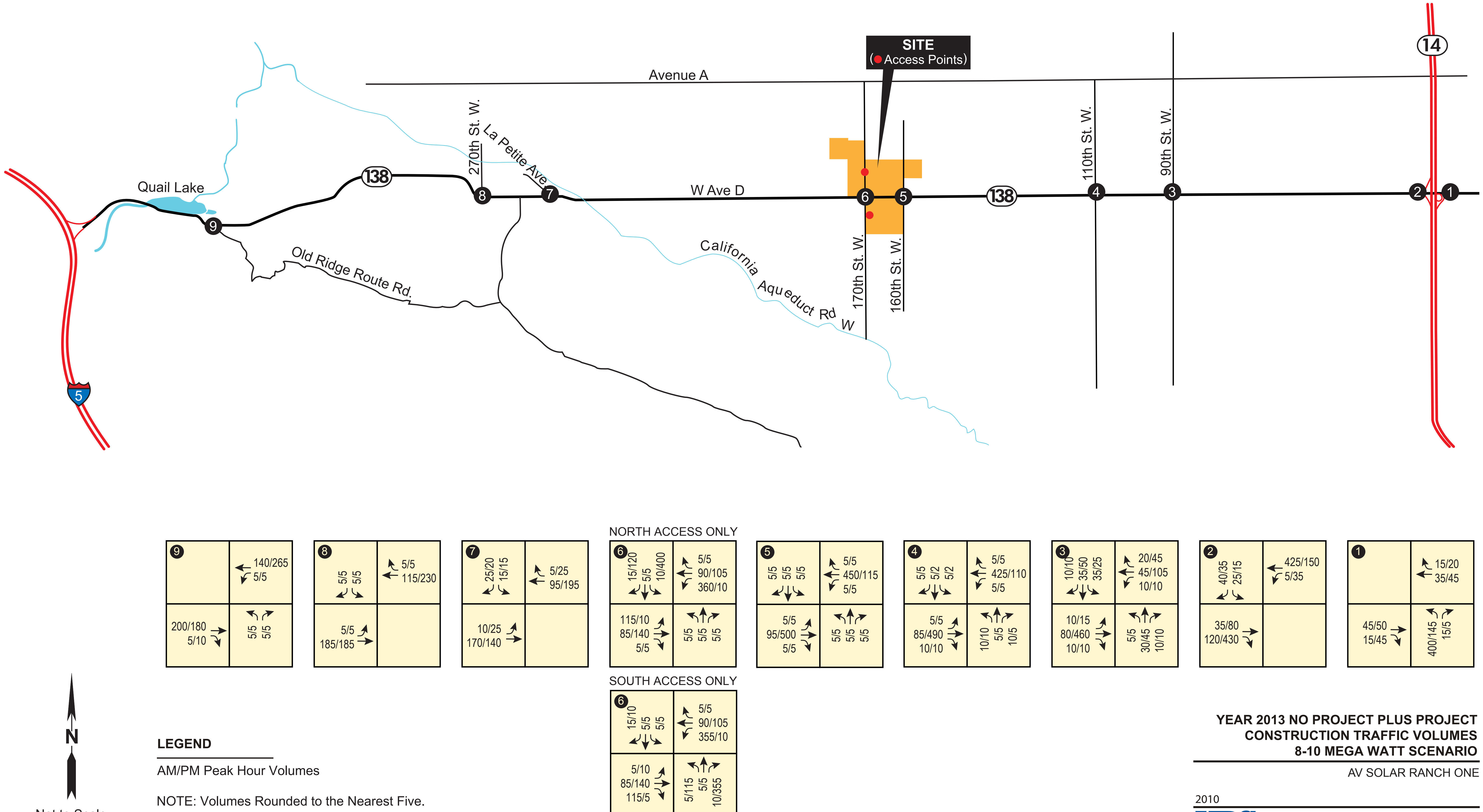
AV SOLAR RANCH ONE

2010

URS

FIGURE 5-1

K:\2008\Nexlight\AV Sloar 1\TIA\fig 5-1.ai



LEGEND

AM/PM Peak Hour Volumes

NOTE: Volumes Rounded to the Nearest Five.

YEAR 2013 NO PROJECT PLUS PROJECT CONSTRUCTION TRAFFIC VOLUMES 8-10 MEGA WATT SCENARIO

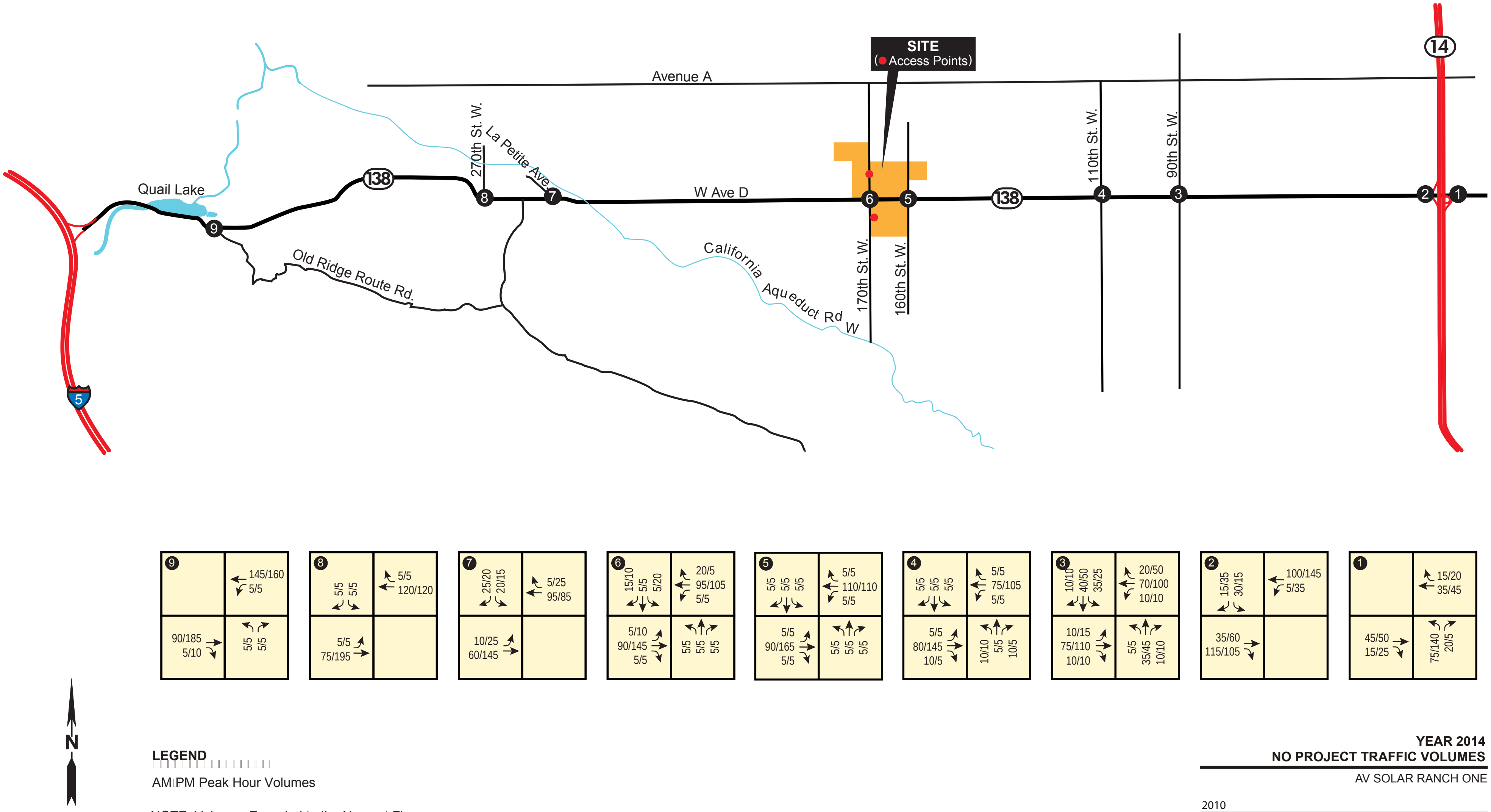
AV SOLAR RANCH ONE

2010

URS

FIGURE 5-2

K:\2008\Nextlight\AV Sloar 1\TIA\fig 5-2.ai



LEGEND

AM/PM Peak Hour Volumes

NOTE: Volumes Rounded to the Nearest Five.

YEAR 2014
NO PROJECT TRAFFIC VOLUMES

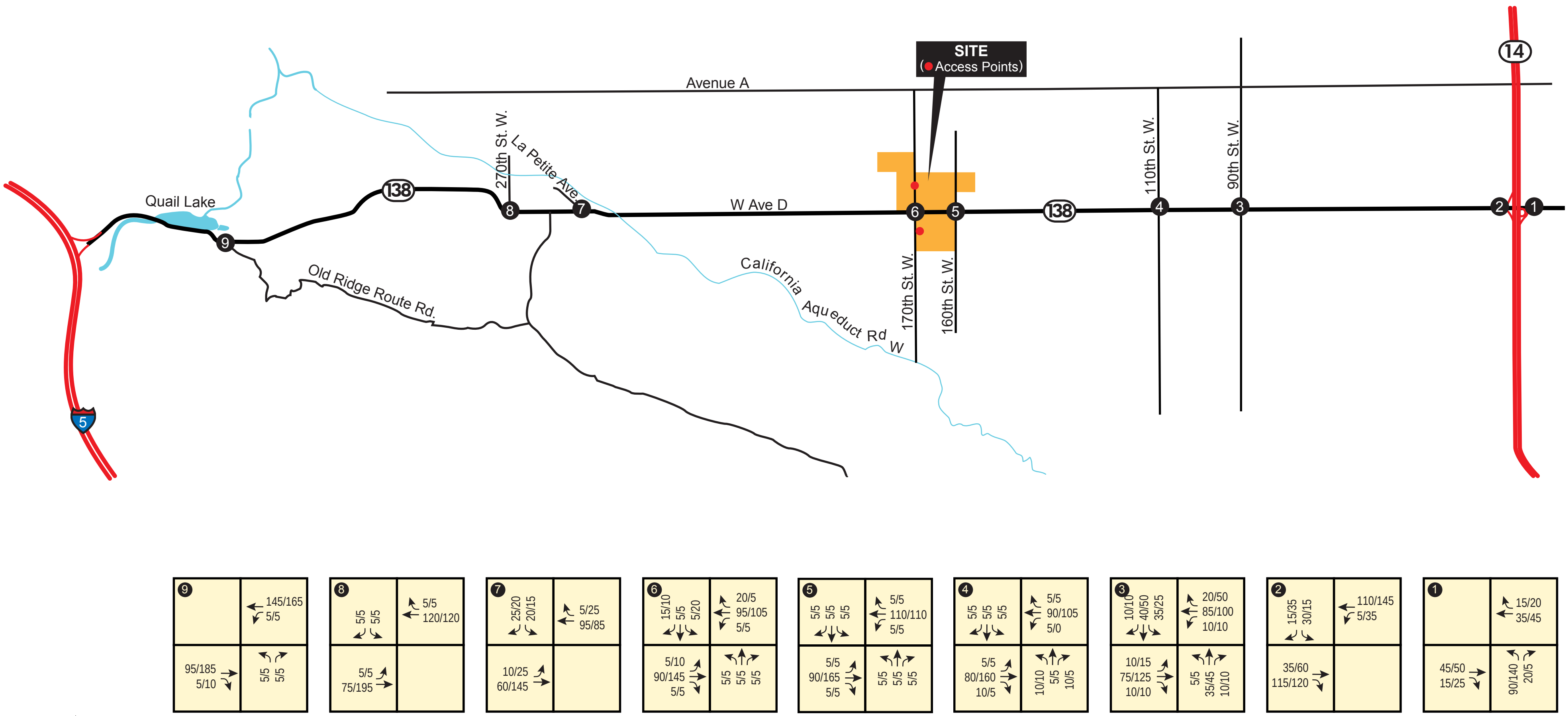
AV SOLAR RANCH ONE

2010

URS

FIGURE 6-1

K:\2008\Nextlight\AV Solar 1\TIA\fig 6-1.ai



N

Not to Scale

LEGEND

AM/PM Peak Hour Volumes

NOTE: Volumes Rounded to the Nearest Five.

YEAR 2014
NO PROJECT PLUS PROJECT
OPERATIONS TRAFFIC VOLUMES

AV SOLAR RANCH ONE

2010

URS

FIGURE 6-2

K:\2008\Nextlight\AV Solar 1\TIA\fig 6-2.ai

APPENDIX A
TRAFFIC COUNTS

Intersection Turning Movement

Prepared by:

NDS

National Data & Surveying Services

TMC Summary of SR-14 NB Ramps/SR-138 (Avenue D)

Project #: 08-5162-001

N

SR-14 NB Ramps

SR-138 (Avenue D)

SOUTHBOUND APPROACH LANES

Lanes	0	0	0
TOTAL	0	0	0
PM	0	0	0
NOON	0	0	0
AM	0	0	0

EASTBOUND APPROACH LANES

Lanes	TOTAL	AM	NOON	PM
0	0	0	0	0
1	75	35	0	40
0	31	12	0	19

WESTBOUND APPROACH LANES

AM	NOON	PM	TOTAL	Lanes
11	0	14	25	0
27	0	35	62	1
0	0	0	0	0

NORTHBOUND APPROACH LANES

PM	115	0	3
NOON	0	0	0
AM	59	0	13
TOTAL	174	0	16
Lanes	1	0	1

TURNING MOVEMENT COUNT

SR-14 NB Ramps / SR-138 (Avenue D)

(Intersection Name)

Wednesday — Day

12/10/08 — Date

COUNT PERIODS			
am	7:00 AM	-	9:00 AM
noon		-	
pm	4:00 PM	-	6:00 PM

CONTROL: 1-Way Stop Sign (NB)

AM PEAK HOUR 745 AM

NOON PEAK HOUR 0 AM

PM PEAK HOUR 415 PM

Intersection Turning Movement

Prepared by:

NDS

National Data & Surveying Services

TMC Summary of SR-14 SB Ramps/SR-138 (Avenue D)

Project #: 08-5162-002

N

SR-14 SB Ramps

SR-138 (Avenue D)

SR-138 (Avenue D)

SOUTHBOUND APPROACH LANES

	1	0	1
TOTAL	38	0	32
PM	27	0	11
NOON	0	0	0
AM	11	0	21

EASTBOUND APPROACH LANES

	TOTAL	AM	NOON	PM
0	0	0	0	0
1	75	27	0	48
0	178	94	0	84

WESTBOUND APPROACH LANES

AM	NOON	PM	TOTAL	
0	0	0	0	0
79	0	117	196	1
4	0	29	33	1

PM	0	0	0
NOON	0	0	0
AM	0	0	0
TOTAL	0	0	0
	0	0	0

NORTHBOUND APPROACH LANES

SR-14 SB Ramps

TURNING MOVEMENT COUNT

SR-14 SB Ramps / SR-138 (Avenue D)

(Intersection Name)

Wednesday
Day

12/10/08
Date

COUNT PERIODS			
am	7:00 AM	-	9:00 AM
noon		-	
pm	4:00 PM	-	6:00 PM

CONTROL: 1-Way Stop Sign (SB)

AM PEAK HOUR 730 AM

NOON PEAK HOUR 0 AM

PM PEAK HOUR 430 PM

Intersection Turning Movement

Prepared by:

NDS

National Data & Surveying Services

TMC Summary of 90th St W/SR-138

Project #: 08-5162-003

N

90th St W

SR-138

SOUTHBOUND APPROACH LANES

	0	1	0
TOTAL	11	71	46
PM	5	41	19
NOON	0	0	0
AM	6	30	27

EASTBOUND APPROACH LANES

	TOTAL	AM	NOON	PM
0	17	7	0	10
1	148	60	0	88
0	13	5	0	8

WESTBOUND APPROACH LANES

AM	NOON	PM	TOTAL	
14	0	38	52	0
57	0	79	136	1
7	0	8	15	0

NORTHBOUND APPROACH LANES

PM	4	35	6
NOON	0	0	0
AM	1	25	5
TOTAL	5	60	11
	0	1	0

90th St W

TURNING MOVEMENT COUNT

90th St W / SR-138

(Intersection Name)

Wednesday — Day

12/10/08 — Date

COUNT PERIODS			
am	7:00 AM	-	9:00 AM
noon		-	
pm	4:00 PM	-	6:00 PM

CONTROL: 2-Way Stop (NS)

AM PEAK HOUR 730 AM

NOON PEAK HOUR 0 AM

PM PEAK HOUR 400 PM

Intersection Turning Movement

Prepared by:

NDS

National Data & Surveying Services

TMC Summary of 110th St W/SR-138

Project #: 08-5162-004

N

110th St W

SR-138

SOUTHBOUND APPROACH LANES

	0	1	0
TOTAL	2	6	0
PM	2	2	0
NOON	0	0	0
AM	0	4	0

EASTBOUND APPROACH LANES

	TOTAL	AM	NOON	PM
0	1	1	0	0
1	180	64	0	116
0	6	6	0	0

WESTBOUND APPROACH LANES

AM	NOON	PM	TOTAL	
1	0	0	1	0
60	0	83	143	1
3	0	0	3	0

NORTHBOUND APPROACH LANES

PM	6	4	0
NOON	0	0	0
AM	6	3	6
TOTAL	12	7	6
	0	1	0

110th St W

TURNING MOVEMENT COUNT

110th St W / SR-138

(Intersection Name)

Wednesday — Day

12/10/08 — Date

COUNT PERIODS			
am	7:00 AM	-	9:00 AM
noon		-	
pm	4:00 PM	-	6:00 PM

CONTROL: 2-Way Stop Sign (N/S)

AM PEAK HOUR 730 AM

NOON PEAK HOUR 0 AM

PM PEAK HOUR 400 PM

Intersection Turning Movement

Prepared by:

NDS

National Data & Surveying Services

TMC Summary of 170th St W/SR-138

Project #: 08-5162-005

N

170th St W

SR-138

SOUTHBOUND APPROACH LANES

Lanes	0	1	0
TOTAL	16	1	4
PM	6	1	4
NOON	0	0	0
AM	10	0	0

EASTBOUND APPROACH LANES

Lanes	TOTAL	AM	NOON	PM
0	6	1	0	5
1	191	72	0	119
0	5	1	0	4

WESTBOUND APPROACH LANES

AM	NOON	PM	TOTAL	Lanes
2	0	1	3	0
77	0	86	163	1
0	0	0	0	0

NORTHBOUND APPROACH LANES

PM	2	3	0
NOON	0	0	0
AM	2	0	0
TOTAL	4	3	0
Lanes	0	1	0

170th St W

TURNING MOVEMENT COUNT

170th St W / SR-138

(Intersection Name)

Thursday — Day

12/11/08 — Date

COUNT PERIODS			
am	7:00 AM	-	9:00 AM
noon		-	
pm	4:00 PM	-	6:00 PM

CONTROL: 2-Way Stop Sign (N/S)

AM PEAK HOUR 715 AM

NOON PEAK HOUR 0 AM

PM PEAK HOUR 415 PM

Intersection Turning Movement

Prepared by:

NDS

National Data & Surveying Services

TMC Summary of La Petite Ave/SR-138

Project #: 08-5162-006

N

La Petite Ave

SR-138

SR-138

SOUTHBOUND APPROACH LANES

	1	0	1
TOTAL	33	0	24
PM	14	0	11
NOON	0	0	0
AM	19	0	13

EASTBOUND APPROACH LANES

	TOTAL	AM	NOON	PM
0	25	5	0	20
1	166	47	0	119
0	0	0	0	0

WESTBOUND APPROACH LANES

AM	NOON	PM	TOTAL	
2	0	17	19	0
78	0	68	146	1
0	0	0	0	0

PM	0	0	0
NOON	0	0	0
AM	0	0	0
TOTAL	0	0	0
	0	0	0

NORTHBOUND APPROACH LANES

La Petite Ave

TURNING MOVEMENT COUNT

La Petite Ave / SR-138

(Intersection Name)

Wednesday	12/10/08
Day	Date

COUNT PERIODS			
am	7:00 AM	-	9:00 AM
noon		-	
pm	4:00 PM	-	6:00 PM

CONTROL: 1-Way Stop Sign (SB)

AM PEAK HOUR	700 AM
NOON PEAK HOUR	0 AM
PM PEAK HOUR	415 PM

Intersection Turning Movement

Prepared by:

NDS

National Data & Surveying Services

TMC Summary of 270th St W/SR-138

Project #: 08-5162-007

270th St W

SR-138

SR-138

N

SOUTHBOUND APPROACH LANES

	1	1	0
TOTAL	0	0	0
PM	0	0	0
NOON	0	0	0
AM	0	0	0

EASTBOUND APPROACH LANES

	TOTAL	AM	NOON	PM
1	2	0	0	2
1	216	58	0	158
0	0	0	0	0

WESTBOUND APPROACH LANES

AM	NOON	PM	TOTAL	
0	0	0	0	0
97	0	97	194	1
0	0	0	0	0

NORTHBOUND APPROACH LANES

PM	0	0	0
NOON	0	0	0
AM	0	0	0
TOTAL	0	0	0
	0	0	0

270th St W

TURNING MOVEMENT COUNT

270th St W / SR-138

(Intersection Name)

Thursday — Day

12/11/08 — Date

COUNT PERIODS

am	7:00 AM	-	9:00 AM
noon		-	
pm	4:00 PM	-	6:00 PM

CONTROL: 1-Way Stop (SB)

AM PEAK HOUR 700 AM

NOON PEAK HOUR 0 AM

PM PEAK HOUR 400 PM

Intersection Turning Movement

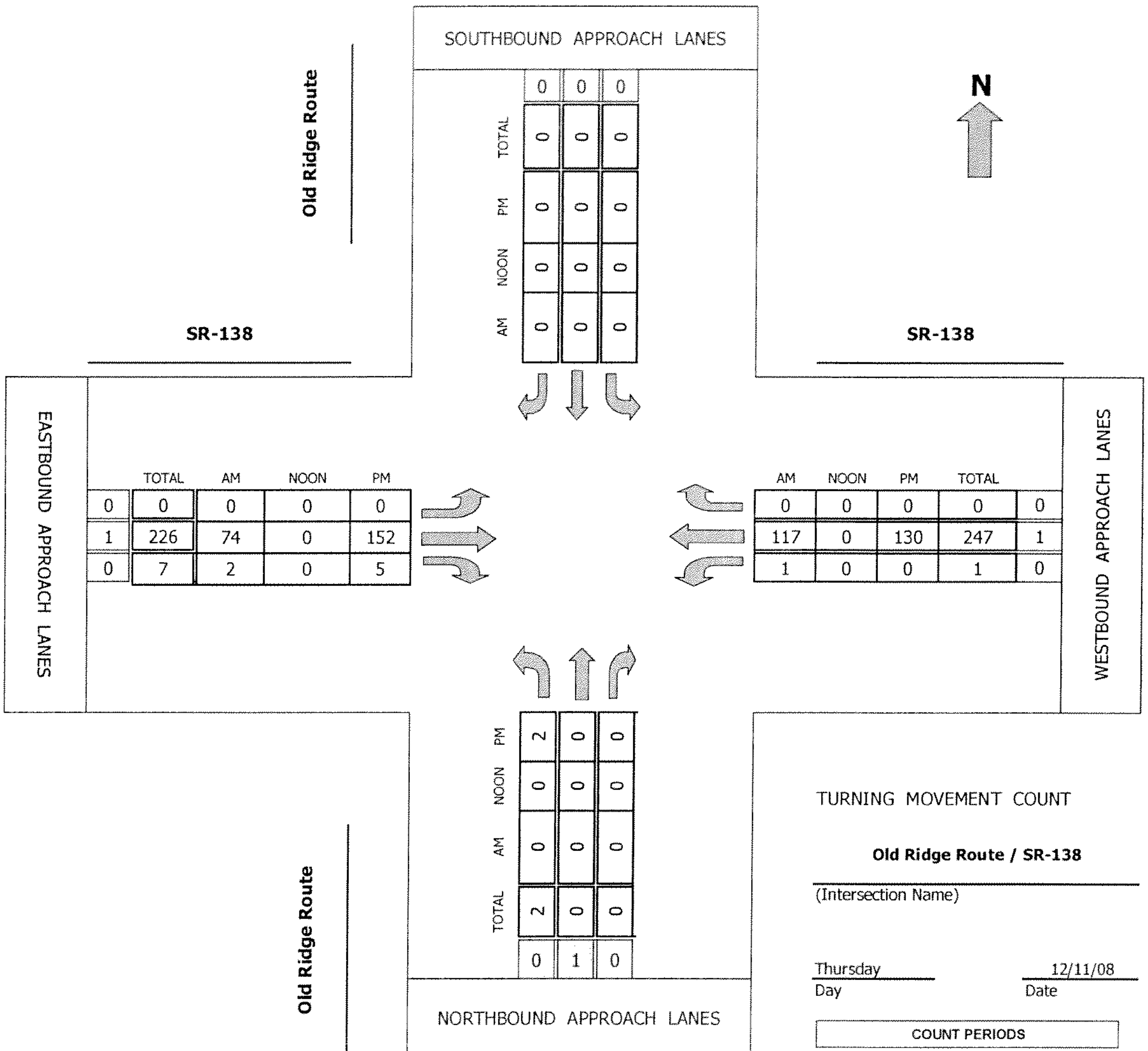
Prepared by:

NDS

National Data & Surveying Services

TMC Summary of Old Ridge Route/SR-138

Project #: 08-5162-008



TURNING MOVEMENT COUNT

Old Ridge Route / SR-138

(Intersection Name)

Thursday — Day

12/11/08 — Date

COUNT PERIODS			
am	7:00 AM	-	9:00 AM
noon		-	
pm	4:00 PM	-	6:00 PM

CONTROL: 1-Way Stop (NB)

AM PEAK HOUR 745 AM

NOON PEAK HOUR 0 AM

PM PEAK HOUR 400 PM

Prepared by NDS/ATD

Volumes for: Thursday, December 11, 2008 **City:** Lancaster **Project #:** 08-5163-001
Location: 170th Street W N/o SR-138

AM Period	NB		SB		EB	WB		PM Period	NB		SB		EB	WB	
00:00	0		0					12:00	0		3				
00:15	0		1					12:15	3		1				
00:30	0		0					12:30	1		2				
00:45	0	0	0	1			1	12:45	2	6	2	8			14
01:00	0		0					13:00	3		1				
01:15	0		0					13:15	2		6				
01:30	0		0					13:30	5		2				
01:45	0	0	0	0				13:45	3	13	4	13			26
02:00	0		0					14:00	2		2				
02:15	1		1					14:15	0		6				
02:30	0		0					14:30	3		1				
02:45	1	2	1	2			4	14:45	0	5	2	11			16
03:00	0		0					15:00	4		2				
03:15	0		0					15:15	1		5				
03:30	0		1					15:30	2		1				
03:45	1	1	0	1			2	15:45	3	10	1	9			19
04:00	0		1					16:00	6		4				
04:15	0		1					16:15	5		0				
04:30	0		0					16:30	2		3				
04:45	1	1	1	3			4	16:45	1	14	2	9			23
05:00	0		1					17:00	1		6				
05:15	1		1					17:15	1		0				
05:30	0		2					17:30	1		0				
05:45	1	2	3	7			9	17:45	2	5	1	7			12
06:00	2		2					18:00	3		2				
06:15	2		5					18:15	5		2				
06:30	1		1					18:30	2		0				
06:45	4	9	2	10			19	18:45	2	12	1	5			17
07:00	6		3					19:00	2		1				
07:15	1		2					19:15	2		0				
07:30	0		2					19:30	0		0				
07:45	0	7	4	11			18	19:45	1	5	0	1			6
08:00	2		1					20:00	4		0				
08:15	2		0					20:15	0		2				
08:30	1		1					20:30	1		2				
08:45	1	6	4	6			12	20:45	0	5	1	5			10
09:00	3		3					21:00	0		0				
09:15	1		1					21:15	0		0				
09:30	0		1					21:30	0		0				
09:45	1	5	1	6			11	21:45	0	0	0	0			
10:00	1		2					22:00	1		0				
10:15	2		0					22:15	1		0				
10:30	2		2					22:30	0		1				
10:45	0	5	2	6			11	22:45	0	2	0	1			3
11:00	1		2					23:00	0		0				
11:15	0		4					23:15	0		1				
11:30	1		2					23:30	0		0				
11:45	4	6	2	10			16	23:45	0	0	0	1			1
Total Vol.		44		63			**107**			77		70			**147**

Daily Totals

NB	SB	Combined	EB	WB
121	133	**254**		

	AM			PM		
Split %	41.1%	58.9%	**42.1%**	52.4%	47.6%	**57.9%**
Peak Hour	06:15	05:30	**06:15**	15:30	13:15	**13:00**
Volume	13	12	**24**	16	14	**26**
P.H.F.	0.54	0.60	**0.67**	0.71	0.58	**0.81**

Prepared by NDS/ATD

Volumes for: Thursday, December 11, 2008 **City:** Lancaster **Project #:** 08-5163-002
Location: 170th Street W S/o SR-138

AM Period	NB		SB		EB	WB		PM Period	NB		SB		EB	WB	
00:00	0		0					12:00	2		0				
00:15	0		0					12:15	1		1				
00:30	0		0					12:30	1		3				
00:45	0	0	0	0				12:45	2	6	1	5			11
01:00	0		0					13:00	1		0				
01:15	0		0					13:15	2		0				
01:30	0		0					13:30	0		2				
01:45	0	0	0	0				13:45	3	6	3	5			11
02:00	0		0					14:00	1		1				
02:15	0		0					14:15	1		2				
02:30	0		0					14:30	2		0				
02:45	0	0	0	0				14:45	0	4	0	3			7
03:00	0		0					15:00	0		1				
03:15	0		0					15:15	0		2				
03:30	0		0					15:30	1		1				
03:45	0	0	0	0				15:45	1	2	2	6			8
04:00	0		0					16:00	0		0				
04:15	0		0					16:15	1		1				
04:30	0		0					16:30	1		1				
04:45	0	0	0	0				16:45	1	3	0	2			5
05:00	0		0					17:00	1		2				
05:15	1		0					17:15	0		1				
05:30	0		0					17:30	0		2				
05:45	0	1	3	3			4	17:45	0	1	0	5			6
06:00	0		0					18:00	0		0				
06:15	1		0					18:15	0		0				
06:30	0		0					18:30	0		0				
06:45	2	3	0	0			3	18:45	1	1	0	0			1
07:00	2		1					19:00	0		1				
07:15	1		1					19:15	0		1				
07:30	1		0					19:30	1		1				
07:45	0	4	0	2			6	19:45	0	1	0	3			4
08:00	0		0					20:00	0		0				
08:15	0		0					20:15	0		1				
08:30	0		0					20:30	0		1				
08:45	1	1	0	0			1	20:45	0	0	0	2			2
09:00	2		1					21:00	0		0				
09:15	0		1					21:15	1		0				
09:30	0		0					21:30	0		0				
09:45	0	2	2	4			6	21:45	0	1	0	0			1
10:00	1		1					22:00	0		0				
10:15	0		0					22:15	1		0				
10:30	0		0					22:30	0		1				
10:45	1	2	0	1			3	22:45	0	1	0	1			2
11:00	0		1					23:00	0		0				
11:15	1		1					23:15	0		0				
11:30	1		2					23:30	0		0				
11:45	1	3	0	4			7	23:45	0	0	0	0			
Total Vol.		16		14			**30**			26		32			**58**

Daily Totals

NB	SB	EB	WB	Combined
42	46			88

	AM NB	AM SB	AM Total	PM NB	PM SB	PM Total
Split %	53.3%	46.7%	**34.1%**	44.8%	55.2%	**65.9%**
Peak Hour	06:45	09:00	**11:45**	13:45	13:30	**13:30**
Volume	6	4	**9**	7	8	**13**
P.H.F.	0.75	0.50	**0.56**	0.50	0.67	**0.54**

Volumes for: Thursday, December 11, 2008 **City:** Lancaster **Project #:** 08-5163-003
Location: SR-138 E/o 170th Street W

AM Period	NB	SB	EB		WB			PM Period	NB	SB	EB		WB		
00:00			2		3			12:00			17		17		
00:15			3		2			12:15			18		13		
00:30			4		8			12:30			28		14		
00:45			0	9	7	20	29	12:45			20	83	15	59	142
01:00			3		1			13:00			27		13		
01:15			5		1			13:15			25		18		
01:30			4		2			13:30			22		19		
01:45			4	16	2	6	22	13:45			23	97	20	70	167
02:00			6		0			14:00			27		27		
02:15			5		4			14:15			33		18		
02:30			14		3			14:30			21		25		
02:45			0	25	0	7	32	14:45			25	106	22	92	198
03:00			4		2			15:00			17		24		
03:15			3		1			15:15			29		22		
03:30			7		0			15:30			20		23		
03:45			4	18	3	6	24	15:45			27	93	22	91	184
04:00			8		2			16:00			25		25		
04:15			6		4			16:15			29		17		
04:30			8		9			16:30			39		30		
04:45			14	36	4	19	55	16:45			25	118	23	95	213
05:00			14		3			17:00			31		22		
05:15			12		11			17:15			23		18		
05:30			22		14			17:30			27		22		
05:45			20	68	11	39	107	17:45			24	105	18	80	185
06:00			22		20			18:00			25		16		
06:15			18		9			18:15			18		23		
06:30			20		9			18:30			13		11		
06:45			15	75	22	60	135	18:45			26	82	11	61	143
07:00			17		19			19:00			18		17		
07:15			24		18			19:15			14		11		
07:30			18		20			19:30			11		11		
07:45			12	71	12	69	140	19:45			9	52	9	48	100
08:00			14		19			20:00			6		16		
08:15			18		16			20:15			5		9		
08:30			12		16			20:30			14		9		
08:45			14	58	15	66	124	20:45			8	33	13	47	80
09:00			25		25			21:00			15		4		
09:15			18		19			21:15			9		10		
09:30			19		25			21:30			9		14		
09:45			20	82	14	83	165	21:45			5	38	10	38	76
10:00			18		16			22:00			9		10		
10:15			14		24			22:15			4		10		
10:30			16		17			22:30			8		10		
10:45			19	67	16	73	140	22:45			17	38	5	35	73
11:00			15		22			23:00			6		2		
11:15			20		21			23:15			1		10		
11:30			18		15			23:30			6		3		
11:45			24	77	21	79	156	23:45			8	21	4	19	40
Total Vol.				602		527	**1129**					866		735	**1601**

Daily Totals

NB	SB		EB	WB
		Combined	1468	1262
		2730		

	AM			PM		
Split %	53.3%	46.7%	**41.4%**	54.1%	45.9%	**58.6%**
Peak Hour	11:45	08:45	**09:00**	16:15	16:00	**16:15**
Volume	87	84	**165**	124	95	**216**
P.H.F.	0.78	0.84	**0.83**	0.79	0.79	**0.78**

APPENDIX B
PEAK HOUR INTERSECTION LOS WORKSHEETS

AV Solar Ranch One Project
8 MW_North Access Only

Scenario Report

Scenario:	2013 Proj Const AM_8 MW
Command:	SM Alam
Volume:	2013 Project Const AM
Geometry:	FUTURE
Impact Fee:	Default Impact Fee
Trip Generation:	2013 Proj Const AM
Trip Distribution:	Default Trip Distribution
Paths:	Default Paths
Routes:	Default Routes
Configuration:	2013

AV Solar Ranch One Project
8 MW_North Access Only

Trip Generation Report

Forecast for 2013 Proj Const AM

Zone #	Subzone	Amount	Units	Rate In	Rate Out	Trips In	Trips Out	Total Trips	% Of Total
1	Const Worker	1.00	Const Worker	407.00	0.00	407	0	407	85.5
1	Const Worker	1.00	Onsite Managem	46.00	0.00	46	0	46	9.7
	Zone 1 Subtotal					453	0	453	95.2
2	Const BUS	0.00	Const BUS Trip	0.00	0.00	0	0	0	0.0
3	Const Delive	1.00	Const Delivery	14.00	9.00	14	9	23	4.8
	Zone 3 Subtotal					14	9	23	4.8
TOTAL						467	9	476	100.0

AV Solar Ranch One Project
8 MW_North Access Only

Turning Movement Report
2013 Proj Const AM

Volume	Northbound			Southbound			Eastbound			Westbound			Total
Type	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Volume
#1 SR-14 NB Ramps/SR-138													
Base	69	0	15	0	0	0	0	41	14	0	32	13	184
Added	331	0	0	0	0	0	0	0	0	0	0	0	331
Total	400	0	15	0	0	0	0	41	14	0	32	13	515
#2 SR-14 SB Ramps/SR-138													
Base	0	0	0	25	0	13	0	32	110	5	92	0	276
Added	0	0	0	0	0	23	0	0	9	0	331	0	363
Total	0	0	0	25	0	36	0	32	119	5	423	0	639
#3 90th Street W/SR-138													
Base	1	29	6	32	35	7	8	70	6	8	67	16	285
Added	0	0	0	0	0	0	0	9	0	0	354	0	363
Total	1	29	6	32	35	7	8	79	6	8	421	16	648
#4 110th Street W/SR-138													
Base	7	4	7	0	5	0	1	75	7	4	70	1	180
Added	0	0	0	0	0	0	0	9	0	0	354	0	363
Total	7	4	7	0	5	0	1	84	7	4	424	1	543
#5 160th Street W/SR-138													
Base	1	1	1	1	1	1	1	84	1	1	92	1	188
Added	0	0	0	0	0	0	0	9	0	0	354	0	363
Total	1	1	1	1	1	1	1	93	1	1	446	1	551
#6 170th Street W/SR-138													
Base	2	0	0	0	0	12	1	84	1	0	90	2	193
Added	0	0	0	9	0	0	113	0	0	0	0	354	476
Total	2	0	0	9	0	12	114	84	1	0	90	356	669
#7 La Petite Avenue/SR-138													
Base	0	0	0	15	0	22	6	55	0	0	91	2	192
Added	0	0	0	0	0	0	0	113	0	0	0	0	113
Total	0	0	0	15	0	22	6	168	0	0	91	2	305
#8 270th Street W/ SR-138													
Base	0	0	0	1	0	1	1	68	0	0	113	1	186
Added	0	0	0	0	0	0	0	113	0	0	0	0	113
Total	0	0	0	1	0	1	1	181	0	0	113	1	299
#9 Old Ridge Road/SR-138													
Base	0	0	0	0	0	0	0	87	2	1	137	0	227
Added	0	0	0	0	0	0	0	113	0	0	0	0	113
Total	0	0	0	0	0	0	0	200	2	1	137	0	340

AV Solar Ranch One Project
8 MW_North Access Only

Impact Analysis Report
Level Of Service

Intersection	Base LOS	Base Del/Veh	Base V/C	Future LOS	Future Del/Veh	Future V/C	Change in
# 1 SR-14 NB Ramps/SR-138	A	9.3	0.000	B	13.5	0.000	+ 4.210 D/V
# 2 SR-14 SB Ramps/SR-138	A	9.6	0.000	B	12.7	0.000	+ 3.102 D/V
# 3 90th Street W/SR-138	B	11.0	0.000	C	18.0	0.000	+ 7.012 D/V
# 4 110th Street W/SR-138	B	10.2	0.000	B	14.3	0.000	+ 4.074 D/V
# 5 160th Street W/SR-138	A	9.7	0.000	B	13.7	0.000	+ 3.957 D/V
# 6 170th Street W/SR-138	A	10.0	0.000	C	17.0	0.000	+ 7.010 D/V
# 7 La Petite Avenue/SR-138	A	9.3	0.000	A	9.7	0.000	+ 0.407 D/V
# 8 270th Street W/ SR-138	A	9.3	0.000	A	9.8	0.000	+ 0.469 D/V
# 9 Old Ridge Road/SR-138	A	7.4	0.000	A	7.7	0.000	+ 0.296 D/V

```
--------------------------------------------------------------------------------
                         AV Solar Ranch One Project
                           8 MW_North Access Only
--------------------------------------------------------------------------------
                     Level Of Service Computation Report
           2000 HCM Unsignalized Method (Future Volume Alternative)
********************************************************************************
Intersection #1 SR-14 NB Ramps/SR-138
********************************************************************************
Average Delay (sec/veh):     10.9   Worst Case Level Of Service:       B[ 13.5]
********************************************************************************
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign       Uncontrolled     Uncontrolled
Rights:           Include          Include          Include          Include
Lanes:        1  0  0  0  1    0  0  0  0  0    0  0  0  1  0    0  0  0  1  0
------------|---------------||---------------||---------------||---------------|
Volume Module: >> Count Date: 10 Dec 2008 <<
Base Vol:      59    0    13     0    0     0     0   35    12     0   27    11
Growth Adj:  1.17 1.17  1.17  1.17 1.17  1.17  1.17 1.17  1.17  1.17 1.17  1.17
Initial Bse:   69    0    15     0    0     0     0   41    14     0   32    13
Added Vol:    331    0     0     0    0     0     0    0     0     0    0     0
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:  400    0    15     0    0     0     0   41    14     0   32    13
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     0.82 0.82  0.82  0.82 0.82  0.82  0.82 0.82  0.82  0.82 0.82  0.82
PHF Volume:   488    0    19     0    0     0     0   50    17     0   39    16
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Final Vol.:   488    0    19     0    0     0     0   50    17     0   39    16
Critical Gap Module:
Critical Gp:  6.4 xxxx   6.2 xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
FollowUpTim:  3.5 xxxx   3.3 xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol:  105 xxxx    59  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Potent Cap.:  898 xxxx  1013  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Move Cap.:    898 xxxx  1013  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Volume/Cap:  0.54 xxxx  0.02  xxxx xxxx  xxxx  xxxx xxxx  xxxx  xxxx xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
Queue:        3.4 xxxx   0.1 xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Stopped Del: 13.7 xxxx   8.6 xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:    B    *     A     *    *     *     *    *     *     *    *     *
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
SharedQueue:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shrd StpDel:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shared LOS:     *    *     *     *    *     *     *    *     *     *    *     *
ApproachDel:       13.5            xxxxxx            xxxxxx            xxxxxx
ApproachLOS:        B                 *                 *                 *
```

```
--------------------------------------------------------------------------------
                         AV Solar Ranch One Project
                           8 MW_North Access Only
--------------------------------------------------------------------------------

                     Level Of Service Computation Report
          2000 HCM Unsignalized Method (Future Volume Alternative)
********************************************************************************
Intersection #2 SR-14 SB Ramps/SR-138
********************************************************************************
Average Delay (sec/veh):      1.3   Worst Case Level Of Service:      B[ 12.7]
********************************************************************************
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign       Uncontrolled     Uncontrolled
Rights:          Include          Include          Include          Include
Lanes:        0  0  0  0  0   1  0  0  0  1   0  0  0  1  0   1  0  1  0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:       0    0     0    21    0    11     0   27    94     4   79     0
Growth Adj:  1.17 1.17  1.17  1.17 1.17  1.17  1.17 1.17  1.17  1.17 1.17  1.17
Initial Bse:    0    0     0    25    0    13     0   32   110     5   92     0
Added Vol:      0    0     0     0    0    23     0    0     9     0  331     0
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:    0    0     0    25    0    36     0   32   119     5  423     0
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     0.82 0.82  0.82  0.82 0.82  0.82  0.82 0.82  0.82  0.82 0.82  0.82
PHF Volume:     0    0     0    30    0    44     0   39   145     6  516     0
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Final Vol.:     0    0     0    30    0    44     0   39   145     6  516     0
Critical Gap Module:
Critical Gp:xxxxx xxxx xxxxx   6.4 xxxx   6.2 xxxxx xxxx xxxxx   4.1 xxxx xxxxx
FollowUpTim:xxxxx xxxx xxxxx   3.5 xxxx   3.3 xxxxx xxxx xxxxx   2.2 xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol: xxxx xxxx xxxxx   639 xxxx   516  xxxx xxxx xxxxx   184 xxxx xxxxx
Potent Cap.: xxxx xxxx xxxxx   444 xxxx   563  xxxx xxxx xxxxx  1403 xxxx xxxxx
Move Cap.:   xxxx xxxx xxxxx   442 xxxx   563  xxxx xxxx xxxxx  1403 xxxx xxxxx
Volume/Cap:  xxxx xxxx  xxxx  0.07 xxxx  0.08  xxxx xxxx  xxxx  0.00 xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
Queue:      xxxxx xxxx xxxxx   0.2 xxxx   0.3 xxxxx xxxx xxxxx   0.0 xxxx xxxxx
Stopped Del:xxxxx xxxx xxxxx  13.7 xxxx  11.9 xxxxx xxxx xxxxx   7.6 xxxx xxxxx
LOS by Move:    *    *     *     B    *     B     *    *     *     A    *     *
Movement:     LT - LTR - RT   LT - LTR - RT   LT - LTR - RT   LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
SharedQueue:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shrd StpDel:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shared LOS:     *    *     *     *    *     *     *    *     *     *    *     *
ApproachDel:     xxxxxx             12.7            xxxxxx           xxxxxx
ApproachLOS:        *                 B                *                *
```

```
--------------------------------------------------------------------------------
                         AV Solar Ranch One Project
                           8 MW_North Access Only
--------------------------------------------------------------------------------
                     Level Of Service Computation Report
           2000 HCM Unsignalized Method (Future Volume Alternative)
********************************************************************************
Intersection #3 90th Street W/SR-138
********************************************************************************
Average Delay (sec/veh):      3.1   Worst Case Level Of Service:      C[ 18.0]
********************************************************************************
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign       Uncontrolled     Uncontrolled
Rights:           Include          Include          Include          Include
Lanes:        0  0  1! 0  0    0  0  1! 0  0    0  0  1! 0  0    0  0  1! 0  0
------------|---------------||---------------||---------------||---------------|
Volume Module: >> Count Date: 10 Dec 2008 <<
Base Vol:       1   25     5    27   30     6     7   60     5     7   57    14
Growth Adj:  1.17 1.17  1.17  1.17 1.17  1.17  1.17 1.17  1.17  1.17 1.17  1.17
Initial Bse:    1   29     6    32   35     7     8   70     6     8   67    16
Added Vol:      0    0     0     0    0     0     0    9     0     0  354     0
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:    1   29     6    32   35     7     8   79     6     8  421    16
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     0.82 0.82  0.82  0.82 0.82  0.82  0.82 0.82  0.82  0.82 0.82  0.82
PHF Volume:     1   36     7    39   43     9    10   97     7    10  513    20
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Final Vol.:     1   36     7    39   43     9    10   97     7    10  513    20
Critical Gap Module:
Critical Gp:  7.1  6.5   6.2   7.1  6.5   6.2   4.1 xxxx xxxxx   4.1 xxxx xxxxx
FollowUpTim:  3.5  4.0   3.3   3.5  4.0   3.3   2.2 xxxx xxxxx   2.2 xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol:  689  673   100   685  667   523   533 xxxx xxxxx   104 xxxx xxxxx
Potent Cap.:  363  379   961   365  382   558  1045 xxxx xxxxx  1501 xxxx xxxxx
Move Cap.:    322  373   961   332  376   558  1045 xxxx xxxxx  1501 xxxx xxxxx
Volume/Cap:  0.00 0.10  0.01  0.12 0.11  0.02  0.01 xxxx  xxxx  0.01 xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
Queue:       xxxxx xxxx xxxxx xxxxx xxxx xxxxx   0.0 xxxx xxxxx   0.0 xxxx xxxxx
Stopped Del:xxxxx xxxx xxxxx xxxxx xxxx xxxxx   8.5 xxxx xxxxx   7.4 xxxx xxxxx
LOS by Move:    *    *     *     *    *     *     A    *     *     A    *     *
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx  411 xxxxx  xxxx  367 xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
SharedQueue:xxxxx  0.4 xxxxx xxxxx  0.9 xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shrd StpDel:xxxxx 14.8 xxxxx xxxxx 18.0 xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shared LOS:     *    B     *     *    C     *     *    *     *     *    *     *
ApproachDel:       14.8             18.0            xxxxxx           xxxxxx
ApproachLOS:         B                C                *                *
```

```
--------------------------------------------------------------------------------
                         AV Solar Ranch One Project
                           8 MW_North Access Only
--------------------------------------------------------------------------------
                     Level Of Service Computation Report
           2000 HCM Unsignalized Method (Future Volume Alternative)
********************************************************************************
Intersection #4 110th Street W/SR-138
********************************************************************************
Average Delay (sec/veh):      0.6   Worst Case Level Of Service:       B[ 14.3]
********************************************************************************
Approach:      North Bound      South Bound       East Bound        West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign       Uncontrolled      Uncontrolled
Rights:           Include          Include          Include           Include
Lanes:        0  0  1! 0  0    0  0  1  0  0    0  0  1! 0  0    0  0  1! 0  0
------------|---------------||---------------||---------------||---------------|
Volume Module: >> Count Date: 10 Dec 2008 <<
Base Vol:        6    3     6     0    4     0     1   64     6     3   60     1
Growth Adj:   1.17 1.17  1.17  1.17 1.17  1.17  1.17 1.17  1.17  1.17 1.17  1.17
Initial Bse:     7    4     7     0    5     0     1   75     7     4   70     1
Added Vol:       0    0     0     0    0     0     0    9     0     0  354     0
PasserByVol:     0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:     7    4     7     0    5     0     1   84     7     4  424     1
User Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:      0.82 0.82  0.82  0.82 0.82  0.82  0.82 0.82  0.82  0.82 0.82  0.82
PHF Volume:      9    4     9     0    6     0     1  102     9     4  517     1
Reduct Vol:      0    0     0     0    0     0     0    0     0     0    0     0
Final Vol.:      9    4     9     0    6     0     1  102     9     4  517     1
Critical Gap Module:
Critical Gp:  7.1  6.5   6.2 xxxxx  6.5 xxxxx   4.1 xxxx xxxxx   4.1 xxxx xxxxx
FollowUpTim:  3.5  4.0   3.3 xxxxx  4.0 xxxxx   2.2 xxxx xxxxx   2.2 xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol:  639  637   107  xxxx  640 xxxxx   519 xxxx xxxxx   111 xxxx xxxxx
Potent Cap.:  392  398   953  xxxx  396 xxxxx  1058 xxxx xxxxx  1492 xxxx xxxxx
Move Cap.:    386  396   953  xxxx  394 xxxxx  1058 xxxx xxxxx  1492 xxxx xxxxx
Volume/Cap:  0.02 0.01  0.01  xxxx 0.01  xxxx  0.00 xxxx  xxxx  0.00 xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
Queue:       xxxxx xxxx xxxxx xxxxx  0.0 xxxxx   0.0 xxxx xxxxx   0.0 xxxx xxxxx
Stopped Del:xxxxx xxxx xxxxx xxxxx 14.3 xxxxx   8.4 xxxx xxxxx   7.4 xxxx xxxxx
LOS by Move:    *    *     *     *    B     *     A    *     *     A    *     *
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx  510 xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
SharedQueue:xxxxx  0.1 xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shrd StpDel:xxxxx 12.4 xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shared LOS:     *    B     *     *    *     *     *    *     *     *    *     *
ApproachDel:      12.4              14.3             xxxxxx            xxxxxx
ApproachLOS:        B                 B                 *                 *
```

```
--------------------------------------------------------------------------------
                         AV Solar Ranch One Project
                           8 MW_North Access Only
--------------------------------------------------------------------------------
                     Level Of Service Computation Report
           2000 HCM Unsignalized Method (Future Volume Alternative)
********************************************************************************
Intersection #5 160th Street W/SR-138
********************************************************************************
Average Delay (sec/veh):      0.2   Worst Case Level Of Service:      B[ 13.7]
********************************************************************************
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign       Uncontrolled     Uncontrolled
Rights:           Include          Include          Include          Include
Lanes:        0  0  1! 0  0    0  0  1! 0  0    0  0  1! 0  0    0  0  1! 0  0
------------|---------------||---------------||---------------||---------------|
Volume Module: >> Count Date: 11 Dec 2008 <<
Base Vol:       1    1     1     1    1     1     1   72     1     1   79     1
Growth Adj:  1.17 1.17  1.17  1.17 1.17  1.17  1.17 1.17  1.17  1.17 1.17  1.17
Initial Bse:    1    1     1     1    1     1     1   84     1     1   92     1
Added Vol:      0    0     0     0    0     0     0    9     0     0  354     0
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:    1    1     1     1    1     1     1   93     1     1  446     1
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     0.82 0.82  0.82  0.82 0.82  0.82  0.82 0.82  0.82  0.82 0.82  0.82
PHF Volume:     1    1     1     1    1     1     1  114     1     1  544     1
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Final Vol.:     1    1     1     1    1     1     1  114     1     1  544     1
Critical Gap Module:
Critical Gp:  7.1  6.5   6.2   7.1  6.5   6.2   4.1 xxxx xxxxx   4.1 xxxx xxxxx
FollowUpTim:  3.5  4.0   3.3   3.5  4.0   3.3   2.2 xxxx xxxxx   2.2 xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol:  667  666   114   667  666   545   546 xxxx xxxxx   115 xxxx xxxxx
Potent Cap.:  375  383   944   375  383   542  1034 xxxx xxxxx  1486 xxxx xxxxx
Move Cap.:    373  382   944   373  382   542  1034 xxxx xxxxx  1486 xxxx xxxxx
Volume/Cap:  0.00 0.00  0.00  0.00 0.00  0.00  0.00 xxxx  xxxx  0.00 xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
Queue:       xxxxx xxxx xxxxx xxxxx xxxx xxxxx   0.0 xxxx xxxxx   0.0 xxxx xxxxx
Stopped Del:xxxxx xxxx xxxxx xxxxx xxxx xxxxx   8.5 xxxx xxxxx   7.4 xxxx xxxxx
LOS by Move:    *    *     *     *    *     *     A    *     *     A    *     *
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx  471 xxxxx  xxxx  420 xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
SharedQueue:xxxxx  0.0 xxxxx xxxxx  0.0 xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shrd StpDel:xxxxx 12.7 xxxxx xxxxx 13.7 xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shared LOS:     *    B     *     *    B     *     *    *     *     *    *     *
ApproachDel:       12.7             13.7            xxxxxx           xxxxxx
ApproachLOS:         B                B                *                *
```

```
--------------------------------------------------------------------------------
                         AV Solar Ranch One Project
                           8 MW_North Access Only
--------------------------------------------------------------------------------
                     Level Of Service Computation Report
           2000 HCM Unsignalized Method (Future Volume Alternative)
********************************************************************************
Intersection #6 170th Street W/SR-138
********************************************************************************
Average Delay (sec/veh):      2.0   Worst Case Level Of Service:      C[ 17.0]
********************************************************************************
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign       Uncontrolled     Uncontrolled
Rights:           Include          Include          Include          Include
Lanes:        1  0  0  0  0    0  0  1! 0  0    0  0  1! 0  0    0  0  0  1  0
------------|---------------||---------------||---------------||---------------|
Volume Module: >> Count Date: 11 Dec 2008 <<
Base Vol:       2    0     0     0    0    10     1   72     1     0   77     2
Growth Adj:  1.17 1.17  1.17  1.17 1.17  1.17  1.17 1.17  1.17  1.17 1.17  1.17
Initial Bse:    2    0     0     0    0    12     1   84     1     0   90     2
Added Vol:      0    0     0     9    0     0   113    0     0     0    0   354
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:    2    0     0     9    0    12   114   84     1     0   90   356
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     0.82 0.82  0.82  0.82 0.82  0.82  0.82 0.82  0.82  0.82 0.82  0.82
PHF Volume:     3    0     0    11    0    14   139  103     1     0  110   435
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Final Vol.:     3    0     0    11    0    14   139  103     1     0  110   435
Critical Gap Module:
Critical Gp:  7.1 xxxx xxxxx   7.1 xxxx   6.2   4.1 xxxx xxxxx xxxxx xxxx xxxxx
FollowUpTim:  3.5 xxxx xxxxx   3.5 xxxx   3.3   2.2 xxxx xxxxx xxxxx xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol:  716 xxxx xxxxx   709 xxxx   327   544 xxxx xxxxx  xxxx xxxx xxxxx
Potent Cap.:  348 xxxx xxxxx   352 xxxx   719  1035 xxxx xxxxx  xxxx xxxx xxxxx
Move Cap.:    303 xxxx xxxxx   312 xxxx   719  1035 xxxx xxxxx  xxxx xxxx xxxxx
Volume/Cap:  0.01 xxxx  xxxx  0.04 xxxx  0.02  0.13 xxxx  xxxx  xxxx xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
Queue:        0.0 xxxx xxxxx xxxxx xxxx xxxxx   0.5 xxxx xxxxx xxxxx xxxx xxxxx
Stopped Del: 17.0 xxxx xxxxx xxxxx xxxx xxxxx   9.0 xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:    C    *     *     *    *     *     A    *     *     *    *     *
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx  459 xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
SharedQueue:xxxxx xxxx xxxxx xxxxx  0.2 xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shrd StpDel:xxxxx xxxx xxxxx xxxxx 13.3 xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shared LOS:     *    *     *     *    B     *     *    *     *     *    *     *
ApproachDel:       17.0             13.3            xxxxxx           xxxxxx
ApproachLOS:         C                B                *                *
```

```
--------------------------------------------------------------------------------
                         AV Solar Ranch One Project
                           8 MW_North Access Only
--------------------------------------------------------------------------------
                     Level Of Service Computation Report
           2000 HCM Unsignalized Method (Future Volume Alternative)
********************************************************************************
Intersection #7 La Petite Avenue/SR-138
********************************************************************************
Average Delay (sec/veh):      1.3   Worst Case Level Of Service:       A[  9.7]
********************************************************************************
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign       Uncontrolled     Uncontrolled
Rights:           Include          Include          Include          Include
Lanes:        0  0  0  0  0    0  0  1! 0  0    0  1  0  0  0    0  0  0  1  0
------------|---------------||---------------||---------------||---------------|
Volume Module: >> Count Date: 10 Dec 2008 <<
Base Vol:       0    0     0    13    0    19     5   47     0     0   78     2
Growth Adj:  1.17 1.17  1.17  1.17 1.17  1.17  1.17 1.17  1.17  1.17 1.17  1.17
Initial Bse:    0    0     0    15    0    22     6   55     0     0   91     2
Added Vol:      0    0     0     0    0     0     0  113     0     0    0     0
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:    0    0     0    15    0    22     6  168     0     0   91     2
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     0.82 0.82  0.82  0.82 0.82  0.82  0.82 0.82  0.82  0.82 0.82  0.82
PHF Volume:     0    0     0    19    0    27     7  205     0     0  111     3
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Final Vol.:     0    0     0    19    0    27     7  205     0     0  111     3
Critical Gap Module:
Critical Gp:xxxxx xxxx xxxxx   6.4 xxxx   6.2   4.1 xxxx xxxxx xxxxx xxxx xxxxx
FollowUpTim:xxxxx xxxx xxxxx   3.5 xxxx   3.3   2.2 xxxx xxxxx xxxxx xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol: xxxx xxxx xxxxx   332 xxxx   113   114 xxxx xxxxx  xxxx xxxx xxxxx
Potent Cap.: xxxx xxxx xxxxx   667 xxxx   946  1488 xxxx xxxxx  xxxx xxxx xxxxx
Move Cap.:   xxxx xxxx xxxxx   665 xxxx   946  1488 xxxx xxxxx  xxxx xxxx xxxxx
Volume/Cap:  xxxx xxxx  xxxx  0.03 xxxx  0.03  0.00 xxxx  xxxx  xxxx xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
Queue:      xxxxx xxxx xxxxx xxxxx xxxx xxxxx   0.0 xxxx xxxxx xxxxx xxxx xxxxx
Stopped Del:xxxxx xxxx xxxxx xxxxx xxxx xxxxx   7.4 xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:    *    *     *     *    *     *     A    *     *     *    *     *
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx  807 xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
SharedQueue:xxxxx xxxx xxxxx xxxxx  0.2 xxxxx   0.0 xxxx xxxxx xxxxx xxxx xxxxx
Shrd StpDel:xxxxx xxxx xxxxx xxxxx  9.7 xxxxx   7.4 xxxx xxxxx xxxxx xxxx xxxxx
Shared LOS:     *    *     *     *    A     *     A    *     *     *    *     *
ApproachDel:     xxxxxx              9.7             xxxxxx           xxxxxx
ApproachLOS:        *                A                 *                *
```

```
--------------------------------------------------------------------------------
                         AV Solar Ranch One Project
                           8 MW_North Access Only
--------------------------------------------------------------------------------
                     Level Of Service Computation Report
          2000 HCM Unsignalized Method (Future Volume Alternative)
********************************************************************************
Intersection #8 270th Street W/ SR-138
********************************************************************************
Average Delay (sec/veh):      0.1   Worst Case Level Of Service:       A[  9.8]
********************************************************************************
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign       Uncontrolled     Uncontrolled
Rights:           Include          Include          Include          Include
Lanes:        0  0  0  0  0   0  0  1! 0  0   1  0  1  0  0   0  0  0  1  0
------------|---------------||---------------||---------------||---------------|
Volume Module: >> Count Date: 11 Dec 2008 <<
Base Vol:       0    0     0     1    0     1     1   58     0     0   97     1
Growth Adj:  1.17 1.17  1.17  1.17 1.17  1.17  1.17 1.17  1.17  1.17 1.17  1.17
Initial Bse:    0    0     0     1    0     1     1   68     0     0  113     1
Added Vol:      0    0     0     0    0     0     0  113     0     0    0     0
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:    0    0     0     1    0     1     1  181     0     0  113     1
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     0.82 0.82  0.82  0.82 0.82  0.82  0.82 0.82  0.82  0.82 0.82  0.82
PHF Volume:     0    0     0     1    0     1     1  221     0     0  138     1
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Final Vol.:     0    0     0     1    0     1     1  221     0     0  138     1
Critical Gap Module:
Critical Gp:xxxxx xxxx xxxxx   6.4 xxxx   6.2   4.1 xxxx xxxxx xxxxx xxxx xxxxx
FollowUpTim:xxxxx xxxx xxxxx   3.5 xxxx   3.3   2.2 xxxx xxxxx xxxxx xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol: xxxx xxxx xxxxx   363 xxxx   139   140 xxxx xxxxx  xxxx xxxx xxxxx
Potent Cap.: xxxx xxxx xxxxx   641 xxxx   914  1456 xxxx xxxxx  xxxx xxxx xxxxx
Move Cap.:   xxxx xxxx xxxxx   640 xxxx   914  1456 xxxx xxxxx  xxxx xxxx xxxxx
Volume/Cap:  xxxx xxxx  xxxx  0.00 xxxx  0.00  0.00 xxxx  xxxx  xxxx xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
Queue:      xxxxx xxxx xxxxx xxxxx xxxx xxxxx   0.0 xxxx xxxxx xxxxx xxxx xxxxx
Stopped Del:xxxxx xxxx xxxxx xxxxx xxxx xxxxx   7.5 xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:    *    *     *     *    *     *     A    *     *     *    *     *
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx  753 xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
SharedQueue:xxxxx xxxx xxxxx xxxxx  0.0 xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shrd StpDel:xxxxx xxxx xxxxx xxxxx  9.8 xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shared LOS:     *    *     *     *    A     *     *    *     *     *    *     *
ApproachDel:     xxxxxx              9.8             xxxxxx            xxxxxx
ApproachLOS:        *                 A                 *                 *
```

```
--------------------------------------------------------------------------------
                         AV Solar Ranch One Project
                           8 MW_North Access Only
--------------------------------------------------------------------------------

                     Level Of Service Computation Report
           2000 HCM Unsignalized Method (Future Volume Alternative)
********************************************************************************
Intersection #9 Old Ridge Road/SR-138
********************************************************************************
Average Delay (sec/veh):      0.0   Worst Case Level Of Service:       A[  7.7]
********************************************************************************
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign       Uncontrolled     Uncontrolled
Rights:           Include          Include          Include          Include
Lanes:        0  0  1! 0  0    0  0  0  0  0    0  0  0  1  0    0  1  0  0  0
------------|---------------||---------------||---------------||---------------|
Volume Module: >> Count Date: 11 Dec 2008 <<
Base Vol:       0    0     0     0    0     0     0   74     2     1  117     0
Growth Adj:  1.17 1.17  1.17  1.17 1.17  1.17  1.17 1.17  1.17  1.17 1.17  1.17
Initial Bse:    0    0     0     0    0     0     0   87     2     1  137     0
Added Vol:      0    0     0     0    0     0     0  113     0     0    0     0
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:    0    0     0     0    0     0     0  200     2     1  137     0
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     0.82 0.82  0.82  0.82 0.82  0.82  0.82 0.82  0.82  0.82 0.82  0.82
PHF Volume:     0    0     0     0    0     0     0  243     3     1  167     0
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Final Vol.:     0    0     0     0    0     0     0  243     3     1  167     0
Critical Gap Module:
Critical Gp:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx   4.1 xxxx xxxxx
FollowUpTim:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx   2.2 xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx   246 xxxx xxxxx
Potent Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  1332 xxxx xxxxx
Move Cap.:   xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  1332 xxxx xxxxx
Volume/Cap:  xxxx xxxx  xxxx  xxxx xxxx  xxxx  xxxx xxxx  xxxx  0.00 xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
Queue:      xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx   0.0 xxxx xxxxx
Stopped Del:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx   7.7 xxxx xxxxx
LOS by Move:    *    *     *     *    *     *     *    *     *     A    *     *
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx    0 xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
SharedQueue:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx   0.0 xxxx xxxxx
Shrd StpDel:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx   7.7 xxxx xxxxx
Shared LOS:     *    *     *     *    *     *     *    *     *     A    *     *
ApproachDel:     xxxxxx           xxxxxx           xxxxxx           xxxxxx
ApproachLOS:        *                *                *                *
```

AV Solar Ranch One Project
8 MW_North Access Only

Scenario Report

Scenario:	2013 Proj Const PM_8 MW
Command:	SM Alam
Volume:	2013 Project Const PM
Geometry:	FUTURE
Impact Fee:	Default Impact Fee
Trip Generation:	2013 Proj Const PM
Trip Distribution:	Default Trip Distribution
Paths:	Default Paths
Routes:	Default Routes
Configuration:	2013

Traffix 7.6.0115 (c) 2004 Dowling Assoc. Licensed to URS CORP., SANTA ANA, CA

AV Solar Ranch One Project
8 MW_North Access Only

Trip Generation Report

Forecast for 2013 Proj Const PM

Zone #	Subzone	Amount	Units	Rate In	Rate Out	Trips In	Trips Out	Total Trips	% Of Total
1	Const Worker	1.00	Const Worker	0.00	407.00	0	407	407	85.5
1	Const Worker	1.00	Onsite Managem	0.00	46.00	0	46	46	9.7
	Zone 1 Subtotal					0	453	453	95.2
2	Const BUS	0.00	Const BUS Trip	0.00	0.00	0	0	0	0.0
3	Const Delive	1.00	Const Delivery	9.00	14.00	9	14	23	4.8
	Zone 3 Subtotal					9	14	23	4.8
TOTAL						9	467	476	100.0

AV Solar Ranch One Project
8 MW_North Access Only

Turning Movement Report
2013 Proj Const PM

Volume Type	Northbound Left	Northbound Thru	Northbound Right	Southbound Left	Southbound Thru	Southbound Right	Eastbound Left	Eastbound Thru	Eastbound Right	Westbound Left	Westbound Thru	Westbound Right	Total Volume
#1 SR-14 NB Ramps/SR-138													
Base	135	0	4	0	0	0	0	47	22	0	41	16	264
Added	9	0	0	0	0	0	0	0	23	0	0	0	32
Total	144	0	4	0	0	0	0	47	45	0	41	16	296
#2 SR-14 SB Ramps/SR-138													
Base	0	0	0	13	0	32	0	56	98	34	137	0	370
Added	0	0	0	0	0	0	0	23	331	0	9	0	363
Total	0	0	0	13	0	32	0	79	429	34	146	0	733
#3 90th Street W/SR-138													
Base	5	41	7	22	48	6	12	103	9	9	92	44	399
Added	0	0	0	0	0	0	0	354	0	0	9	0	363
Total	5	41	7	22	48	6	12	457	9	9	101	44	762
#4 110th Street W/SR-138													
Base	7	5	0	0	2	2	0	136	0	0	97	0	249
Added	0	0	0	0	0	0	0	354	0	0	9	0	363
Total	7	5	0	0	2	2	0	490	0	0	106	0	612
#5 160th Street W/SR-138													
Base	1	1	1	1	1	1	1	144	1	1	102	1	257
Added	0	0	0	0	0	0	0	354	0	0	9	0	363
Total	1	1	1	1	1	1	1	498	1	1	111	1	620
#6 170th Street W/SR-138													
Base	2	4	0	5	1	7	6	139	5	0	101	1	270
Added	0	0	0	354	0	113	0	0	0	0	0	9	476
Total	2	4	0	359	1	120	6	139	5	0	101	10	746
#7 La Petite Avenue/SR-138													
Base	0	0	0	13	0	16	23	139	0	0	80	22	294
Added	0	0	0	0	0	0	0	0	0	0	113	0	113
Total	0	0	0	13	0	16	23	139	0	0	193	22	407
#8 270th Street W/ SR-138													
Base	0	0	0	0	0	0	2	185	0	0	113	0	301
Added	0	0	0	0	0	0	0	0	0	0	113	0	113
Total	0	0	0	0	0	0	2	185	0	0	226	0	414
#9 Old Ridge Road/SR-138													
Base	2	0	0	0	0	0	0	178	6	0	152	0	338
Added	0	0	0	0	0	0	0	0	0	0	113	0	113
Total	2	0	0	0	0	0	0	178	6	0	265	0	451

AV Solar Ranch One Project
8 MW_North Access Only

Impact Analysis Report
Level Of Service

Intersection	Base LOS	Base Del/Veh	Base V/C	Future LOS	Future Del/Veh	Future V/C	Change in
# 1 SR-14 NB Ramps/SR-138	A	9.8	0.000	B	10.0	0.000	+ 0.163 D/V
# 2 SR-14 SB Ramps/SR-138	A	9.6	0.000	B	10.2	0.000	+ 0.612 D/V
# 3 90th Street W/SR-138	B	11.7	0.000	C	17.8	0.000	+ 6.149 D/V
# 4 110th Street W/SR-138	B	10.4	0.000	B	14.6	0.000	+ 4.246 D/V
# 5 160th Street W/SR-138	B	10.0	0.000	B	13.7	0.000	+ 3.639 D/V
# 6 170th Street W/SR-138	B	10.6	0.000	C	22.0	0.000	+11.345 D/V
# 7 La Petite Avenue/SR-138	A	9.6	0.000	B	10.4	0.000	+ 0.835 D/V
# 8 270th Street W/ SR-138	A	7.4	0.000	A	7.7	0.000	+ 0.266 D/V
# 9 Old Ridge Road/SR-138	B	10.6	0.000	B	11.6	0.000	+ 1.001 D/V

```
--------------------------------------------------------------------------------
                         AV Solar Ranch One Project
                           8 MW_North Access Only
--------------------------------------------------------------------------------
                     Level Of Service Computation Report
           2000 HCM Unsignalized Method (Future Volume Alternative)
********************************************************************************
Intersection #1 SR-14 NB Ramps/SR-138
********************************************************************************
Average Delay (sec/veh):      5.0   Worst Case Level Of Service:      B[ 10.0]
********************************************************************************
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign       Uncontrolled     Uncontrolled
Rights:           Include          Include          Include          Include
Lanes:        1  0  0  0  1   0  0  0  0  0   0  0  0  1  0   0  0  0  1  0
------------|---------------||---------------||---------------||---------------|
Volume Module: >> Count Date: 1 Dec 2008 <<
Base Vol:     115    0     3    0    0     0    0   40    19    0   35    14
Growth Adj:  1.17 1.17  1.17 1.17 1.17  1.17 1.17 1.17  1.17 1.17 1.17  1.17
Initial Bse:  135    0     4    0    0     0    0   47    22    0   41    16
Added Vol:      9    0     0    0    0     0    0    0    23    0    0     0
PasserByVol:    0    0     0    0    0     0    0    0     0    0    0     0
Initial Fut:  144    0     4    0    0     0    0   47    45    0   41    16
User Adj:    1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
PHF Adj:     0.92 0.92  0.92 0.92 0.92  0.92 0.92 0.92  0.92 0.92 0.92  0.92
PHF Volume:   156    0     4    0    0     0    0   51    49    0   45    18
Reduct Vol:     0    0     0    0    0     0    0    0     0    0    0     0
Final Vol.:   156    0     4    0    0     0    0   51    49    0   45    18
Critical Gap Module:
Critical Gp:  6.4 xxxx   6.2 xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
FollowUpTim:  3.5 xxxx   3.3 xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol:  129 xxxx    75  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Potent Cap.:  870 xxxx   991  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Move Cap.:    870 xxxx   991  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Volume/Cap:  0.18 xxxx  0.00  xxxx xxxx  xxxx  xxxx xxxx  xxxx  xxxx xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
Queue:        0.7 xxxx   0.0 xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Stopped Del: 10.0 xxxx   8.6 xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:    B    *     A    *    *     *    *    *     *    *    *     *
Movement:     LT - LTR - RT   LT - LTR - RT   LT - LTR - RT   LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
SharedQueue:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shrd StpDel:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shared LOS:     *    *     *    *    *     *    *    *     *    *    *     *
ApproachDel:       10.0           xxxxxx           xxxxxx           xxxxxx
ApproachLOS:         B               *                *                *
```

```
--------------------------------------------------------------------------------
                         AV Solar Ranch One Project
                           8 MW_North Access Only
--------------------------------------------------------------------------------
                     Level Of Service Computation Report
          2000 HCM Unsignalized Method (Future Volume Alternative)
********************************************************************************
Intersection #2 SR-14 SB Ramps/SR-138
********************************************************************************
Average Delay (sec/veh):      1.0   Worst Case Level Of Service:       B[ 10.2]
********************************************************************************
Approach:      North Bound      South Bound       East Bound        West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign       Uncontrolled      Uncontrolled
Rights:           Include          Include          Include           Include
Lanes:        0  0  0  0  0    1  0  0  0  1    0  0  0  1  0    1  0  1  0  0
------------|---------------||---------------||---------------||---------------|
Volume Module: >> Count Date: 10 Dec 2008 <<
Base Vol:       0    0     0    11    0    27     0   48    84    29  117     0
Growth Adj:  1.17 1.17  1.17  1.17 1.17  1.17  1.17 1.17  1.17  1.17 1.17  1.17
Initial Bse:    0    0     0    13    0    32     0   56    98    34  137     0
Added Vol:      0    0     0     0    0     0     0   23   331     0    9     0
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:    0    0     0    13    0    32     0   79   429    34  146     0
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     0.92 0.92  0.92  0.92 0.92  0.92  0.92 0.92  0.92  0.92 0.92  0.92
PHF Volume:     0    0     0    14    0    34     0   86   467    37  159     0
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Final Vol.:     0    0     0    14    0    34     0   86   467    37  159     0
Critical Gap Module:
Critical Gp:xxxxx xxxx xxxxx   6.4 xxxx   6.2 xxxxx xxxx xxxxx   4.1 xxxx xxxxx
FollowUpTim:xxxxx xxxx xxxxx   3.5 xxxx   3.3 xxxxx xxxx xxxxx   2.2 xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol: xxxx xxxx xxxxx   552 xxxx   159  xxxx xxxx xxxxx   553 xxxx xxxxx
Potent Cap.: xxxx xxxx xxxxx   498 xxxx   892  xxxx xxxx xxxxx  1028 xxxx xxxxx
Move Cap.:   xxxx xxxx xxxxx   485 xxxx   892  xxxx xxxx xxxxx  1028 xxxx xxxxx
Volume/Cap:  xxxx xxxx  xxxx  0.03 xxxx  0.04  xxxx xxxx  xxxx  0.04 xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
Queue:      xxxxx xxxx xxxxx   0.1 xxxx   0.1 xxxxx xxxx xxxxx   0.1 xxxx xxxxx
Stopped Del:xxxxx xxxx xxxxx  12.6 xxxx   9.2 xxxxx xxxx xxxxx   8.6 xxxx xxxxx
LOS by Move:    *    *     *     B    *     A     *    *     *     A    *     *
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
SharedQueue:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shrd StpDel:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shared LOS:     *    *     *     *    *     *     *    *     *     *    *     *
ApproachDel:     xxxxxx             10.2            xxxxxx            xxxxxx
ApproachLOS:        *                 B                 *                 *
```

```
--------------------------------------------------------------------------------
                         AV Solar Ranch One Project
                           8 MW_North Access Only
--------------------------------------------------------------------------------
                     Level Of Service Computation Report
          2000 HCM Unsignalized Method (Future Volume Alternative)
********************************************************************************
Intersection #3 90th Street W/SR-138
********************************************************************************
Average Delay (sec/veh):      3.1   Worst Case Level Of Service:      C[ 17.8]
********************************************************************************
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign       Uncontrolled     Uncontrolled
Rights:          Include          Include          Include          Include
Lanes:        0  0  1! 0  0    0  0  1! 0  0    0  0  1! 0  0    0  0  1! 0  0
------------|---------------||---------------||---------------||---------------|
Volume Module: >> Count Date: 10 Dec 2008 <<
Base Vol:        4   35     6    19   41     5    10   88     8     8   79    38
Growth Adj:   1.17 1.17  1.17  1.17 1.17  1.17  1.17 1.17  1.17  1.17 1.17  1.17
Initial Bse:     5   41     7    22   48     6    12  103     9     9   92    44
Added Vol:       0    0     0     0    0     0     0  354     0     0    9     0
PasserByVol:     0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:     5   41     7    22   48     6    12  457     9     9  101    44
User Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:      0.92 0.92  0.92  0.92 0.92  0.92  0.92 0.92  0.92  0.92 0.92  0.92
PHF Volume:      5   45     8    24   52     6    13  497    10    10  110    48
Reduct Vol:      0    0     0     0    0     0     0    0     0     0    0     0
Final Vol.:      5   45     8    24   52     6    13  497    10    10  110    48
Critical Gap Module:
Critical Gp:  7.1  6.5   6.2   7.1  6.5   6.2   4.1 xxxx xxxxx   4.1 xxxx xxxxx
FollowUpTim:  3.5  4.0   3.3   3.5  4.0   3.3   2.2 xxxx xxxxx   2.2 xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol:  711  706   502   708  687   134   159 xxxx xxxxx   507 xxxx xxxxx
Potent Cap.:  350  363   574   352  372   920  1433 xxxx xxxxx  1068 xxxx xxxxx
Move Cap.:    306  356   574   310  365   920  1433 xxxx xxxxx  1068 xxxx xxxxx
Volume/Cap:  0.02 0.12  0.01  0.08 0.14  0.01  0.01 xxxx  xxxx  0.01 xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
Queue:       xxxxx xxxx xxxxx xxxxx xxxx xxxxx   0.0 xxxx xxxxx   0.0 xxxx xxxxx
Stopped Del:xxxxx xxxx xxxxx xxxxx xxxx xxxxx   7.5 xxxx xxxxx   8.4 xxxx xxxxx
LOS by Move:    *    *     *     *    *     *     A    *     *     A    *     *
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx  369 xxxxx  xxxx  363 xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
SharedQueue:xxxxx  0.5 xxxxx xxxxx  0.9 xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shrd StpDel:xxxxx 16.5 xxxxx xxxxx 17.8 xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shared LOS:     *    C     *     *    C     *     *    *     *     *    *     *
ApproachDel:       16.5             17.8            xxxxxx           xxxxxx
ApproachLOS:         C                C                *                *
```

```
--------------------------------------------------------------------------------
                         AV Solar Ranch One Project
                           8 MW_North Access Only
--------------------------------------------------------------------------------
                     Level Of Service Computation Report
           2000 HCM Unsignalized Method (Future Volume Alternative)
********************************************************************************
Intersection #4 110th Street W/SR-138
********************************************************************************
Average Delay (sec/veh):      0.4   Worst Case Level Of Service:      B[ 14.6]
********************************************************************************
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign       Uncontrolled     Uncontrolled
Rights:           Include          Include          Include          Include
Lanes:        0  1  0  0  0    0  0  0  1  0    0  0  1  0  0    0  0  1  0  0
------------|---------------||---------------||---------------||---------------|
Volume Module: >> Count Date: 10 Dec 2008 <<
Base Vol:       6    4    0      0    2    2      0  116    0      0   83    0
Growth Adj:  1.17 1.17  1.17  1.17 1.17  1.17  1.17 1.17  1.17  1.17 1.17  1.17
Initial Bse:    7    5    0      0    2    2      0  136    0      0   97    0
Added Vol:      0    0    0      0    0    0      0  354    0      0    9    0
PasserByVol:    0    0    0      0    0    0      0    0    0      0    0    0
Initial Fut:    7    5    0      0    2    2      0  490    0      0  106    0
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     0.92 0.92  0.92  0.92 0.92  0.92  0.92 0.92  0.92  0.92 0.92  0.92
PHF Volume:     8    5    0      0    3    3      0  532    0      0  115    0
Reduct Vol:     0    0    0      0    0    0      0    0    0      0    0    0
Final Vol.:     8    5    0      0    3    3      0  532    0      0  115    0
Critical Gap Module:
Critical Gp:  7.1  6.5 xxxxx xxxxx  6.5   6.2 xxxxx xxxx xxxxx xxxxx xxxx xxxxx
FollowUpTim:  3.5  4.0 xxxxx xxxxx  4.0   3.3 xxxxx xxxx xxxxx xxxxx xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol:  650  648 xxxxx  xxxx  648   115  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Potent Cap.:  385  392 xxxxx  xxxx  392   942  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Move Cap.:    382  392 xxxxx  xxxx  392   942  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Volume/Cap:  0.02 0.01  xxxx  xxxx 0.01  0.00  xxxx xxxx  xxxx  xxxx xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
Queue:       xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Stopped Del:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:    *    *     *     *    *     *     *    *     *     *    *     *
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.:  386 xxxx xxxxx  xxxx xxxx   554  xxxx xxxx xxxxx  xxxx xxxx xxxxx
SharedQueue:  0.1 xxxx xxxxx xxxxx xxxx   0.0 xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shrd StpDel: 14.6 xxxx xxxxx xxxxx xxxx  11.6 xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shared LOS:     B    *     *     *    *     B     *    *     *     *    *     *
ApproachDel:       14.6             11.6            xxxxxx           xxxxxx
ApproachLOS:        B                B                *                *
```

```
--------------------------------------------------------------------------------
                         AV Solar Ranch One Project
                           8 MW_North Access Only
--------------------------------------------------------------------------------
                      Level Of Service Computation Report
          2000 HCM Unsignalized Method (Future Volume Alternative)
********************************************************************************
Intersection #5 160th Street W/SR-138
********************************************************************************
Average Delay (sec/veh):      0.2   Worst Case Level Of Service:      B[ 13.7]
********************************************************************************
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign       Uncontrolled     Uncontrolled
Rights:           Include          Include          Include          Include
Lanes:        0  0  1! 0  0    0  0  1! 0  0    0  0  1! 0  0    0  0  1! 0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:       1    1     1     1    1     1     1  123     1     1   87     1
Growth Adj:  1.17 1.17  1.17  1.17 1.17  1.17  1.17 1.17  1.17  1.17 1.17  1.17
Initial Bse:    1    1     1     1    1     1     1  144     1     1  102     1
Added Vol:      0    0     0     0    0     0     0  354     0     0    9     0
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:    1    1     1     1    1     1     1  498     1     1  111     1
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     0.92 0.92  0.92  0.92 0.92  0.92  0.92 0.92  0.92  0.92 0.92  0.92
PHF Volume:     1    1     1     1    1     1     1  541     1     1  120     1
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Final Vol.:     1    1     1     1    1     1     1  541     1     1  120     1
Critical Gap Module:
Critical Gp:  7.1  6.5   6.2   7.1  6.5   6.2   4.1 xxxx xxxxx   4.1 xxxx xxxxx
FollowUpTim:  3.5  4.0   3.3   3.5  4.0   3.3   2.2 xxxx xxxxx   2.2 xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol:  669  669   542   669  669   121   122 xxxx xxxxx   542 xxxx xxxxx
Potent Cap.:  374  381   544   374  381   936  1478 xxxx xxxxx  1036 xxxx xxxxx
Move Cap.:    372  381   544   371  381   936  1478 xxxx xxxxx  1036 xxxx xxxxx
Volume/Cap:  0.00 0.00  0.00  0.00 0.00  0.00  0.00 xxxx  xxxx  0.00 xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
Queue:       xxxxx xxxx xxxxx xxxxx xxxx xxxxx   0.0 xxxx xxxxx   0.0 xxxx xxxxx
Stopped Del:xxxxx xxxx xxxxx xxxxx xxxx xxxxx   7.4 xxxx xxxxx   8.5 xxxx xxxxx
LOS by Move:    *    *     *     *    *     *     A    *     *     A    *     *
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx  419 xxxxx  xxxx  470 xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
SharedQueue:xxxxx  0.0 xxxxx xxxxx  0.0 xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shrd StpDel:xxxxx 13.7 xxxxx xxxxx 12.7 xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shared LOS:     *    B     *     *    B     *     *    *     *     *    *     *
ApproachDel:      13.7             12.7            xxxxxx           xxxxxx
ApproachLOS:        B                B                *                *
```

```
--------------------------------------------------------------------------------
                          AV Solar Ranch One Project
                            8 MW_North Access Only
--------------------------------------------------------------------------------
                      Level Of Service Computation Report
          2000 HCM Unsignalized Method (Future Volume Alternative)
********************************************************************************
Intersection #6 170th Street W/SR-138
********************************************************************************
Average Delay (sec/veh):     14.3   Worst Case Level Of Service:       C[ 22.0]
********************************************************************************
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign       Uncontrolled     Uncontrolled
Rights:           Include          Include          Include          Include
Lanes:        0  1  0  0  0    0  0  1! 0  0    0  0  1! 0  0    0  0  0  1  0
------------|---------------||---------------||---------------||---------------|
Volume Module: >> Count Date: 11 Dec 2008 <<
Base Vol:        2    3     0     4    1     6     5  119     4     0   86     1
Growth Adj:  1.17 1.17  1.17  1.17 1.17  1.17  1.17 1.17  1.17  1.17 1.17  1.17
Initial Bse:     2    4     0     5    1     7     6  139     5     0  101     1
Added Vol:       0    0     0   354    0   113     0    0     0     0    0     9
PasserByVol:     0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:     2    4     0   359    1   120     6  139     5     0  101    10
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     0.92 0.92  0.92  0.92 0.92  0.92  0.92 0.92  0.92  0.92 0.92  0.92
PHF Volume:      3    4     0   390    1   130     6  151     5     0  109    11
Reduct Vol:      0    0     0     0    0     0     0    0     0     0    0     0
Final Vol.:      3    4     0   390    1   130     6  151     5     0  109    11
Critical Gap Module:
Critical Gp:  7.1  6.5 xxxxx   7.1  6.5   6.2   4.1 xxxx xxxxx xxxxx xxxx xxxxx
FollowUpTim:  3.5  4.0 xxxxx   3.5  4.0   3.3   2.2 xxxx xxxxx xxxxx xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol:  347  287 xxxxx   283  284   115   120 xxxx xxxxx  xxxx xxxx xxxxx
Potent Cap.:  611  626 xxxxx   673  628   943  1480 xxxx xxxxx  xxxx xxxx xxxxx
Move Cap.:    524  623 xxxxx   668  626   943  1480 xxxx xxxxx  xxxx xxxx xxxxx
Volume/Cap:  0.00 0.01  xxxx  0.58 0.00  0.14  0.00 xxxx  xxxx  xxxx xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
Queue:       xxxxx xxxx xxxxx xxxxx xxxx xxxxx   0.0 xxxx xxxxx xxxxx xxxx xxxxx
Stopped Del:xxxxx xxxx xxxxx xxxxx xxxx xxxxx   7.4 xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:    *    *     *     *    *     *     A    *     *     *    *     *
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.:  579 xxxx xxxxx  xxxx  720 xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
SharedQueue:  0.0 xxxx xxxxx xxxxx  6.3 xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shrd StpDel: 11.3 xxxx xxxxx xxxxx 22.0 xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shared LOS:     B    *     *     *    C     *     *    *     *     *    *     *
ApproachDel:      11.3             22.0            xxxxxx           xxxxxx
ApproachLOS:        B                C                *                *
```

```
--------------------------------------------------------------------------------
                          AV Solar Ranch One Project
                            8 MW_North Access Only
--------------------------------------------------------------------------------
                      Level Of Service Computation Report
          2000 HCM Unsignalized Method (Future Volume Alternative)
********************************************************************************
Intersection #7 La Petite Avenue/SR-138
********************************************************************************
Average Delay (sec/veh):      1.2   Worst Case Level Of Service:       B[ 10.4]
********************************************************************************
Approach:      North Bound      South Bound       East Bound        West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign       Uncontrolled      Uncontrolled
Rights:           Include          Include          Include           Include
Lanes:        0  0  0  0  0    0  0  1! 0  0    0  1  0  0  0    0  0  0  1  0
------------|---------------||---------------||---------------||---------------|
Volume Module: >> Count Date: 10 Dec 2008 <<
Base Vol:       0    0     0    11    0    14    20  119     0     0   68    19
Growth Adj:  1.17 1.17  1.17  1.17 1.17  1.17  1.17 1.17  1.17  1.17 1.17  1.17
Initial Bse:    0    0     0    13    0    16    23  139     0     0   80    22
Added Vol:      0    0     0     0    0     0     0    0     0     0  113     0
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:    0    0     0    13    0    16    23  139     0     0  193    22
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     0.92 0.92  0.92  0.92 0.92  0.92  0.92 0.92  0.92  0.92 0.92  0.92
PHF Volume:     0    0     0    14    0    18    25  151     0     0  209    24
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Final Vol.:     0    0     0    14    0    18    25  151     0     0  209    24
Critical Gap Module:
Critical Gp:xxxxx xxxx xxxxx   6.4 xxxx   6.2   4.1 xxxx xxxxx xxxxx xxxx xxxxx
FollowUpTim:xxxxx xxxx xxxxx   3.5 xxxx   3.3   2.2 xxxx xxxxx xxxxx xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol: xxxx xxxx xxxxx   424 xxxx   221   233 xxxx xxxxx  xxxx xxxx xxxxx
Potent Cap.: xxxx xxxx xxxxx   591 xxxx   823  1346 xxxx xxxxx  xxxx xxxx xxxxx
Move Cap.:   xxxx xxxx xxxxx   582 xxxx   823  1346 xxxx xxxxx  xxxx xxxx xxxxx
Volume/Cap:  xxxx xxxx  xxxx  0.02 xxxx  0.02  0.02 xxxx  xxxx  xxxx xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
Queue:      xxxxx xxxx xxxxx xxxxx xxxx xxxxx   0.1 xxxx xxxxx xxxxx xxxx xxxxx
Stopped Del:xxxxx xxxx xxxxx xxxxx xxxx xxxxx   7.7 xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:    *    *     *     *    *     *     A    *     *     *    *     *
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx  696 xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
SharedQueue:xxxxx xxxx xxxxx xxxxx  0.1 xxxxx   0.1 xxxx xxxxx xxxxx xxxx xxxxx
Shrd StpDel:xxxxx xxxx xxxxx xxxxx 10.4 xxxxx   7.7 xxxx xxxxx xxxxx xxxx xxxxx
Shared LOS:     *    *     *     *    B     *     A    *     *     *    *     *
ApproachDel:     xxxxxx             10.4             xxxxxx            xxxxxx
ApproachLOS:        *                 B                 *                 *
```

```
--------------------------------------------------------------------------------
                          AV Solar Ranch One Project
                            8 MW_North Access Only
--------------------------------------------------------------------------------
                      Level Of Service Computation Report
           2000 HCM Unsignalized Method (Future Volume Alternative)
********************************************************************************
Intersection #8 270th Street W/ SR-138
********************************************************************************
Average Delay (sec/veh):      0.0   Worst Case Level Of Service:       A[  7.7]
********************************************************************************
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign       Uncontrolled     Uncontrolled
Rights:           Include          Include          Include          Include
Lanes:        0  0  0  0  0    0  0  1! 0  0    1  0  1  0  0    0  0  1  0  0
------------|---------------||---------------||---------------||---------------|
Volume Module: >> Count Date: 11 Dec 2008 <<
Base Vol:       0    0     0     0    0     0     2  158     0     0   97     0
Growth Adj:  1.17 1.17  1.17  1.17 1.17  1.17  1.17 1.17  1.17  1.17 1.17  1.17
Initial Bse:    0    0     0     0    0     0     2  185     0     0  113     0
Added Vol:      0    0     0     0    0     0     0    0     0     0  113     0
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:    0    0     0     0    0     0     2  185     0     0  226     0
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     0.92 0.92  0.92  0.92 0.92  0.92  0.92 0.92  0.92  0.92 0.92  0.92
PHF Volume:     0    0     0     0    0     0     3  201     0     0  246     0
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Final Vol.:     0    0     0     0    0     0     3  201     0     0  246     0
Critical Gap Module:
Critical Gp:xxxxx xxxx xxxxx xxxxx xxxx xxxxx   4.1 xxxx xxxxx xxxxx xxxx xxxxx
FollowUpTim:xxxxx xxxx xxxxx xxxxx xxxx xxxxx   2.2 xxxx xxxxx xxxxx xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol: xxxx xxxx xxxxx  xxxx xxxx xxxxx   246 xxxx xxxxx  xxxx xxxx xxxxx
Potent Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  1332 xxxx xxxxx  xxxx xxxx xxxxx
Move Cap.:   xxxx xxxx xxxxx  xxxx xxxx xxxxx  1332 xxxx xxxxx  xxxx xxxx xxxxx
Volume/Cap:  xxxx xxxx  xxxx  xxxx xxxx  xxxx  0.00 xxxx  xxxx  xxxx xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
Queue:      xxxxx xxxx xxxxx xxxxx xxxx xxxxx   0.0 xxxx xxxxx xxxxx xxxx xxxxx
Stopped Del:xxxxx xxxx xxxxx xxxxx xxxx xxxxx   7.7 xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:    *    *     *     *    *     *     A    *     *     *    *     *
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx    0 xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
SharedQueue:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shrd StpDel:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shared LOS:     *    *     *     *    *     *     *    *     *     *    *     *
ApproachDel:     xxxxxx           xxxxxx           xxxxxx           xxxxxx
ApproachLOS:        *                *                *                *
```

```
--------------------------------------------------------------------------------
                         AV Solar Ranch One Project
                           8 MW_North Access Only
--------------------------------------------------------------------------------
                     Level Of Service Computation Report
           2000 HCM Unsignalized Method (Future Volume Alternative)
********************************************************************************
Intersection #9 Old Ridge Road/SR-138
********************************************************************************
Average Delay (sec/veh):      0.1   Worst Case Level Of Service:      B[ 11.6]
********************************************************************************
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign       Uncontrolled     Uncontrolled
Rights:           Include          Include          Include          Include
Lanes:        1  0  0  0  0    0  0  0  0  0    0  0  0  1  0    0  0  1  0  0
------------|---------------||---------------||---------------||---------------|
Volume Module: >> Count Date: 11 Dec 2008 <<
Base Vol:        2    0     0     0    0     0     0  152     5     0  130     0
Growth Adj:   1.17 1.17  1.17  1.17 1.17  1.17  1.17 1.17  1.17  1.17 1.17  1.17
Initial Bse:     2    0     0     0    0     0     0  178     6     0  152     0
Added Vol:       0    0     0     0    0     0     0    0     0     0  113     0
PasserByVol:     0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:     2    0     0     0    0     0     0  178     6     0  265     0
User Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:      0.92 0.92  0.92  0.92 0.92  0.92  0.92 0.92  0.92  0.92 0.92  0.92
PHF Volume:      3    0     0     0    0     0     0  193     6     0  288     0
Reduct Vol:      0    0     0     0    0     0     0    0     0     0    0     0
Final Vol.:      3    0     0     0    0     0     0  193     6     0  288     0
Critical Gap Module:
Critical Gp:  6.4 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
FollowUpTim:  3.5 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol:  485 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Potent Cap.:  545 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Move Cap.:    545 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Volume/Cap:  0.00 xxxx  xxxx  xxxx xxxx  xxxx  xxxx xxxx  xxxx  xxxx xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
Queue:        0.0 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Stopped Del: 11.6 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:    B    *     *     *    *     *     *    *     *     *    *     *
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
SharedQueue:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shrd StpDel:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shared LOS:     *    *     *     *    *     *     *    *     *     *    *     *
ApproachDel:       11.6            xxxxxx           xxxxxx           xxxxxx
ApproachLOS:         B                *                *                *
```

AV Solar Ranch One Project
8 MW_South Access Only

Scenario Report

Scenario:	2013 Proj Const AM_8 MW (South)
Command:	SM Alam
Volume:	2013 Project Const AM
Geometry:	FUTURE
Impact Fee:	Default Impact Fee
Trip Generation:	2013 Proj Const AM
Trip Distribution:	Default Trip Distribution
Paths:	Default Paths
Routes:	Default Routes
Configuration:	2013

AV Solar Ranch One Project
8 MW_South Access Only

Trip Generation Report

Forecast for 2013 Proj Const AM

Zone #	Subzone	Amount	Units	Rate In	Rate Out	Trips In	Trips Out	Total Trips	% Of Total
1	Const Worker	1.00	Onsite Managem	46.00	0.00	46	0	46	9.7
1	Const Worker	1.00	Const Worker	407.00	0.00	407	0	407	85.5
	Zone 1 Subtotal					453	0	453	95.2
3	Const Delive	1.00	Const Delivery	14.00	9.00	14	9	23	4.8
	Zone 3 Subtotal					14	9	23	4.8
TOTAL						467	9	476	100.0

AV Solar Ranch One Project
8 MW_South Access Only

Impact Analysis Report
Level Of Service

Intersection	Base LOS	Base Del/ Veh	Base V/ C	Future LOS	Future Del/ Veh	Future V/ C	Change in
# 1 SR-14 NB Ramps/SR-138	A	9.3	0.000	B	13.5	0.000	+ 4.210 D/V
# 2 SR-14 SB Ramps/SR-138	A	9.6	0.000	B	12.7	0.000	+ 3.102 D/V
# 3 90th Street W/SR-138	B	11.0	0.000	C	18.0	0.000	+ 7.012 D/V
# 4 110th Street W/SR-138	B	10.2	0.000	B	14.3	0.000	+ 4.074 D/V
# 5 160th Street W/SR-138	A	9.7	0.000	B	13.7	0.000	+ 3.957 D/V
# 6 170th Street W/SR-138	A	10.0	0.000	C	15.1	0.000	+ 5.101 D/V
# 7 La Petite Avenue/SR-138	A	9.3	0.000	A	9.7	0.000	+ 0.407 D/V
# 8 270th Street W/ SR-138	A	9.3	0.000	A	9.8	0.000	+ 0.469 D/V
# 9 Old Ridge Road/SR-138	A	7.4	0.000	A	7.7	0.000	+ 0.296 D/V

```
--------------------------------------------------------------------------------
                           AV Solar Ranch One Project
                             8 MW_South Access Only
--------------------------------------------------------------------------------
                        Level Of Service Computation Report
              2000 HCM Unsignalized Method (Future Volume Alternative)
********************************************************************************
Intersection #1 SR-14 NB Ramps/SR-138
********************************************************************************
Average Delay (sec/veh):      10.9   Worst Case Level Of Service:       B[ 13.5]
********************************************************************************
Approach:      North Bound      South Bound       East Bound        West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign       Uncontrolled      Uncontrolled
Rights:           Include          Include          Include           Include
Lanes:        1  0  0  0  1    0  0  0  0  0    0  0  0  1  0    0  0  0  1  0
------------|---------------||---------------||---------------||---------------|
Volume Module: >> Count Date: 10 Dec 2008 <<
Base Vol:      59    0    13     0    0     0     0   35    12     0   27    11
Growth Adj:  1.17 1.17  1.17  1.17 1.17  1.17  1.17 1.17  1.17  1.17 1.17  1.17
Initial Bse:   69    0    15     0    0     0     0   41    14     0   32    13
Added Vol:    331    0     0     0    0     0     0    0     0     0    0     0
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:  400    0    15     0    0     0     0   41    14     0   32    13
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     0.82 0.82  0.82  0.82 0.82  0.82  0.82 0.82  0.82  0.82 0.82  0.82
PHF Volume:   488    0    19     0    0     0     0   50    17     0   39    16
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Final Vol.:   488    0    19     0    0     0     0   50    17     0   39    16
Critical Gap Module:
Critical Gp:  6.4 xxxx   6.2 xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
FollowUpTim:  3.5 xxxx   3.3 xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol:  105 xxxx    59  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Potent Cap.:  898 xxxx  1013  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Move Cap.:    898 xxxx  1013  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Volume/Cap:  0.54 xxxx  0.02  xxxx xxxx  xxxx  xxxx xxxx  xxxx  xxxx xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
Queue:        3.4 xxxx   0.1 xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Stopped Del: 13.7 xxxx   8.6 xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:    B    *     A     *    *     *     *    *     *     *    *     *
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
SharedQueue:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shrd StpDel:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shared LOS:     *    *     *     *    *     *     *    *     *     *    *     *
ApproachDel:       13.5            xxxxxx            xxxxxx            xxxxxx
ApproachLOS:         B                *                 *                 *
```

```
--------------------------------------------------------------------------------
                         AV Solar Ranch One Project
                           8 MW_South Access Only
--------------------------------------------------------------------------------
                      Level Of Service Computation Report
          2000 HCM Unsignalized Method (Future Volume Alternative)
********************************************************************************
Intersection #2 SR-14 SB Ramps/SR-138
********************************************************************************
Average Delay (sec/veh):      1.3   Worst Case Level Of Service:      B[ 12.7]
********************************************************************************
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign       Uncontrolled     Uncontrolled
Rights:           Include          Include          Include          Include
Lanes:        0  0  0  0  0    1  0  0  0  1    0  0  0  1  0    1  0  1  0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:        0    0     0    21    0    11     0   27    94     4   79     0
Growth Adj:  1.17 1.17  1.17  1.17 1.17  1.17  1.17 1.17  1.17  1.17 1.17  1.17
Initial Bse:     0    0     0    25    0    13     0   32   110     5   92     0
Added Vol:       0    0     0     0    0    23     0    0     9     0  331     0
PasserByVol:     0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:     0    0     0    25    0    36     0   32   119     5  423     0
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     0.82 0.82  0.82  0.82 0.82  0.82  0.82 0.82  0.82  0.82 0.82  0.82
PHF Volume:      0    0     0    30    0    44     0   39   145     6  516     0
Reduct Vol:      0    0     0     0    0     0     0    0     0     0    0     0
Final Vol.:      0    0     0    30    0    44     0   39   145     6  516     0
Critical Gap Module:
Critical Gp:xxxxx xxxx xxxxx   6.4 xxxx   6.2 xxxxx xxxx xxxxx   4.1 xxxx xxxxx
FollowUpTim:xxxxx xxxx xxxxx   3.5 xxxx   3.3 xxxxx xxxx xxxxx   2.2 xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol: xxxx xxxx xxxxx   639 xxxx   516  xxxx xxxx xxxxx   184 xxxx xxxxx
Potent Cap.: xxxx xxxx xxxxx   444 xxxx   563  xxxx xxxx xxxxx  1403 xxxx xxxxx
Move Cap.:   xxxx xxxx xxxxx   442 xxxx   563  xxxx xxxx xxxxx  1403 xxxx xxxxx
Volume/Cap:  xxxx xxxx  xxxx  0.07 xxxx  0.08  xxxx xxxx  xxxx  0.00 xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
Queue:      xxxxx xxxx xxxxx   0.2 xxxx   0.3 xxxxx xxxx xxxxx   0.0 xxxx xxxxx
Stopped Del:xxxxx xxxx xxxxx  13.7 xxxx  11.9 xxxxx xxxx xxxxx   7.6 xxxx xxxxx
LOS by Move:    *    *     *     B    *     B     *    *     *     A    *     *
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
SharedQueue:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shrd StpDel:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shared LOS:     *    *     *     *    *     *     *    *     *     *    *     *
ApproachDel:     xxxxxx             12.7            xxxxxx           xxxxxx
ApproachLOS:        *                 B                *                *
```

```
--------------------------------------------------------------------------------
                         AV Solar Ranch One Project
                           8 MW_South Access Only
--------------------------------------------------------------------------------
                     Level Of Service Computation Report
           2000 HCM Unsignalized Method (Future Volume Alternative)
********************************************************************************
Intersection #3 90th Street W/SR-138
********************************************************************************
Average Delay (sec/veh):      3.1   Worst Case Level Of Service:       C[ 18.0]
********************************************************************************
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign       Uncontrolled     Uncontrolled
Rights:           Include          Include          Include          Include
Lanes:        0  0  1! 0  0    0  0  1! 0  0    0  0  1! 0  0    0  0  1! 0  0
------------|---------------||---------------||---------------||---------------|
Volume Module: >> Count Date: 10 Dec 2008 <<
Base Vol:        1   25     5    27   30     6     7   60     5     7   57    14
Growth Adj:   1.17 1.17  1.17  1.17 1.17  1.17  1.17 1.17  1.17  1.17 1.17  1.17
Initial Bse:     1   29     6    32   35     7     8   70     6     8   67    16
Added Vol:       0    0     0     0    0     0     0    9     0     0  354     0
PasserByVol:     0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:     1   29     6    32   35     7     8   79     6     8  421    16
User Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:      0.82 0.82  0.82  0.82 0.82  0.82  0.82 0.82  0.82  0.82 0.82  0.82
PHF Volume:      1   36     7    39   43     9    10   97     7    10  513    20
Reduct Vol:      0    0     0     0    0     0     0    0     0     0    0     0
Final Vol.:      1   36     7    39   43     9    10   97     7    10  513    20
Critical Gap Module:
Critical Gp:  7.1  6.5   6.2   7.1  6.5   6.2   4.1 xxxx xxxxx   4.1 xxxx xxxxx
FollowUpTim:  3.5  4.0   3.3   3.5  4.0   3.3   2.2 xxxx xxxxx   2.2 xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol:  689  673   100   685  667   523   533 xxxx xxxxx   104 xxxx xxxxx
Potent Cap.:  363  379   961   365  382   558  1045 xxxx xxxxx  1501 xxxx xxxxx
Move Cap.:    322  373   961   332  376   558  1045 xxxx xxxxx  1501 xxxx xxxxx
Volume/Cap:  0.00 0.10  0.01  0.12 0.11  0.02  0.01 xxxx  xxxx  0.01 xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
Queue:       xxxxx xxxx xxxxx xxxxx xxxx xxxxx   0.0 xxxx xxxxx   0.0 xxxx xxxxx
Stopped Del:xxxxx xxxx xxxxx xxxxx xxxx xxxxx   8.5 xxxx xxxxx   7.4 xxxx xxxxx
LOS by Move:   *    *     *     *    *     *     A    *     *     A    *     *
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx  411 xxxxx  xxxx  367 xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
SharedQueue:xxxxx  0.4 xxxxx xxxxx  0.9 xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shrd StpDel:xxxxx 14.8 xxxxx xxxxx 18.0 xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shared LOS:    *    B     *     *    C     *     *    *     *     *    *     *
ApproachDel:      14.8             18.0            xxxxxx           xxxxxx
ApproachLOS:        B                C                *                *
```

```
--------------------------------------------------------------------------------
                          AV Solar Ranch One Project
                            8 MW_South Access Only
--------------------------------------------------------------------------------
                      Level Of Service Computation Report
          2000 HCM Unsignalized Method (Future Volume Alternative)
********************************************************************************
Intersection #4 110th Street W/SR-138
********************************************************************************
Average Delay (sec/veh):      0.6   Worst Case Level Of Service:      B[ 14.3]
********************************************************************************
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Stop Sign        Stop Sign       Uncontrolled     Uncontrolled
Rights:          Include          Include          Include          Include
Lanes:        0  0  1! 0  0   0  0  1  0  0   0  0  1! 0  0   0  0  1! 0  0
------------|---------------||---------------||---------------||---------------|
Volume Module: >> Count Date: 10 Dec 2008 <<
Base Vol:        6    3     6     0    4     0     1   64     6     3   60     1
Growth Adj:   1.17 1.17  1.17  1.17 1.17  1.17  1.17 1.17  1.17  1.17 1.17  1.17
Initial Bse:     7    4     7     0    5     0     1   75     7     4   70     1
Added Vol:       0    0     0     0    0     0     0    9     0     0  354     0
PasserByVol:     0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:     7    4     7     0    5     0     1   84     7     4  424     1
User Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:      0.82 0.82  0.82  0.82 0.82  0.82  0.82 0.82  0.82  0.82 0.82  0.82
PHF Volume:      9    4     9     0    6     0     1  102     9     4  517     1
Reduct Vol:      0    0     0     0    0     0     0    0     0     0    0     0
Final Vol.:      9    4     9     0    6     0     1  102     9     4  517     1
Critical Gap Module:
Critical Gp:  7.1  6.5   6.2 xxxxx  6.5 xxxxx   4.1 xxxx xxxxx   4.1 xxxx xxxxx
FollowUpTim:  3.5  4.0   3.3 xxxxx  4.0 xxxxx   2.2 xxxx xxxxx   2.2 xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol:  639  637   107  xxxx  640 xxxxx   519 xxxx xxxxx   111 xxxx xxxxx
Potent Cap.:  392  398   953  xxxx  396 xxxxx  1058 xxxx xxxxx  1492 xxxx xxxxx
Move Cap.:    386  396   953  xxxx  394 xxxxx  1058 xxxx xxxxx  1492 xxxx xxxxx
Volume/Cap:  0.02 0.01  0.01  xxxx 0.01  xxxx  0.00 xxxx  xxxx  0.00 xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
Queue:       xxxxx xxxx xxxxx xxxxx  0.0 xxxxx   0.0 xxxx xxxxx   0.0 xxxx xxxxx
Stopped Del:xxxxx xxxx xxxxx xxxxx 14.3 xxxxx   8.4 xxxx xxxxx   7.4 xxxx xxxxx
LOS by Move:    *    *     *     *    B     *     A    *     *     A    *     *
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx  510 xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
SharedQueue:xxxxx  0.1 xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shrd StpDel:xxxxx 12.4 xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shared LOS:     *    B     *     *    *     *     *    *     *     *    *     *
ApproachDel:       12.4             14.3            xxxxxx           xxxxxx
ApproachLOS:         B                B                *                *
```

```
--------------------------------------------------------------------------------
                         AV Solar Ranch One Project
                           8 MW_South Access Only
--------------------------------------------------------------------------------
                     Level Of Service Computation Report
          2000 HCM Unsignalized Method (Future Volume Alternative)
********************************************************************************
Intersection #5 160th Street W/SR-138
********************************************************************************
Average Delay (sec/veh):      0.2   Worst Case Level Of Service:      B[ 13.7]
********************************************************************************
Approach:      North Bound      South Bound       East Bound        West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign       Uncontrolled      Uncontrolled
Rights:           Include          Include          Include          Include
Lanes:        0  0  1! 0  0    0  0  1! 0  0    0  0  1! 0  0    0  0  1! 0  0
------------|---------------||---------------||---------------||---------------|
Volume Module: >> Count Date: 11 Dec 2008 <<
Base Vol:       1    1     1     1    1     1     1   72     1     1   79     1
Growth Adj:  1.17 1.17  1.17  1.17 1.17  1.17  1.17 1.17  1.17  1.17 1.17  1.17
Initial Bse:    1    1     1     1    1     1     1   84     1     1   92     1
Added Vol:      0    0     0     0    0     0     0    9     0     0  354     0
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:    1    1     1     1    1     1     1   93     1     1  446     1
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     0.82 0.82  0.82  0.82 0.82  0.82  0.82 0.82  0.82  0.82 0.82  0.82
PHF Volume:     1    1     1     1    1     1     1  114     1     1  544     1
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Final Vol.:     1    1     1     1    1     1     1  114     1     1  544     1
Critical Gap Module:
Critical Gp:  7.1  6.5   6.2   7.1  6.5   6.2   4.1 xxxx xxxxx   4.1 xxxx xxxxx
FollowUpTim:  3.5  4.0   3.3   3.5  4.0   3.3   2.2 xxxx xxxxx   2.2 xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol:  667  666   114   667  666   545   546 xxxx xxxxx   115 xxxx xxxxx
Potent Cap.:  375  383   944   375  383   542  1034 xxxx xxxxx  1486 xxxx xxxxx
Move Cap.:    373  382   944   373  382   542  1034 xxxx xxxxx  1486 xxxx xxxxx
Volume/Cap:  0.00 0.00  0.00  0.00 0.00  0.00  0.00 xxxx  xxxx  0.00 xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
Queue:       xxxxx xxxx xxxxx xxxxx xxxx xxxxx   0.0 xxxx xxxxx   0.0 xxxx xxxxx
Stopped Del:xxxxx xxxx xxxxx xxxxx xxxx xxxxx   8.5 xxxx xxxxx   7.4 xxxx xxxxx
LOS by Move:    *    *     *     *    *     *     A    *     *     A    *     *
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx  471 xxxxx  xxxx  420 xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
SharedQueue:xxxxx  0.0 xxxxx xxxxx  0.0 xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shrd StpDel:xxxxx 12.7 xxxxx xxxxx 13.7 xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shared LOS:     *    B     *     *    B     *     *    *     *     *    *     *
ApproachDel:       12.7             13.7            xxxxxx            xxxxxx
ApproachLOS:         B                B                *                 *
```

```
--------------------------------------------------------------------------------
                         AV Solar Ranch One Project
                           8 MW_South Access Only
--------------------------------------------------------------------------------
                     Level Of Service Computation Report
           2000 HCM Unsignalized Method (Future Volume Alternative)
********************************************************************************
Intersection #6 170th Street W/SR-138
********************************************************************************
Average Delay (sec/veh):      5.2   Worst Case Level Of Service:      C[ 15.1]
********************************************************************************
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign       Uncontrolled     Uncontrolled
Rights:          Include          Include          Include          Include
Lanes:        0  0  1! 0  0    0  0  0  0  1    0  0  1! 0  0    0  0  1! 0  0
------------|---------------||---------------||---------------||---------------|
Volume Module: >> Count Date: 11 Dec 2008 <<
Base Vol:       2    0     0     0    0    10     1   72     1     0   77     2
Growth Adj:  1.17 1.17  1.17  1.17 1.17  1.17  1.17 1.17  1.17  1.17 1.17  1.17
Initial Bse:    2    0     0     0    0    12     1   84     1     0   90     2
Added Vol:      0    0     9     0    0     0     0    0   113   354    0     0
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:    2    0     9     0    0    12     1   84   114   354   90     2
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     0.82 0.82  0.82  0.82 0.82  0.82  0.82 0.82  0.82  0.82 0.82  0.82
PHF Volume:     3    0    11     0    0    14     1  103   139   432  110     3
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Final Vol.:     3    0    11     0    0    14     1  103   139   432  110     3
Critical Gap Module:
Critical Gp:  7.1 xxxx   6.2 xxxxx xxxx   6.2   4.1 xxxx xxxxx   4.1 xxxx xxxxx
FollowUpTim:  3.5 xxxx   3.3 xxxxx xxxx   3.3   2.2 xxxx xxxxx   2.2 xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol: 1157 xxxx   172  xxxx xxxx   111   113 xxxx xxxxx   242 xxxx xxxxx
Potent Cap.:  175 xxxx   876  xxxx xxxx   947  1489 xxxx xxxxx  1336 xxxx xxxxx
Move Cap.:    115 xxxx   876  xxxx xxxx   947  1489 xxxx xxxxx  1336 xxxx xxxxx
Volume/Cap:  0.02 xxxx  0.01  xxxx xxxx  0.02  0.00 xxxx  xxxx  0.32 xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
Queue:      xxxxx xxxx xxxxx xxxxx xxxx   0.0   0.0 xxxx xxxxx   1.4 xxxx xxxxx
Stopped Del:xxxxx xxxx xxxxx xxxxx xxxx   8.9   7.4 xxxx xxxxx   9.0 xxxx xxxxx
LOS by Move:    *    *     *     *    *     A     A    *     *     A    *     *
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx  370 xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
SharedQueue:xxxxx  0.1 xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shrd StpDel:xxxxx 15.1 xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shared LOS:     *    C     *     *    *     *     *    *     *     *    *     *
ApproachDel:      15.1              8.9           xxxxxx           xxxxxx
ApproachLOS:        C                A               *                *
```

```
-------------------------------------------------------------------------------
                         AV Solar Ranch One Project
                           8 MW_South Access Only
-------------------------------------------------------------------------------

                     Level Of Service Computation Report
           2000 HCM Unsignalized Method (Future Volume Alternative)
*******************************************************************************
Intersection #7 La Petite Avenue/SR-138
*******************************************************************************
Average Delay (sec/veh):      1.3   Worst Case Level Of Service:       A[  9.7]
*******************************************************************************
Approach:      North Bound      South Bound       East Bound        West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign       Uncontrolled      Uncontrolled
Rights:           Include          Include          Include           Include
Lanes:        0  0  0  0  0    0  0  1! 0  0    0  1  0  0  0    0  0  0  1  0
------------|---------------||---------------||---------------||---------------|
Volume Module: >> Count Date: 10 Dec 2008 <<
Base Vol:       0    0     0    13    0    19     5   47     0     0   78     2
Growth Adj:  1.17 1.17  1.17  1.17 1.17  1.17  1.17 1.17  1.17  1.17 1.17  1.17
Initial Bse:    0    0     0    15    0    22     6   55     0     0   91     2
Added Vol:      0    0     0     0    0     0     0  113     0     0    0     0
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:    0    0     0    15    0    22     6  168     0     0   91     2
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     0.82 0.82  0.82  0.82 0.82  0.82  0.82 0.82  0.82  0.82 0.82  0.82
PHF Volume:     0    0     0    19    0    27     7  205     0     0  111     3
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Final Vol.:     0    0     0    19    0    27     7  205     0     0  111     3
Critical Gap Module:
Critical Gp:xxxxx xxxx xxxxx   6.4 xxxx   6.2   4.1 xxxx xxxxx xxxxx xxxx xxxxx
FollowUpTim:xxxxx xxxx xxxxx   3.5 xxxx   3.3   2.2 xxxx xxxxx xxxxx xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol: xxxx xxxx xxxxx   332 xxxx   113   114 xxxx xxxxx  xxxx xxxx xxxxx
Potent Cap.: xxxx xxxx xxxxx   667 xxxx   946  1488 xxxx xxxxx  xxxx xxxx xxxxx
Move Cap.:   xxxx xxxx xxxxx   665 xxxx   946  1488 xxxx xxxxx  xxxx xxxx xxxxx
Volume/Cap:  xxxx xxxx  xxxx  0.03 xxxx  0.03  0.00 xxxx  xxxx  xxxx xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
Queue:      xxxxx xxxx xxxxx xxxxx xxxx xxxxx   0.0 xxxx xxxxx xxxxx xxxx xxxxx
Stopped Del:xxxxx xxxx xxxxx xxxxx xxxx xxxxx   7.4 xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:   *    *     *     *    *     *     A    *     *     *    *     *
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx  807 xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
SharedQueue:xxxxx xxxx xxxxx xxxxx  0.2 xxxxx   0.0 xxxx xxxxx xxxxx xxxx xxxxx
Shrd StpDel:xxxxx xxxx xxxxx xxxxx  9.7 xxxxx   7.4 xxxx xxxxx xxxxx xxxx xxxxx
Shared LOS:    *    *     *     *    A     *     A    *     *     *    *     *
ApproachDel:    xxxxxx              9.7            xxxxxx            xxxxxx
ApproachLOS:       *                A                 *                 *
```

```
--------------------------------------------------------------------------------
                         AV Solar Ranch One Project
                           8 MW_South Access Only
--------------------------------------------------------------------------------
                     Level Of Service Computation Report
           2000 HCM Unsignalized Method (Future Volume Alternative)
********************************************************************************
Intersection #8 270th Street W/ SR-138
********************************************************************************
Average Delay (sec/veh):      0.1   Worst Case Level Of Service:      A[  9.8]
********************************************************************************
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign       Uncontrolled     Uncontrolled
Rights:           Include          Include          Include          Include
Lanes:        0  0  0  0  0    0  0  1! 0  0    1  0  1  0  0    0  0  0  1  0
------------|---------------||---------------||---------------||---------------|
Volume Module: >> Count Date: 11 Dec 2008 <<
Base Vol:        0    0     0     1    0     1     1   58     0     0   97     1
Growth Adj:   1.17 1.17  1.17  1.17 1.17  1.17  1.17 1.17  1.17  1.17 1.17  1.17
Initial Bse:     0    0     0     1    0     1     1   68     0     0  113     1
Added Vol:       0    0     0     0    0     0     0  113     0     0    0     0
PasserByVol:     0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:     0    0     0     1    0     1     1  181     0     0  113     1
User Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:      0.82 0.82  0.82  0.82 0.82  0.82  0.82 0.82  0.82  0.82 0.82  0.82
PHF Volume:      0    0     0     1    0     1     1  221     0     0  138     1
Reduct Vol:      0    0     0     0    0     0     0    0     0     0    0     0
Final Vol.:      0    0     0     1    0     1     1  221     0     0  138     1
Critical Gap Module:
Critical Gp:xxxxx xxxx xxxxx   6.4 xxxx   6.2   4.1 xxxx xxxxx xxxxx xxxx xxxxx
FollowUpTim:xxxxx xxxx xxxxx   3.5 xxxx   3.3   2.2 xxxx xxxxx xxxxx xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol: xxxx xxxx xxxxx   363 xxxx   139   140 xxxx xxxxx  xxxx xxxx xxxxx
Potent Cap.: xxxx xxxx xxxxx   641 xxxx   914  1456 xxxx xxxxx  xxxx xxxx xxxxx
Move Cap.:   xxxx xxxx xxxxx   640 xxxx   914  1456 xxxx xxxxx  xxxx xxxx xxxxx
Volume/Cap:  xxxx xxxx  xxxx  0.00 xxxx  0.00  0.00 xxxx  xxxx  xxxx xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
Queue:      xxxxx xxxx xxxxx xxxxx xxxx xxxxx   0.0 xxxx xxxxx xxxxx xxxx xxxxx
Stopped Del:xxxxx xxxx xxxxx xxxxx xxxx xxxxx   7.5 xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:    *    *     *     *    *     *     A    *     *     *    *     *
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx  753 xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
SharedQueue:xxxxx xxxx xxxxx xxxxx  0.0 xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shrd StpDel:xxxxx xxxx xxxxx xxxxx  9.8 xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shared LOS:     *    *     *     *    A     *     *    *     *     *    *     *
ApproachDel:     xxxxxx              9.8             xxxxxx           xxxxxx
ApproachLOS:        *                 A                 *                *
```

```
--------------------------------------------------------------------------------
                         AV Solar Ranch One Project
                           8 MW_South Access Only
--------------------------------------------------------------------------------
                     Level Of Service Computation Report
           2000 HCM Unsignalized Method (Future Volume Alternative)
********************************************************************************
Intersection #9 Old Ridge Road/SR-138
********************************************************************************
Average Delay (sec/veh):      0.0   Worst Case Level Of Service:       A[  7.7]
********************************************************************************
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign       Uncontrolled     Uncontrolled
Rights:           Include          Include          Include          Include
Lanes:        0  0  1! 0  0    0  0  0  0  0    0  0  0  1  0    0  1  0  0  0
------------|---------------||---------------||---------------||---------------|
Volume Module: >> Count Date: 11 Dec 2008 <<
Base Vol:       0    0     0     0    0     0     0   74     2     1  117     0
Growth Adj:  1.17 1.17  1.17  1.17 1.17  1.17  1.17 1.17  1.17  1.17 1.17  1.17
Initial Bse:    0    0     0     0    0     0     0   87     2     1  137     0
Added Vol:      0    0     0     0    0     0     0  113     0     0    0     0
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:    0    0     0     0    0     0     0  200     2     1  137     0
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     0.82 0.82  0.82  0.82 0.82  0.82  0.82 0.82  0.82  0.82 0.82  0.82
PHF Volume:     0    0     0     0    0     0     0  243     3     1  167     0
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Final Vol.:     0    0     0     0    0     0     0  243     3     1  167     0
Critical Gap Module:
Critical Gp:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx   4.1 xxxx xxxxx
FollowUpTim:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx   2.2 xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx   246 xxxx xxxxx
Potent Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  1332 xxxx xxxxx
Move Cap.:   xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  1332 xxxx xxxxx
Volume/Cap:  xxxx xxxx  xxxx  xxxx xxxx  xxxx  xxxx xxxx  xxxx  0.00 xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
Queue:      xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx   0.0 xxxx xxxxx
Stopped Del:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx   7.7 xxxx xxxxx
LOS by Move:    *    *     *     *    *     *     *    *     *     A    *     *
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx    0 xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
SharedQueue:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx   0.0 xxxx xxxxx
Shrd StpDel:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx   7.7 xxxx xxxxx
Shared LOS:     *    *     *     *    *     *     *    *     *     A    *     *
ApproachDel:     xxxxxx           xxxxxx           xxxxxx           xxxxxx
ApproachLOS:        *                *                *                *
```

AV Solar Ranch One Project
8 MW_South Access Only

Scenario Report

Scenario:	2013 Proj Const PM_8 MW (South)
Command:	SM Alam
Volume:	2013 Project Const PM
Geometry:	FUTURE
Impact Fee:	Default Impact Fee
Trip Generation:	2013 Proj Const PM
Trip Distribution:	Default Trip Distribution
Paths:	Default Paths
Routes:	Default Routes
Configuration:	2013

AV Solar Ranch One Project
8 MW_South Access Only

Trip Generation Report

Forecast for 2013 Proj Const PM

Zone #	Subzone	Amount	Units	Rate In	Rate Out	Trips In	Trips Out	Total Trips	% Of Total
1	Const Worker	1.00	Onsite Managem	0.00	46.00	0	46	46	9.7
1	Const Worker	1.00	Const Worker	0.00	407.00	0	407	407	85.5
	Zone 1 Subtotal					0	453	453	95.2
3	Const Delive	1.00	Const Delivery	9.00	14.00	9	14	23	4.8
	Zone 3 Subtotal					9	14	23	4.8
TOTAL						9	467	476	100.0

AV Solar Ranch One Project
8 MW_South Access Only

Impact Analysis Report
Level Of Service

Intersection	Base LOS	Base Del/ Veh	Base V/ C	Future LOS	Future Del/ Veh	Future V/ C	Change in
# 1 SR-14 NB Ramps/SR-138	A	9.8	0.000	B	10.0	0.000	+ 0.163 D/V
# 2 SR-14 SB Ramps/SR-138	A	9.6	0.000	B	10.2	0.000	+ 0.612 D/V
# 3 90th Street W/SR-138	B	11.7	0.000	C	17.8	0.000	+ 6.149 D/V
# 4 110th Street W/SR-138	B	10.4	0.000	B	14.6	0.000	+ 4.246 D/V
# 5 160th Street W/SR-138	B	10.0	0.000	B	13.7	0.000	+ 3.639 D/V
# 6 170th Street W/SR-138	B	10.6	0.000	C	16.6	0.000	+ 5.966 D/V
# 7 La Petite Avenue/SR-138	A	9.6	0.000	B	10.4	0.000	+ 0.835 D/V
# 8 270th Street W/ SR-138	A	7.4	0.000	A	7.7	0.000	+ 0.266 D/V
# 9 Old Ridge Road/SR-138	B	10.6	0.000	B	11.6	0.000	+ 1.001 D/V

```
--------------------------------------------------------------------------------
                          AV Solar Ranch One Project
                            8 MW_South Access Only
--------------------------------------------------------------------------------
                      Level Of Service Computation Report
           2000 HCM Unsignalized Method (Future Volume Alternative)
********************************************************************************
Intersection #1 SR-14 NB Ramps/SR-138
********************************************************************************
Average Delay (sec/veh):      5.0   Worst Case Level Of Service:      B[ 10.0]
********************************************************************************
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign       Uncontrolled     Uncontrolled
Rights:           Include          Include          Include          Include
Lanes:        1  0  0  0  1   0  0  0  0  0   0  0  0  1  0   0  0  0  1  0
------------|---------------||---------------||---------------||---------------|
Volume Module: >> Count Date: 1 Dec 2008 <<
Base Vol:     115    0     3    0    0     0    0   40    19    0   35    14
Growth Adj:  1.17 1.17  1.17 1.17 1.17  1.17 1.17 1.17  1.17 1.17 1.17  1.17
Initial Bse:  135    0     4    0    0     0    0   47    22    0   41    16
Added Vol:      9    0     0    0    0     0    0    0    23    0    0     0
PasserByVol:    0    0     0    0    0     0    0    0     0    0    0     0
Initial Fut:  144    0     4    0    0     0    0   47    45    0   41    16
User Adj:    1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
PHF Adj:     0.92 0.92  0.92 0.92 0.92  0.92 0.92 0.92  0.92 0.92 0.92  0.92
PHF Volume:   156    0     4    0    0     0    0   51    49    0   45    18
Reduct Vol:     0    0     0    0    0     0    0    0     0    0    0     0
Final Vol.:   156    0     4    0    0     0    0   51    49    0   45    18
Critical Gap Module:
Critical Gp:  6.4 xxxx   6.2 xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
FollowUpTim:  3.5 xxxx   3.3 xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol:  129 xxxx    75  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Potent Cap.:  870 xxxx   991  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Move Cap.:    870 xxxx   991  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Volume/Cap:  0.18 xxxx  0.00  xxxx xxxx  xxxx  xxxx xxxx  xxxx  xxxx xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
Queue:         0.7 xxxx   0.0 xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Stopped Del: 10.0 xxxx   8.6 xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:    B    *     A     *    *     *     *    *     *     *    *     *
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
SharedQueue:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shrd StpDel:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shared LOS:     *    *     *     *    *     *     *    *     *     *    *     *
ApproachDel:      10.0           xxxxxx           xxxxxx           xxxxxx
ApproachLOS:        B                *                *                *
```

```
--------------------------------------------------------------------------------
                         AV Solar Ranch One Project
                           8 MW_South Access Only
--------------------------------------------------------------------------------
                     Level Of Service Computation Report
           2000 HCM Unsignalized Method (Future Volume Alternative)
********************************************************************************
Intersection #2 SR-14 SB Ramps/SR-138
********************************************************************************
Average Delay (sec/veh):      1.0   Worst Case Level Of Service:       B[ 10.2]
********************************************************************************
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign       Uncontrolled     Uncontrolled
Rights:           Include          Include          Include          Include
Lanes:        0  0  0  0  0    1  0  0  0  1    0  0  0  1  0    1  0  1  0  0
------------|---------------||---------------||---------------||---------------|
Volume Module: >> Count Date: 10 Dec 2008 <<
Base Vol:       0    0     0    11    0    27     0   48    84    29  117     0
Growth Adj:  1.17 1.17  1.17  1.17 1.17  1.17  1.17 1.17  1.17  1.17 1.17  1.17
Initial Bse:    0    0     0    13    0    32     0   56    98    34  137     0
Added Vol:      0    0     0     0    0     0     0   23   331     0    9     0
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:    0    0     0    13    0    32     0   79   429    34  146     0
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     0.92 0.92  0.92  0.92 0.92  0.92  0.92 0.92  0.92  0.92 0.92  0.92
PHF Volume:     0    0     0    14    0    34     0   86   467    37  159     0
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Final Vol.:     0    0     0    14    0    34     0   86   467    37  159     0
Critical Gap Module:
Critical Gp:xxxxx xxxx xxxxx   6.4 xxxx   6.2 xxxxx xxxx xxxxx   4.1 xxxx xxxxx
FollowUpTim:xxxxx xxxx xxxxx   3.5 xxxx   3.3 xxxxx xxxx xxxxx   2.2 xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol: xxxx xxxx xxxxx   552 xxxx   159  xxxx xxxx xxxxx   553 xxxx xxxxx
Potent Cap.: xxxx xxxx xxxxx   498 xxxx   892  xxxx xxxx xxxxx  1028 xxxx xxxxx
Move Cap.:   xxxx xxxx xxxxx   485 xxxx   892  xxxx xxxx xxxxx  1028 xxxx xxxxx
Volume/Cap:  xxxx xxxx  xxxx  0.03 xxxx  0.04  xxxx xxxx  xxxx  0.04 xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
Queue:      xxxxx xxxx xxxxx   0.1 xxxx   0.1 xxxxx xxxx xxxxx   0.1 xxxx xxxxx
Stopped Del:xxxxx xxxx xxxxx  12.6 xxxx   9.2 xxxxx xxxx xxxxx   8.6 xxxx xxxxx
LOS by Move:    *    *     *     B    *     A     *    *     *     A    *     *
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
SharedQueue:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shrd StpDel:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shared LOS:     *    *     *     *    *     *     *    *     *     *    *     *
ApproachDel:     xxxxxx             10.2            xxxxxx           xxxxxx
ApproachLOS:        *                 B                *                *
```

```
--------------------------------------------------------------------------------
                         AV Solar Ranch One Project
                           8 MW_South Access Only
--------------------------------------------------------------------------------
                     Level Of Service Computation Report
           2000 HCM Unsignalized Method (Future Volume Alternative)
********************************************************************************
Intersection #3 90th Street W/SR-138
********************************************************************************
Average Delay (sec/veh):      3.1   Worst Case Level Of Service:      C[ 17.8]
********************************************************************************
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign       Uncontrolled     Uncontrolled
Rights:           Include          Include          Include          Include
Lanes:        0  0  1! 0  0    0  0  1! 0  0    0  0  1! 0  0    0  0  1! 0  0
------------|---------------||---------------||---------------||---------------|
Volume Module: >> Count Date: 10 Dec 2008 <<
Base Vol:        4   35     6   19   41     5   10   88     8    8   79    38
Growth Adj:   1.17 1.17  1.17 1.17 1.17  1.17 1.17 1.17  1.17 1.17 1.17  1.17
Initial Bse:     5   41     7   22   48     6   12  103     9    9   92    44
Added Vol:       0    0     0    0    0     0    0  354     0    0    9     0
PasserByVol:     0    0     0    0    0     0    0    0     0    0    0     0
Initial Fut:     5   41     7   22   48     6   12  457     9    9  101    44
User Adj:     1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
PHF Adj:      0.92 0.92  0.92 0.92 0.92  0.92 0.92 0.92  0.92 0.92 0.92  0.92
PHF Volume:      5   45     8   24   52     6   13  497    10   10  110    48
Reduct Vol:      0    0     0    0    0     0    0    0     0    0    0     0
Final Vol.:      5   45     8   24   52     6   13  497    10   10  110    48
Critical Gap Module:
Critical Gp:  7.1  6.5   6.2  7.1  6.5   6.2  4.1 xxxx xxxxx   4.1 xxxx xxxxx
FollowUpTim:  3.5  4.0   3.3  3.5  4.0   3.3  2.2 xxxx xxxxx   2.2 xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol:  711  706   502  708  687   134  159 xxxx xxxxx   507 xxxx xxxxx
Potent Cap.:  350  363   574  352  372   920 1433 xxxx xxxxx  1068 xxxx xxxxx
Move Cap.:    306  356   574  310  365   920 1433 xxxx xxxxx  1068 xxxx xxxxx
Volume/Cap:  0.02 0.12  0.01 0.08 0.14  0.01 0.01 xxxx  xxxx  0.01 xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
Queue:       xxxxx xxxx xxxxx xxxxx xxxx xxxxx   0.0 xxxx xxxxx   0.0 xxxx xxxxx
Stopped Del:xxxxx xxxx xxxxx xxxxx xxxx xxxxx   7.5 xxxx xxxxx   8.4 xxxx xxxxx
LOS by Move:    *    *     *    *    *     *    A    *     *    A    *     *
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx  369 xxxxx  xxxx  363 xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
SharedQueue:xxxxx  0.5 xxxxx xxxxx  0.9 xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shrd StpDel:xxxxx 16.5 xxxxx xxxxx 17.8 xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shared LOS:     *    C     *    *    C     *    *    *     *    *    *     *
ApproachDel:      16.5             17.8            xxxxxx           xxxxxx
ApproachLOS:        C                C                *                *
```

```
--------------------------------------------------------------------------------
                         AV Solar Ranch One Project
                           8 MW_South Access Only
--------------------------------------------------------------------------------
                     Level Of Service Computation Report
          2000 HCM Unsignalized Method (Future Volume Alternative)
********************************************************************************
Intersection #4 110th Street W/SR-138
********************************************************************************
Average Delay (sec/veh):      0.4   Worst Case Level Of Service:       B[ 14.6]
********************************************************************************
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign       Uncontrolled     Uncontrolled
Rights:           Include          Include          Include          Include
Lanes:        0  1  0  0  0    0  0  0  1  0    0  0  1  0  0    0  0  1  0  0
------------|---------------||---------------||---------------||---------------|
Volume Module: >> Count Date: 10 Dec 2008 <<
Base Vol:       6    4     0     0    2     2     0  116     0     0   83     0
Growth Adj:  1.17 1.17  1.17  1.17 1.17  1.17  1.17 1.17  1.17  1.17 1.17  1.17
Initial Bse:    7    5     0     0    2     2     0  136     0     0   97     0
Added Vol:      0    0     0     0    0     0     0  354     0     0    9     0
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:    7    5     0     0    2     2     0  490     0     0  106     0
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     0.92 0.92  0.92  0.92 0.92  0.92  0.92 0.92  0.92  0.92 0.92  0.92
PHF Volume:     8    5     0     0    3     3     0  532     0     0  115     0
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Final Vol.:     8    5     0     0    3     3     0  532     0     0  115     0
Critical Gap Module:
Critical Gp:  7.1  6.5 xxxxx xxxxx  6.5   6.2 xxxxx xxxx xxxxx xxxxx xxxx xxxxx
FollowUpTim:  3.5  4.0 xxxxx xxxxx  4.0   3.3 xxxxx xxxx xxxxx xxxxx xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol:  650  648 xxxxx  xxxx  648   115  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Potent Cap.:  385  392 xxxxx  xxxx  392   942  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Move Cap.:    382  392 xxxxx  xxxx  392   942  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Volume/Cap:  0.02 0.01  xxxx  xxxx 0.01  0.00  xxxx xxxx  xxxx  xxxx xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
Queue:       xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Stopped Del:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:    *    *     *     *    *     *     *    *     *     *    *     *
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.:  386 xxxx xxxxx  xxxx xxxx   554  xxxx xxxx xxxxx  xxxx xxxx xxxxx
SharedQueue:  0.1 xxxx xxxxx xxxxx xxxx   0.0 xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shrd StpDel: 14.6 xxxx xxxxx xxxxx xxxx  11.6 xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shared LOS:     B    *     *     *    *     B     *    *     *     *    *     *
ApproachDel:       14.6             11.6            xxxxxx           xxxxxx
ApproachLOS:         B                B                *                *
```

```
--------------------------------------------------------------------------------
                          AV Solar Ranch One Project
                            8 MW_South Access Only
--------------------------------------------------------------------------------

                      Level Of Service Computation Report
           2000 HCM Unsignalized Method (Future Volume Alternative)
********************************************************************************
Intersection #5 160th Street W/SR-138
********************************************************************************
Average Delay (sec/veh):      0.2   Worst Case Level Of Service:      B[ 13.7]
********************************************************************************
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign       Uncontrolled     Uncontrolled
Rights:           Include          Include          Include          Include
Lanes:        0  0  1! 0  0    0  0  1! 0  0    0  0  1! 0  0    0  0  1! 0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:       1    1     1     1    1     1     1  123     1     1   87     1
Growth Adj:  1.17 1.17  1.17  1.17 1.17  1.17  1.17 1.17  1.17  1.17 1.17  1.17
Initial Bse:    1    1     1     1    1     1     1  144     1     1  102     1
Added Vol:      0    0     0     0    0     0     0  354     0     0    9     0
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:    1    1     1     1    1     1     1  498     1     1  111     1
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     0.92 0.92  0.92  0.92 0.92  0.92  0.92 0.92  0.92  0.92 0.92  0.92
PHF Volume:     1    1     1     1    1     1     1  541     1     1  120     1
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Final Vol.:     1    1     1     1    1     1     1  541     1     1  120     1
Critical Gap Module:
Critical Gp:  7.1  6.5   6.2   7.1  6.5   6.2   4.1 xxxx xxxxx   4.1 xxxx xxxxx
FollowUpTim:  3.5  4.0   3.3   3.5  4.0   3.3   2.2 xxxx xxxxx   2.2 xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol:  669  669   542   669  669   121   122 xxxx xxxxx   542 xxxx xxxxx
Potent Cap.:  374  381   544   374  381   936  1478 xxxx xxxxx  1036 xxxx xxxxx
Move Cap.:    372  381   544   371  381   936  1478 xxxx xxxxx  1036 xxxx xxxxx
Volume/Cap:  0.00 0.00  0.00  0.00 0.00  0.00  0.00 xxxx  xxxx  0.00 xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
Queue:       xxxxx xxxx xxxxx xxxxx xxxx xxxxx   0.0 xxxx xxxxx   0.0 xxxx xxxxx
Stopped Del:xxxxx xxxx xxxxx xxxxx xxxx xxxxx   7.4 xxxx xxxxx   8.5 xxxx xxxxx
LOS by Move:    *    *     *     *    *     *     A    *     *     A    *     *
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx  419 xxxxx  xxxx  470 xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
SharedQueue:xxxxx  0.0 xxxxx xxxxx  0.0 xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shrd StpDel:xxxxx 13.7 xxxxx xxxxx 12.7 xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shared LOS:     *    B     *     *    B     *     *    *     *     *    *     *
ApproachDel:       13.7             12.7            xxxxxx           xxxxxx
ApproachLOS:         B                B                *                *
```

```
--------------------------------------------------------------------------------
                         AV Solar Ranch One Project
                           8 MW_South Access Only
--------------------------------------------------------------------------------
                     Level Of Service Computation Report
           2000 HCM Unsignalized Method (Future Volume Alternative)
********************************************************************************
Intersection #6 170th Street W/SR-138
********************************************************************************
Average Delay (sec/veh):     10.9   Worst Case Level Of Service:      C[ 16.6]
********************************************************************************
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign       Uncontrolled     Uncontrolled
Rights:           Include          Include          Include          Include
Lanes:        0  0  1! 0  0    0  0  1! 0  0    0  0  1! 0  0    0  0  1! 0  0
------------|---------------||---------------||---------------||---------------|
Volume Module: >> Count Date: 11 Dec 2008 <<
Base Vol:        2    3     0     4    1     6     5  119     4     0   86     1
Growth Adj:   1.17 1.17  1.17  1.17 1.17  1.17  1.17 1.17  1.17  1.17 1.17  1.17
Initial Bse:     2    4     0     5    1     7     6  139     5     0  101     1
Added Vol:     113    0   354     0    0     0     0    0     0     9    0     0
PasserByVol:     0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:   115    4   354     5    1     7     6  139     5     9  101     1
User Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:      0.92 0.92  0.92  0.92 0.92  0.92  0.92 0.92  0.92  0.92 0.92  0.92
PHF Volume:    125    4   385     5    1     8     6  151     5    10  109     1
Reduct Vol:      0    0     0     0    0     0     0    0     0     0    0     0
Final Vol.:    125    4   385     5    1     8     6  151     5    10  109     1
Critical Gap Module:
Critical Gp:   7.1  6.5   6.2   7.1  6.5   6.2   4.1 xxxx xxxxx   4.1 xxxx xxxxx
FollowUpTim:   3.5  4.0   3.3   3.5  4.0   3.3   2.2 xxxx xxxxx   2.2 xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol:   301  297   154   490  299   110   111 xxxx xxxxx   156 xxxx xxxxx
Potent Cap.:   656  618   897   492  617   949  1492 xxxx xxxxx  1436 xxxx xxxxx
Move Cap.:     644  611   897   277  610   949  1492 xxxx xxxxx  1436 xxxx xxxxx
Volume/Cap:   0.19 0.01  0.43  0.02 0.00  0.01  0.00 xxxx  xxxx  0.01 xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
Queue:       xxxxx xxxx xxxxx xxxxx xxxx xxxxx   0.0 xxxx xxxxx   0.0 xxxx xxxxx
Stopped Del:xxxxx xxxx xxxxx xxxxx xxxx xxxxx   7.4 xxxx xxxxx   7.5 xxxx xxxxx
LOS by Move:     *    *     *     *    *     *     A    *     *     A    *     *
Movement:      LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.:  xxxx  816 xxxxx  xxxx  491 xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
SharedQueue:xxxxx  4.6 xxxxx xxxxx  0.1 xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shrd StpDel:xxxxx 16.6 xxxxx xxxxx 12.5 xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shared LOS:      *    C     *     *    B     *     *    *     *     *    *     *
ApproachDel:        16.6             12.5            xxxxxx           xxxxxx
ApproachLOS:          C                B                *                *
```

```
--------------------------------------------------------------------------------
                         AV Solar Ranch One Project
                           8 MW_South Access Only
--------------------------------------------------------------------------------
                       Level Of Service Computation Report
            2000 HCM Unsignalized Method (Future Volume Alternative)
********************************************************************************
Intersection #7 La Petite Avenue/SR-138
********************************************************************************
Average Delay (sec/veh):      1.2   Worst Case Level Of Service:      B[ 10.4]
********************************************************************************
Approach:      North Bound      South Bound       East Bound        West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign       Uncontrolled      Uncontrolled
Rights:           Include          Include          Include           Include
Lanes:        0  0  0  0  0    0  0  1! 0  0    0  1  0  0  0    0  0  0  1  0
------------|---------------||---------------||---------------||---------------|
Volume Module: >> Count Date: 10 Dec 2008 <<
Base Vol:       0    0     0    11    0    14    20  119     0     0   68    19
Growth Adj:  1.17 1.17  1.17  1.17 1.17  1.17  1.17 1.17  1.17  1.17 1.17  1.17
Initial Bse:    0    0     0    13    0    16    23  139     0     0   80    22
Added Vol:      0    0     0     0    0     0     0    0     0     0  113     0
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:    0    0     0    13    0    16    23  139     0     0  193    22
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     0.92 0.92  0.92  0.92 0.92  0.92  0.92 0.92  0.92  0.92 0.92  0.92
PHF Volume:     0    0     0    14    0    18    25  151     0     0  209    24
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Final Vol.:     0    0     0    14    0    18    25  151     0     0  209    24
Critical Gap Module:
Critical Gp:xxxxx xxxx xxxxx   6.4 xxxx   6.2   4.1 xxxx xxxxx xxxxx xxxx xxxxx
FollowUpTim:xxxxx xxxx xxxxx   3.5 xxxx   3.3   2.2 xxxx xxxxx xxxxx xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol: xxxx xxxx xxxxx   424 xxxx   221   233 xxxx xxxxx  xxxx xxxx xxxxx
Potent Cap.: xxxx xxxx xxxxx   591 xxxx   823  1346 xxxx xxxxx  xxxx xxxx xxxxx
Move Cap.:   xxxx xxxx xxxxx   582 xxxx   823  1346 xxxx xxxxx  xxxx xxxx xxxxx
Volume/Cap:  xxxx xxxx  xxxx  0.02 xxxx  0.02  0.02 xxxx  xxxx  xxxx xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
Queue:      xxxxx xxxx xxxxx xxxxx xxxx xxxxx   0.1 xxxx xxxxx xxxxx xxxx xxxxx
Stopped Del:xxxxx xxxx xxxxx xxxxx xxxx xxxxx   7.7 xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:    *    *     *     *    *     *     A    *     *     *    *     *
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx  696 xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
SharedQueue:xxxxx xxxx xxxxx xxxxx  0.1 xxxxx   0.1 xxxx xxxxx xxxxx xxxx xxxxx
Shrd StpDel:xxxxx xxxx xxxxx xxxxx 10.4 xxxxx   7.7 xxxx xxxxx xxxxx xxxx xxxxx
Shared LOS:     *    *     *     *    B     *     A    *     *     *    *     *
ApproachDel:     xxxxxx            10.4            xxxxxx            xxxxxx
ApproachLOS:        *                B                *                 *
```

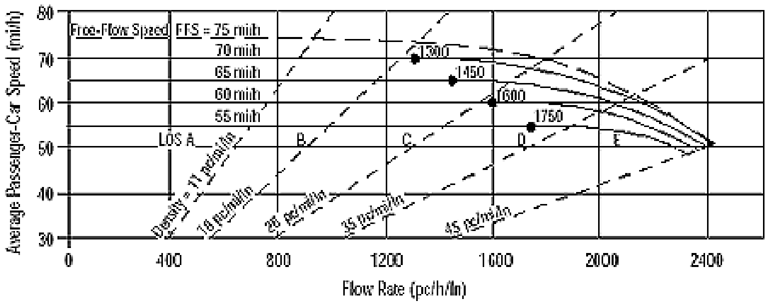
```
--------------------------------------------------------------------------------
                         AV Solar Ranch One Project
                           8 MW_South Access Only
--------------------------------------------------------------------------------
                     Level Of Service Computation Report
          2000 HCM Unsignalized Method (Future Volume Alternative)
********************************************************************************
Intersection #8 270th Street W/ SR-138
********************************************************************************
Average Delay (sec/veh):      0.0   Worst Case Level Of Service:      A[  7.7]
********************************************************************************
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign       Uncontrolled     Uncontrolled
Rights:           Include          Include          Include          Include
Lanes:        0  0  0  0  0   0  0  1! 0  0   1  0  1  0  0   0  0  1  0  0
------------|---------------||---------------||---------------||---------------|
Volume Module: >> Count Date: 11 Dec 2008 <<
Base Vol:       0    0     0     0    0     0     2  158     0     0   97     0
Growth Adj:  1.17 1.17  1.17  1.17 1.17  1.17  1.17 1.17  1.17  1.17 1.17  1.17
Initial Bse:    0    0     0     0    0     0     2  185     0     0  113     0
Added Vol:      0    0     0     0    0     0     0    0     0     0  113     0
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:    0    0     0     0    0     0     2  185     0     0  226     0
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     0.92 0.92  0.92  0.92 0.92  0.92  0.92 0.92  0.92  0.92 0.92  0.92
PHF Volume:     0    0     0     0    0     0     3  201     0     0  246     0
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Final Vol.:     0    0     0     0    0     0     3  201     0     0  246     0
Critical Gap Module:
Critical Gp:xxxxx xxxx xxxxx xxxxx xxxx xxxxx   4.1 xxxx xxxxx xxxxx xxxx xxxxx
FollowUpTim:xxxxx xxxx xxxxx xxxxx xxxx xxxxx   2.2 xxxx xxxxx xxxxx xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol: xxxx xxxx xxxxx  xxxx xxxx xxxxx   246 xxxx xxxxx  xxxx xxxx xxxxx
Potent Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  1332 xxxx xxxxx  xxxx xxxx xxxxx
Move Cap.:   xxxx xxxx xxxxx  xxxx xxxx xxxxx  1332 xxxx xxxxx  xxxx xxxx xxxxx
Volume/Cap:  xxxx xxxx  xxxx  xxxx xxxx  xxxx  0.00 xxxx  xxxx  xxxx xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
Queue:      xxxxx xxxx xxxxx xxxxx xxxx xxxxx   0.0 xxxx xxxxx xxxxx xxxx xxxxx
Stopped Del:xxxxx xxxx xxxxx xxxxx xxxx xxxxx   7.7 xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:    *    *     *     *    *     *     A    *     *     *    *     *
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx    0 xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
SharedQueue:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shrd StpDel:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shared LOS:     *    *     *     *    *     *     *    *     *     *    *     *
ApproachDel:     xxxxxx           xxxxxx           xxxxxx           xxxxxx
ApproachLOS:        *                *                *                *
```

```
--------------------------------------------------------------------------------
                         AV Solar Ranch One Project
                           8 MW_South Access Only
--------------------------------------------------------------------------------
                     Level Of Service Computation Report
          2000 HCM Unsignalized Method (Future Volume Alternative)
********************************************************************************
Intersection #9 Old Ridge Road/SR-138
********************************************************************************
Average Delay (sec/veh):      0.1   Worst Case Level Of Service:      B[ 11.6]
********************************************************************************
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign       Uncontrolled     Uncontrolled
Rights:           Include          Include          Include          Include
Lanes:        1  0  0  0  0    0  0  0  0  0    0  0  0  1  0    0  0  1  0  0
------------|---------------||---------------||---------------||---------------|
Volume Module: >> Count Date: 11 Dec 2008 <<
Base Vol:        2    0     0     0    0     0     0  152     5     0  130     0
Growth Adj:   1.17 1.17  1.17  1.17 1.17  1.17  1.17 1.17  1.17  1.17 1.17  1.17
Initial Bse:     2    0     0     0    0     0     0  178     6     0  152     0
Added Vol:       0    0     0     0    0     0     0    0     0     0  113     0
PasserByVol:     0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:     2    0     0     0    0     0     0  178     6     0  265     0
User Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:      0.92 0.92  0.92  0.92 0.92  0.92  0.92 0.92  0.92  0.92 0.92  0.92
PHF Volume:      3    0     0     0    0     0     0  193     6     0  288     0
Reduct Vol:      0    0     0     0    0     0     0    0     0     0    0     0
Final Vol.:      3    0     0     0    0     0     0  193     6     0  288     0
Critical Gap Module:
Critical Gp:   6.4 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
FollowUpTim:   3.5 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol:   485 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Potent Cap.:   545 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Move Cap.:     545 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Volume/Cap:   0.00 xxxx  xxxx  xxxx xxxx  xxxx  xxxx xxxx  xxxx  xxxx xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
Queue:         0.0 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Stopped Del: 11.6 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:     B    *     *     *    *     *     *    *     *     *    *     *
Movement:      LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
SharedQueue:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shrd StpDel:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shared LOS:      *    *     *     *    *     *     *    *     *     *    *     *
ApproachDel:        11.6            xxxxxx            xxxxxx            xxxxxx
ApproachLOS:          B                *                 *                 *
```

Traffix 7.6.0115 (c) 2004 Dowling Assoc. Licensed to URS CORP., SANTA ANA, CA

APPENDIX C
ROADWAY SEGMENT LOS WORKSHEETS

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p, S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p, S, D

General Information

Analyst	*Gene Kim*
Agency or Company	*URS*
Date Performed	*03/12/2010*
Analysis Time Period	

Site Information

Highway/Direction of Travel	*I-5*
From/To	
Jurisdiction	
Analysis Year	*Year 2013*

Project Description Year 2013 With Proj 8MW AM

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*2979*	veh/h	Peak-Hour Factor, PHF	*0.90*
AADT		veh/day	%Trucks and Buses, P_T	*25*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.889*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Shoulder Lat. Clearance	*6.0*	ft
Interchange Density	*0.50*	I/mi
Number of Lanes, N	*4*	
FFS (measured)	*70.0*	mi/h
Base free-flow Speed, BFFS		mi/h

Calc Speed Adj and FFS

f_{LW}		mi/h
f_{LC}		mi/h
f_{ID}		mi/h
f_N		mi/h
FFS	*70.0*	mi/h

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*931*	pc/h/ln
S	*70.0*	mi/h
D = v_p / S	*13.3*	pc/mi/ln
LOS	*B*	

Design (N)

Design (N)

Design LOS		
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)		pc/h
S		mi/h
D = v_p / S		pc/mi/ln
Required Number of Lanes, N		

Glossary

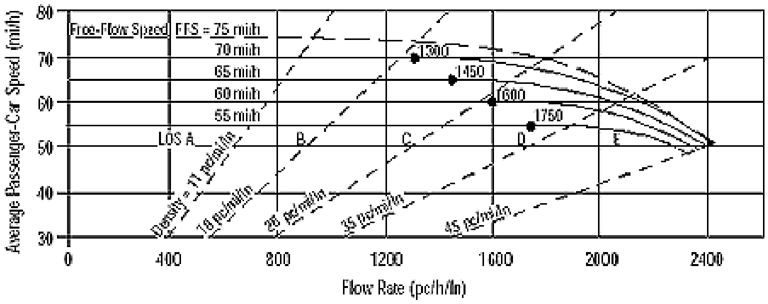
N - Number of lanes
S - Speed
V - Hourly volume
D - Density
v_p - Flow rate
FFS - Free-flow speed
LOS - Level of service
BFFS - Base free-flow speed
DDHV - Directional design hour volume

Factor Location

E_R - Exhibits23-8, 23-10
f_{LW} - Exhibit 23-4
E_T - Exhibits 23-8, 23-10, 23-11
f_{LC} - Exhibit 23-5
f_p - Page 23-12
f_N - Exhibit 23-6
LOS, S, FFS, v_p - Exhibits 23-2, 23-3
f_{ID} - Exhibit 23-7

Copyright © 2005 University of Florida, All Rights Reserved
HCS+™ Version 5.2 Generated: 3/12/2010 4:57 PM

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p, S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p, S, D

General Information

Analyst	*Gene Kim*
Agency or Company	*URS*
Date Performed	*03/12/2010*
Analysis Time Period	*PM*

Site Information

Highway/Direction of Travel	*I-5*
From/To	
Jurisdiction	
Analysis Year	*Year 2013*

Project Description Year 2013 With Proj 8MW PM

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*2923*	veh/h	Peak-Hour Factor, PHF	*0.90*
AADT		veh/day	%Trucks and Buses, P_T	*25*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.889*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Shoulder Lat. Clearance	*6.0*	ft
Interchange Density	*0.50*	I/mi
Number of Lanes, N	*4*	
FFS (measured)	*70.0*	mi/h
Base free-flow Speed, BFFS		mi/h

Calc Speed Adj and FFS

f_{LW}		mi/h
f_{LC}		mi/h
f_{ID}		mi/h
f_N		mi/h
FFS	*70.0*	mi/h

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*913*	pc/h/ln
S	*70.0*	mi/h
D = v_p / S	*13.0*	pc/mi/ln
LOS	*B*	

Design (N)

Design (N)

Design LOS		
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)		pc/h
S		mi/h
D = v_p / S		pc/mi/ln
Required Number of Lanes, N		

Glossary

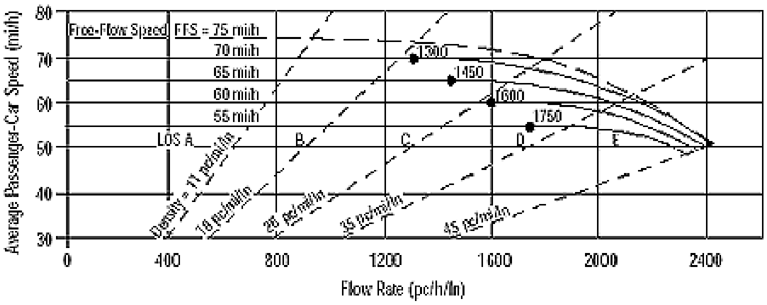
N - Number of lanes
V - Hourly volume
v_p - Flow rate
LOS - Level of service
DDHV - Directional design hour volume
S - Speed
D - Density
FFS - Free-flow speed
BFFS - Base free-flow speed

Factor Location

E_R - Exhibits23-8, 23-10
E_T - Exhibits 23-8, 23-10, 23-11
f_p - Page 23-12
LOS, S, FFS, v_p - Exhibits 23-2, 23-3
f_{LW} - Exhibit 23-4
f_{LC} - Exhibit 23-5
f_N - Exhibit 23-6
f_{ID} - Exhibit 23-7

Copyright © 2005 University of Florida, All Rights Reserved HCS+TM Version 5.2 Generated: 3/12/2010 4:58 PM

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p, S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p, S, D

General Information

Analyst	Gene Kim	Highway/Direction of Travel	SR 14 (South)
Agency or Company	URS	From/To	
Date Performed	03/12/2010	Jurisdiction	
Analysis Time Period	AM	Analysis Year	2013

Project Description Year 2013 With Proj 8MW AM

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	2121	veh/h	Peak-Hour Factor, PHF	0.90
AADT		veh/day	%Trucks and Buses, P_T	7
Peak-Hr Prop. of AADT, K			%RVs, P_R	0
Peak-Hr Direction Prop, D			General Terrain:	Level
DDHV = AADT x K x D		veh/h	Grade % Length	mi
Driver type adjustment	1.00		Up/Down %	

Calculate Flow Adjustments

f_p	1.00	E_R	1.2
E_T	1.5	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	0.966

Speed Inputs / Calc Speed Adj and FFS

Lane Width	12.0	ft	f_{LW}		mi/h
Rt-Shoulder Lat. Clearance	6.0	ft	f_{LC}		mi/h
Interchange Density	0.50	I/mi	f_{ID}		mi/h
Number of Lanes, N	2		f_N		mi/h
FFS (measured)	70.0	mi/h	FFS	70.0	mi/h
Base free-flow Speed, BFFS		mi/h			

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	1220	pc/h/ln
S	70.0	mi/h
D = v_p / S	17.4	pc/mi/ln
LOS	B	

Design (N)

Design (N)

Design LOS		
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)		pc/h
S		mi/h
D = v_p / S		pc/mi/ln
Required Number of Lanes, N		

Glossary

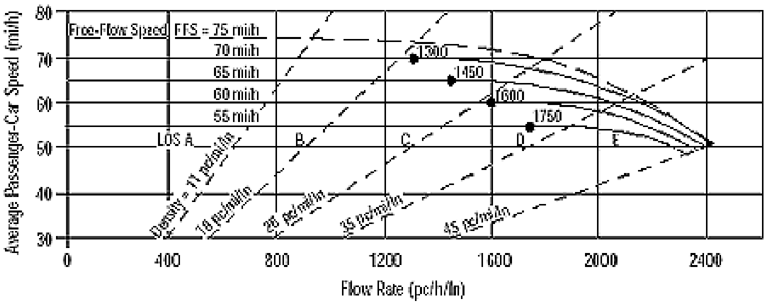
N - Number of lanes S - Speed
V - Hourly volume D - Density
v_p - Flow rate FFS - Free-flow speed
LOS - Level of service BFFS - Base free-flow speed
DDHV - Directional design hour volume

Factor Location

E_R - Exhibits23-8, 23-10 f_{LW} - Exhibit 23-4
E_T - Exhibits 23-8, 23-10, 23-11 f_{LC} - Exhibit 23-5
f_p - Page 23-12 f_N - Exhibit 23-6
LOS, S, FFS, v_p - Exhibits 23-2, 23-3 f_{ID} - Exhibit 23-7

Copyright © 2005 University of Florida, All Rights Reserved HCS+™ Version 5.2 Generated: 3/12/2010 5:01 PM

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p, S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p, S, D

General Information / *Site Information*

Analyst	*Gene Kim*	Highway/Direction of Travel	*SR 14 (South)*
Agency or Company	*URS*	From/To	
Date Performed	*03/12/2010*	Jurisdiction	
Analysis Time Period	*PM*	Analysis Year	*2013*

Project Description Year 2013 With Proj 8MW PM

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*2113*	veh/h	Peak-Hour Factor, PHF	*0.90*
AADT		veh/day	%Trucks and Buses, P_T	*7*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.966*

Speed Inputs / Calc Speed Adj and FFS

Lane Width	*12.0*	ft	f_{LW}		mi/h
Rt-Shoulder Lat. Clearance	*6.0*	ft	f_{LC}		mi/h
Interchange Density	*0.50*	I/mi	f_{ID}		mi/h
Number of Lanes, N	*2*		f_N		mi/h
FFS (measured)	*70.0*	mi/h	FFS	*70.0*	mi/h
Base free-flow Speed, BFFS		mi/h			

LOS and Performance Measures / Design (N)

Operational (LOS)			Design (N)	
			Design LOS	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1215*	pc/h/ln	v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h
S	*70.0*	mi/h	S	mi/h
D = v_p / S	*17.4*	pc/mi/ln	D = v_p / S	pc/mi/ln
LOS	*B*		Required Number of Lanes, N	

Glossary

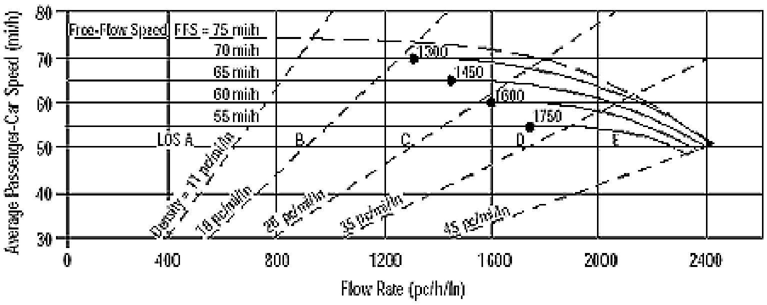
N - Number of lanes S - Speed
V - Hourly volume D - Density
v_p - Flow rate FFS - Free-flow speed
LOS - Level of service BFFS - Base free-flow speed
DDHV - Directional design hour volume

Factor Location

E_R - Exhibits23-8, 23-10 f_{LW} - Exhibit 23-4
E_T - Exhibits 23-8, 23-10, 23-11 f_{LC} - Exhibit 23-5
f_p - Page 23-12 f_N - Exhibit 23-6
LOS, S, FFS, v_p - Exhibits 23-2, 23-3 f_{ID} - Exhibit 23-7

Copyright © 2005 University of Florida, All Rights Reserved *HCS+*™ Version 5.2 Generated: 3/12/2010 5:02 PM

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p, S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p, S, D

General Information

Analyst	*Gene Kim*	Highway/Direction of Travel	*SR-14 (North)*
Agency or Company	*URS*	From/To	
Date Performed	*03/12/2010*	Jurisdiction	
Analysis Time Period	*AM*	Analysis Year	*2013*

(Site Information in right columns.)

Project Description Year 2013 With Proj 8MW AM

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*2003*	veh/h	Peak-Hour Factor, PHF	*0.90*
AADT		veh/day	%Trucks and Buses, P_T	*7*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.966*

Speed Inputs / Calc Speed Adj and FFS

Lane Width	*12.0*	ft	f_{LW}		mi/h
Rt-Shoulder Lat. Clearance	*6.0*	ft	f_{LC}		mi/h
Interchange Density	*0.50*	I/mi	f_{ID}		mi/h
Number of Lanes, N	*2*		f_N		mi/h
FFS (measured)	*70.0*	mi/h	FFS	*70.0*	mi/h
Base free-flow Speed, BFFS		mi/h			

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1152*	pc/h/ln
S	*70.0*	mi/h
D = v_p / S	*16.5*	pc/mi/ln
LOS	*B*	

Design (N)

Design (N)

Design LOS		
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)		pc/h
S		mi/h
D = v_p / S		pc/mi/ln
Required Number of Lanes, N		

Glossary

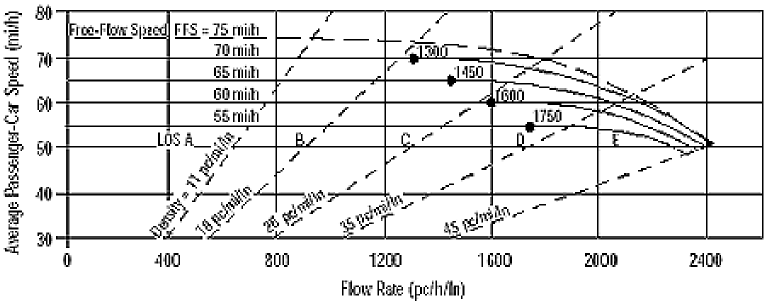
N - Number of lanes
S - Speed
V - Hourly volume
D - Density
v_p - Flow rate
FFS - Free-flow speed
LOS - Level of service
BFFS - Base free-flow speed
DDHV - Directional design hour volume

Factor Location

E_R - Exhibits23-8, 23-10
f_{LW} - Exhibit 23-4
E_T - Exhibits 23-8, 23-10, 23-11
f_{LC} - Exhibit 23-5
f_p - Page 23-12
f_N - Exhibit 23-6
LOS, S, FFS, v_p - Exhibits 23-2, 23-3
f_{ID} - Exhibit 23-7

Copyright © 2005 University of Florida, All Rights Reserved HCS+™ Version 5.2 Generated: 3/12/2010 5:05 PM

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p, S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p, S, D

General Information		***Site Information***	
Analyst	*Gene Kim*	Highway/Direction of Travel	*SR-14 (North)*
Agency or Company	*URS*	From/To	
Date Performed	*03/12/2010*	Jurisdiction	
Analysis Time Period	*PM*	Analysis Year	*2013*

Project Description Year 2013 With Proj 8MW PM

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*1995*	veh/h	Peak-Hour Factor, PHF	*0.90*
AADT		veh/day	%Trucks and Buses, P_T	*7*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	f_{HV} = $1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.966*

Speed Inputs			**Calc Speed Adj and FFS**		
Lane Width	*12.0*	ft	f_{LW}		mi/h
Rt-Shoulder Lat. Clearance	*6.0*	ft	f_{LC}		mi/h
Interchange Density	*0.50*	I/mi	f_{ID}		mi/h
Number of Lanes, N	*2*		f_N		mi/h
FFS (measured)	*70.0*	mi/h	FFS	*70.0*	mi/h
Base free-flow Speed, BFFS		mi/h			

LOS and Performance Measures			**Design (N)**	
Operational (LOS)			Design (N)	
			Design LOS	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1147*	pc/h/ln	v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h
S	*70.0*	mi/h	S	mi/h
D = v_p / S	*16.4*	pc/mi/ln	D = v_p / S	pc/mi/ln
LOS	*B*		Required Number of Lanes, N	

Glossary		**Factor Location**	
N - Number of lanes	S - Speed	E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
v_p - Flow rate	FFS - Free-flow speed	f_p - Page 23-12	f_N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

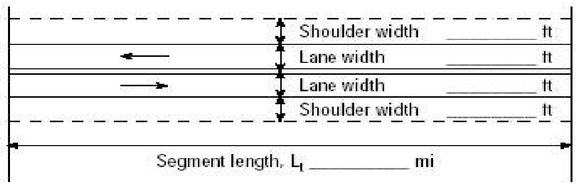
Copyright © 2005 University of Florida, All Rights Reserved HCS+™ Version 5.2 Generated: 3/12/2010 5:06 PM

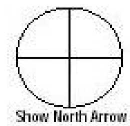
TWO-WAY TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		**Site Information**	
Analyst	*Gene Kim*	Highway	*SR 138*
Agency or Company	*URS*	From/To	*East of 170th Avenue*
Date Performed	*03/12/2010*	Jurisdiction	*Los Angeles County*
Analysis Time Period	*2013 Proj Cons AM_8 MW*	Analysis Year	*2013*

Project Description: *Nextlight Antelope Valley EIR*

Input Data





☑ Class I highway ☐ Class II highway

Terrain ☑ Level ☐ Rolling

Two-way hourly volume	*539* veh/h
Directional split	*80* / *20*
Peak-hour factor, PHF	*0.85*
No-passing zone	*0*
% Trucks and Buses , P_T	*20* %
% Recreational vehicles, P_R	*4%*
Access points/ *mi*	*8*

Average Travel Speed

Grade adjustment factor, f_G (Exhibit 20-7)	*1.00*
Passenger-car equivalents for trucks, E_T (Exhibit 20-9)	*1.2*
Passenger-car equivalents for RVs, E_R (Exhibit 20-9)	*1.0*
Heavy-vehicle adjustment factor, f_{HV}=1/ (1+ $P_T(E_T$-1)+$P_R(E_R$-1))	*0.962*
Two-way flow rate[1], v_p (pc/h)=V/ (PHF * f_G * f_{HV})	*659*
v_p * highest directional split proportion[2] (pc/h)	*527*

Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed	
Field Measured speed, S_{FM}	mi/h	Base free-flow speed, $BFFS_{FM}$	*55.0* mi/h
Observed volume, V_f	veh/h	Adj. for lane width and shoulder width[3], f_{LS} (Exhibit 20-5)	*0.0* mi/h
Free-flow speed, FFS FFS=S_{FM}+0.00776(V_f/ f_{HV})	mi/h	Adj. for access points, f_A (Exhibit 20-6)	*2.0* mi/h
		Free-flow speed, FFS (FSS=BFFS-f_{LS}-f_A)	*53.0* mi/h

Adj. for no-passing zones, f_{np} (*mi/h*) (Exhibit 20-11)	*0.0*
Average travel speed, ATS (*mi/h*) ATS=FFS-0.00776v_p-f_{np}	*47.9*

Percent Time-Spent-Following

Grade Adjustment factor, f_G (Exhibit 20-8)	*1.00*
Passenger-car equivalents for trucks, E_T (Exhibit 20-10)	*1.1*
Passenger-car equivalents for RVs, E_R (Exhibit 20-10)	*1.0*
Heavy-vehicle adjustment factor, f_{HV}=1/ (1+ $P_T(E_T$-1)+$P_R(E_R$-1))	*0.980*
Two-way flow rate[1], v_p (pc/h)=V/ (PHF * f_G * f_{HV})	*647*
v_p * highest directional split proportion[2] (pc/h)	*518*
Base percent time-spent-following, BPTSF(%)=100(1-$e^{-0.000879v_p}$)	*43.4*
Adj. for directional distribution and no-passing zone, $f_{d/hp}$(%)(Exh. 20-12)	*0.0*
Percent time-spent-following, PTSF(%)=BPTSF+$f_{d/np}$	*43.4*

Level of Service and Other Performance Measures

Level of service, LOS (Exhibit 20-3 for Class I or 20-4 for Class II)	*C*
Volume to capacity ratio, v/c=V_p/ 3,200	*0.21*
Peak 15-min veh-miles of travel, VMT_{15} (veh- *mi*)= 0.25L_t(V/PHF)	*0*
Peak-hour vehicle-miles of travel, VMT_{60}(veh- *mi*)=V*L_t	*0*
Peak 15-min total travel time, TT_{15}(veh-h)= VMT_{15}/ATS	*0.0*

Notes

1. If Vp >= 3,200 pc/h, terminate analysis-the LOS is F.
2. If highest directional split Vp>= 1,700 pc/h, terminated anlysis-the LOS is F.

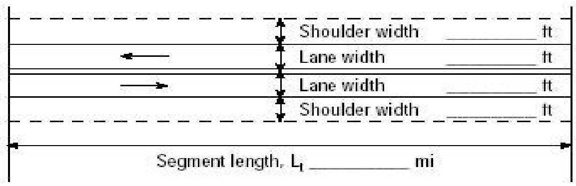
Copyright © 2005 University of Florida, All Rights Reserved HCS+™ Version 5.2 Generated: 3/12/2010 5:08 PM

TWO-WAY TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		Site Information	
Analyst	*Gene Kim*	Highway	*SR 138*
Agency or Company	*URS*	From/To	*East of 170th Avenue*
Date Performed	*11/18/2009*	Jurisdiction	*Los Angeles County*
Analysis Time Period	*2013 Proj Cons PM_8 MW*	Analysis Year	*2013*

Project Description: *Nextlight Antelope Valley EIR*

Input Data



☑ Class I highway ☐ Class II highway

Terrain ☑ Level ☐ Rolling

Two-way hourly volume	*610* veh/h
Directional split	*80* / *20*
Peak-hour factor, PHF	*0.85*
No-passing zone	*0*
% Trucks and Buses , P_T	*20* %
% Recreational vehicles, P_R	*4%*
Access points/ *mi*	*8*

Average Travel Speed

Grade adjustment factor, f_G (Exhibit 20-7)	*1.00*
Passenger-car equivalents for trucks, E_T (Exhibit 20-9)	*1.2*
Passenger-car equivalents for RVs, E_R (Exhibit 20-9)	*1.0*
Heavy-vehicle adjustment factor, f_{HV}=1/ (1+ $P_T(E_T-1)+P_R(E_R-1)$)	*0.962*
Two-way flow rate[1], v_p (pc/h)=V/ (PHF * f_G * f_{HV})	*746*
v_p * highest directional split proportion[2] (pc/h)	*597*

Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed	
Field Measured speed, S_{FM}	*mi/h*	Base free-flow speed, $BFFS_{FM}$	*55.0 mi/h*
Observed volume, V_f	*veh/h*	Adj. for lane width and shoulder width[3], f_{LS} (Exhibit 20-5)	*0.0 mi/h*
Free-flow speed, FFS FFS=S_{FM}+0.00776(V_f/ f_{HV})	*mi/h*	Adj. for access points, f_A (Exhibit 20-6)	*2.0 mi/h*
		Free-flow speed, FFS (FSS=BFFS-f_{LS}-f_A)	*53.0 mi/h*

Adj. for no-passing zones, f_{np} (*mi/h*) (Exhibit 20-11)	*0.0*
Average travel speed, ATS (*mi/h*) ATS=FFS-0.00776v_p-f_{np}	*47.2*

Percent Time-Spent-Following

Grade Adjustment factor, f_G (Exhibit 20-8)	*1.00*
Passenger-car equivalents for trucks, E_T (Exhibit 20-10)	*1.1*
Passenger-car equivalents for RVs, E_R (Exhibit 20-10)	*1.0*
Heavy-vehicle adjustment factor, f_{HV}=1/ (1+ $P_T(E_T-1)+P_R(E_R-1)$)	*0.980*
Two-way flow rate[1], v_p (pc/h)=V/ (PHF * f_G * f_{HV})	*732*
v_p * highest directional split proportion[2] (pc/h)	*586*
Base percent time-spent-following, BPTSF(%)=100(1-$e^{-0.000879v_p}$)	*47.5*
Adj. for directional distribution and no-passing zone, $f_{d/hp}$(%)(Exh. 20-12)	*0.0*
Percent time-spent-following, PTSF(%)=BPTSF+$f_{d/np}$	*47.5*

Level of Service and Other Performance Measures

Level of service, LOS (Exhibit 20-3 for Class I or 20-4 for Class II)	*C*
Volume to capacity ratio, v/c=V_p/ 3,200	*0.23*
Peak 15-min veh-miles of travel, VMT_{15} (veh- *mi*)= 0.25L_t(V/PHF)	*0*
Peak-hour vehicle-miles of travel, VMT_{60}(veh- *mi*)=V*L_t	*0*
Peak 15-min total travel time, TT_{15}(veh-h)= VMT_{15}/ATS	*0.0*

Notes

1. If Vp >= 3,200 pc/h, terminate analysis-the LOS is F.
2. If highest directional split Vp>= 1,700 pc/h, terminated anlysis-the LOS is F.

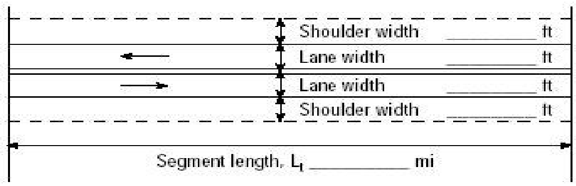
Copyright © 2005 University of Florida, All Rights Reserved HCS+™ Version 5.2 Generated: 3/12/2010 5:10 PM

TWO-WAY TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		**Site Information**	
Analyst	*Gene Kim*	Highway	*170th Ave*
Agency or Company	*URS*	From/To	*North of SR 138*
Date Performed	*03/12/2010*	Jurisdiction	*Los Angeles County*
Analysis Time Period	*2013 Proj Cons AM_8 MW*	Analysis Year	*2013 (North Access Only)*

Project Description: *Nextlight Antelope Valley EIR*

Input Data



Class I highway ☐ Class II highway ☑

Terrain ☑ Level ☐ Rolling

Two-way hourly volume	*491* veh/h
Directional split	*60* / *40*
Peak-hour factor, PHF	*0.92*
No-passing zone	*0*
% Trucks and Buses , P_T	*2* %
% Recreational vehicles, P_R	*2*%
Access points/ *mi*	*8*

Average Travel Speed

Grade adjustment factor, f_G (Exhibit 20-7)	*1.00*
Passenger-car equivalents for trucks, E_T (Exhibit 20-9)	*1.7*
Passenger-car equivalents for RVs, E_R (Exhibit 20-9)	*1.0*
Heavy-vehicle adjustment factor, f_{HV}=1/ (1+ $P_T(E_T$-1)+$P_R(E_R$-1))	*0.986*
Two-way flow rate[1], v_p (pc/h)=V/ (PHF * f_G * f_{HV})	*541*
v_p * highest directional split proportion[2] (pc/h)	*325*

Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed	
Field Measured speed, S_{FM}	*mi/h*	Base free-flow speed, $BFFS_{FM}$	*45.0 mi/h*
Observed volume, V_f	*veh/h*	Adj. for lane width and shoulder width[3], f_{LS} (Exhibit 20-5)	*2.6 mi/h*
Free-flow speed, FFS FFS=S_{FM}+0.00776(V_f/ f_{HV})	*mi/h*	Adj. for access points, f_A (Exhibit 20-6)	*2.0 mi/h*
		Free-flow speed, FFS (FSS=BFFS-f_{LS}-f_A)	*40.4 mi/h*

Adj. for no-passing zones, f_{np} (*mi/h*) (Exhibit 20-11)	*0.0*
Average travel speed, ATS (*mi/h*) ATS=FFS-0.00776v_p-f_{np}	*36.2*

Percent Time-Spent-Following

Grade Adjustment factor, f_G (Exhibit 20-8)	*1.00*
Passenger-car equivalents for trucks, E_T (Exhibit 20-10)	*1.1*
Passenger-car equivalents for RVs, E_R (Exhibit 20-10)	*1.0*
Heavy-vehicle adjustment factor, f_{HV}=1/ (1+ $P_T(E_T$-1)+$P_R(E_R$-1))	*0.998*
Two-way flow rate[1], v_p (pc/h)=V/ (PHF * f_G * f_{HV})	*535*
v_p * highest directional split proportion[2] (pc/h)	*321*
Base percent time-spent-following, BPTSF(%)=100(1-$e^{-0.000879v_p}$)	*37.5*
Adj. for directional distribution and no-passing zone, $f_{d/hp}$(%)(Exh. 20-12)	*0.2*
Percent time-spent-following, PTSF(%)=BPTSF+$f_{d/np}$	*37.7*

Level of Service and Other Performance Measures

Level of service, LOS (Exhibit 20-3 for Class I or 20-4 for Class II)	*A*
Volume to capacity ratio, v/c=V_p/ 3,200	*0.17*
Peak 15-min veh-miles of travel, VMT_{15} (veh- *mi*)= 0.25L_t(V/PHF)	*0*
Peak-hour vehicle-miles of travel, VMT_{60}(veh- *mi*)=V*L_t	*0*
Peak 15-min total travel time, TT_{15}(veh-h)= VMT_{15}/ATS	*0.0*

Notes

1. If Vp >= 3,200 pc/h, terminate analysis-the LOS is F.
2. If highest directional split Vp>= 1,700 pc/h, terminated anlysis-the LOS is F.

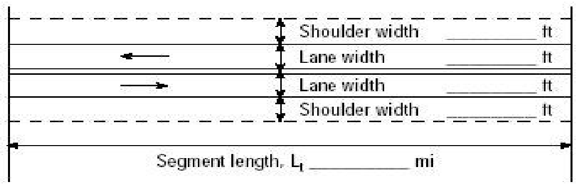
Copyright © 2005 University of Florida, All Rights Reserved HCS+™ Version 5.2 Generated: 3/12/2010 5:13 PM

TWO-WAY TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		Site Information	
Analyst	*Gene Kim*	Highway	*170th Ave*
Agency or Company	*URS*	From/To	*North of SR 138*
Date Performed	*03/12/2010*	Jurisdiction	*Los Angeles County*
Analysis Time Period	*2013 Proj Cons PM_8 MW*	Analysis Year	*2013 (North Access Only)*

Project Description: *Nextlight Antelope Valley EIR*

Input Data



Class I highway	
Class II highway	☑
Terrain	Level ☑ / Rolling
Two-way hourly volume	*500* veh/h
Directional split	*60* / *40*
Peak-hour factor, PHF	*0.92*
No-passing zone	*0*
% Trucks and Buses, P_T	*2* %
% Recreational vehicles, P_R	*2*%
Access points/ *mi*	*8*

Average Travel Speed

Grade adjustment factor, f_G (Exhibit 20-7)	*1.00*
Passenger-car equivalents for trucks, E_T (Exhibit 20-9)	*1.7*
Passenger-car equivalents for RVs, E_R (Exhibit 20-9)	*1.0*
Heavy-vehicle adjustment factor, f_{HV}=1/ (1+ $P_T(E_T$-1)+$P_R(E_R$-1))	*0.986*
Two-way flow rate[1], v_p (pc/h)=V/ (PHF * f_G * f_{HV})	*551*
v_p * highest directional split proportion[2] (pc/h)	*331*

Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed	
Field Measured speed, S_{FM}	*mi/h*	Base free-flow speed, $BFFS_{FM}$	*45.0 mi/h*
Observed volume, V_f	*veh/h*	Adj. for lane width and shoulder width[3], f_{LS} (Exhibit 20-5)	*2.6 mi/h*
Free-flow speed, FFS FFS=S_{FM}+0.00776(V_f/ f_{HV})	*mi/h*	Adj. for access points, f_A (Exhibit 20-6)	*2.0 mi/h*
		Free-flow speed, FFS (FSS=BFFS-f_{LS}-f_A)	*40.4 mi/h*

Adj. for no-passing zones, f_{np} (*mi/h*) (Exhibit 20-11)	*0.0*
Average travel speed, ATS (*mi/h*) ATS=FFS-0.00776v_p-f_{np}	*36.1*

Percent Time-Spent-Following

Grade Adjustment factor, f_G (Exhibit 20-8)	*1.00*
Passenger-car equivalents for trucks, E_T (Exhibit 20-10)	*1.1*
Passenger-car equivalents for RVs, E_R (Exhibit 20-10)	*1.0*
Heavy-vehicle adjustment factor, f_{HV}=1/ (1+ $P_T(E_T$-1)+$P_R(E_R$-1))	*0.998*
Two-way flow rate[1], v_p (pc/h)=V/ (PHF * f_G * f_{HV})	*545*
v_p * highest directional split proportion[2] (pc/h)	*327*
Base percent time-spent-following, BPTSF(%)=100(1-$e^{-0.000879v_p}$)	*38.1*
Adj. for directional distribution and no-passing zone, $f_{d/hp}$(%)(Exh. 20-12)	*0.1*
Percent time-spent-following, PTSF(%)=BPTSF+$f_{d/np}$	*38.2*

Level of Service and Other Performance Measures

Level of service, LOS (Exhibit 20-3 for Class I or 20-4 for Class II)	*A*
Volume to capacity ratio, v/c=V_p/ 3,200	*0.17*
Peak 15-min veh-miles of travel, VMT_{15} (veh- *mi*)= 0.25L_t(V/PHF)	*0*
Peak-hour vehicle-miles of travel, VMT_{60}(veh- *mi*)=V*L_t	*0*
Peak 15-min total travel time, TT_{15}(veh-h)= VMT_{15}/ATS	*0.0*

Notes

1. If Vp >= 3,200 pc/h, terminate analysis-the LOS is F.
2. If highest directional split Vp>= 1,700 pc/h, terminated anlysis-the LOS is F.

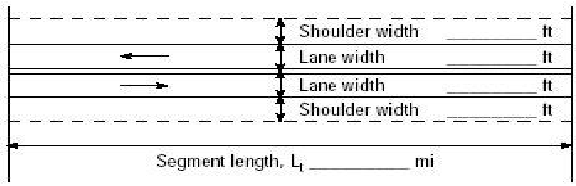
Copyright © 2005 University of Florida, All Rights Reserved HCS+TM Version 5.2 Generated: 3/12/2010 5:14 PM

TWO-WAY TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		Site Information	
Analyst	*Gene Kim*	Highway	*170th Ave*
Agency or Company	*URS*	From/To	*South of SR 138*
Date Performed	*03/12/2010*	Jurisdiction	*Los Angeles County*
Analysis Time Period	*2013 Proj Cons AM_8 MW*	Analysis Year	*2013 (South Access Only)*

Project Description: *Nextlight Antelope Valley EIR*

Input Data



☐ Class I highway ☑ Class II highway

Terrain ☑ Level ☐ Rolling

Two-way hourly volume	*479* veh/h
Directional split	*60 / 40*
Peak-hour factor, PHF	*0.92*
No-passing zone	*0*
% Trucks and Buses , P_T	*2* %
% Recreational vehicles, P_R	*2*%
Access points/ *mi*	*8*

Average Travel Speed

Grade adjustment factor, f_G (Exhibit 20-7)	*1.00*
Passenger-car equivalents for trucks, E_T (Exhibit 20-9)	*1.7*
Passenger-car equivalents for RVs, E_R (Exhibit 20-9)	*1.0*
Heavy-vehicle adjustment factor, f_{HV}=1/ (1+ $P_T(E_T$-1)+$P_R(E_R$-1))	*0.986*
Two-way flow rate[1], v_p (pc/h)=V/ (PHF * f_G * f_{HV})	*528*
v_p * highest directional split proportion[2] (pc/h)	*317*

Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed	
Field Measured speed, S_{FM}	*mi/h*	Base free-flow speed, $BFFS_{FM}$	*45.0 mi/h*
Observed volume, V_f	*veh/h*	Adj. for lane width and shoulder width[3], f_{LS} (Exhibit 20-5)	*2.6 mi/h*
Free-flow speed, FFS FFS=S_{FM}+0.00776(V_f/ f_{HV})	*mi/h*	Adj. for access points, f_A (Exhibit 20-6)	*2.0 mi/h*
		Free-flow speed, FFS (FSS=BFFS-f_{LS}-f_A)	*40.4 mi/h*

Adj. for no-passing zones, f_{np} (*mi/h*) (Exhibit 20-11)	*0.0*
Average travel speed, ATS (*mi/h*) ATS=FFS-0.00776v_p-f_{np}	*36.3*

Percent Time-Spent-Following

Grade Adjustment factor, f_G (Exhibit 20-8)	*1.00*
Passenger-car equivalents for trucks, E_T (Exhibit 20-10)	*1.1*
Passenger-car equivalents for RVs, E_R (Exhibit 20-10)	*1.0*
Heavy-vehicle adjustment factor, f_{HV}=1/ (1+ $P_T(E_T$-1)+$P_R(E_R$-1))	*0.998*
Two-way flow rate[1], v_p (pc/h)=V/ (PHF * f_G * f_{HV})	*522*
v_p * highest directional split proportion[2] (pc/h)	*313*
Base percent time-spent-following, BPTSF(%)=100(1-$e^{-0.000879v_p}$)	*36.8*
Adj. for directional distribution and no-passing zone, $f_{d/hp}$(%)(Exh. 20-12)	*0.2*
Percent time-spent-following, PTSF(%)=BPTSF+$f_{d/np}$	*37.0*

Level of Service and Other Performance Measures

Level of service, LOS (Exhibit 20-3 for Class I or 20-4 for Class II)	*A*
Volume to capacity ratio, v/c=V_p/ 3,200	*0.17*
Peak 15-min veh-miles of travel, VMT_{15} (veh- *mi*)= 0.25L_t(V/PHF)	*0*
Peak-hour vehicle-miles of travel, VMT_{60}(veh- *mi*)=V*L_t	*0*
Peak 15-min total travel time, TT_{15}(veh-h)= VMT_{15}/ATS	*0.0*

Notes

1. If Vp >= 3,200 pc/h, terminate analysis-the LOS is F.
2. If highest directional split Vp>= 1,700 pc/h, terminated anlysis-the LOS is F.

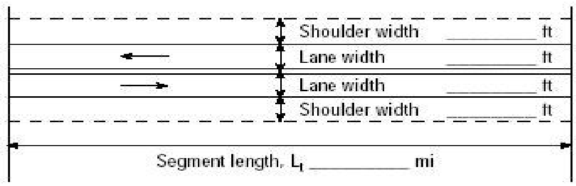
Copyright © 2005 University of Florida, All Rights Reserved *HCS+*™ Version 5.2 Generated: 3/12/2010 5:16 PM

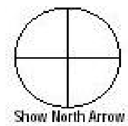
TWO-WAY TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		***Site Information***	
Analyst	*Gene Kim*	Highway	*170th Ave*
Agency or Company	*URS*	From/To	*South of SR 138*
Date Performed	*03/12/2010*	Jurisdiction	*Los Angeles County*
Analysis Time Period	*2013 Proj Cons PM_8 MW*	Analysis Year	*2013 (South Access Only)*

Project Description: *Nextlight Antelope Valley EIR*

Input Data





Class I highway ☑ Class II highway

Terrain ☑ Level Rolling

Two-way hourly volume	*491* veh/h
Directional split	*60* / *40*
Peak-hour factor, PHF	*0.92*
No-passing zone	*0*
% Trucks and Buses , P_T	*2* %
% Recreational vehicles, P_R	*2*%
Access points/ *mi*	*8*

Average Travel Speed

Grade adjustment factor, f_G (Exhibit 20-7)	*1.00*
Passenger-car equivalents for trucks, E_T (Exhibit 20-9)	*1.7*
Passenger-car equivalents for RVs, E_R (Exhibit 20-9)	*1.0*
Heavy-vehicle adjustment factor, f_{HV}=1/ (1+ $P_T(E_T$-1)+$P_R(E_R$-1))	*0.986*
Two-way flow rate[1], v_p (pc/h)=V/ (PHF * f_G * f_{HV})	*541*
v_p * highest directional split proportion[2] (pc/h)	*325*

Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed	
Field Measured speed, S_{FM}	*mi/h*	Base free-flow speed, $BFFS_{FM}$	*45.0 mi/h*
Observed volume, V_f	*veh/h*	Adj. for lane width and shoulder width[3], f_{LS} (Exhibit 20-5)	*2.6 mi/h*
Free-flow speed, FFS FFS=S_{FM}+0.00776(V_f/ f_{HV})	*mi/h*	Adj. for access points, f_A (Exhibit 20-6)	*2.0 mi/h*
		Free-flow speed, FFS (FSS=BFFS-f_{LS}-f_A)	*40.4 mi/h*

Adj. for no-passing zones, f_{np} (*mi/h*) (Exhibit 20-11)	*0.0*
Average travel speed, ATS (*mi/h*) ATS=FFS-0.00776v_p-f_{np}	*36.2*

Percent Time-Spent-Following

Grade Adjustment factor, f_G (Exhibit 20-8)	*1.00*
Passenger-car equivalents for trucks, E_T (Exhibit 20-10)	*1.1*
Passenger-car equivalents for RVs, E_R (Exhibit 20-10)	*1.0*
Heavy-vehicle adjustment factor, f_{HV}=1/ (1+ $P_T(E_T$-1)+$P_R(E_R$-1))	*0.998*
Two-way flow rate[1], v_p (pc/h)=V/ (PHF * f_G * f_{HV})	*535*
v_p * highest directional split proportion[2] (pc/h)	*321*
Base percent time-spent-following, BPTSF(%)=100(1-$e^{-0.000879v_p}$)	*37.5*
Adj. for directional distribution and no-passing zone, $f_{d/hp}$(%)(Exh. 20-12)	*0.2*
Percent time-spent-following, PTSF(%)=BPTSF+$f_{d/np}$	*37.7*

Level of Service and Other Performance Measures

Level of service, LOS (Exhibit 20-3 for Class I or 20-4 for Class II)	*A*
Volume to capacity ratio, v/c=V_p/ 3,200	*0.17*
Peak 15-min veh-miles of travel, VMT_{15} (veh- *mi*)= 0.25L_t(V/PHF)	*0*
Peak-hour vehicle-miles of travel, VMT_{60}(veh- *mi*)=V*L_t	*0*
Peak 15-min total travel time, TT_{15}(veh-h)= VMT_{15}/ATS	*0.0*

Notes

1. If Vp >= 3,200 pc/h, terminate analysis-the LOS is F.
2. If highest directional split Vp>= 1,700 pc/h, terminated anlysis-the LOS is F.

Copyright © 2005 University of Florida, All Rights Reserved *HCS+*™ Version 5.2 Generated: 3/12/2010 5:17 PM

APPENDIX H
CONSTRUCTION EQUIPMENT AND TRUCK DELIVERY DETAILS

This appendix presents additional construction phase details for the proposed AV Solar Ranch One Project in support of the Project Description presented in Section 4.0 of the EIR. This appendix includes the following tables:

Table No.	Table Title
H-1	Project Schedule Major Milestones
H-2A	Estimated Construction Equipment Usage – 8-10 MW per Month, Concrete Ballast Foundations
H-2B	Estimated Construction Equipment Usage – 8-10 MW per Month, Pile Foundations
H-3A	Estimated Construction Deliveries Schedule – 8-10 MW per Month, Concrete Ballast Foundations
H-3B	Estimated Construction Deliveries Schedule – 8-10 MW per Month, Pile Foundations

Both the concrete ballast foundation and pile foundation options are planned to proceed at the 8-10 MW-per-month of installed electrical generation capacity construction rate. The pile foundation option was found to constitute the worst-case basis for the Air Quality, Traffic, and Noise analyses.

TABLE H-1
PROJECT SCHEDULE MAJOR MILESTONES

Activity	Date
Begin construction	Fourth quarter 2010
Initial energy delivery	Third quarter 2011
Commercial operation	Fourth quarter 2013

Page intentionally left blank.

TABLE H-2A
ESTIMATED CONSTRUCTION EQUIPMENT USAGE – 8-10 MW PER MONTH
CONCRETE BALLAST FOUNDATIONS

Construction Equipment Description	HP	D	G	P	Month after Construction Start																																				
					1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38
AC paver					0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Backhoe (CAT-225)	135	X			0	0	0	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Butt fusion machine and generator	51	X			0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Carry lift, Pettibone	100	X			0	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Case backhoe/front end loader (580)	90	X			0	0	0	0	0	0	0	2	2	2	2	4	4	4	6	6	6	6	4	4	4	4	4	4	4	6	6	6	6	6	6	4	4	4	4	2	2	2
Compactor (Bomag BW211)	130	X			0	1	0	2	2	1	0	1	1	1	0	1	1	1	1	1	1	1	1	0	0	1	1	1	0	1	1	1	1	1	1	0	0	0	0	0	0	0
Conveyor truck for rock/sand	250	X			0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Crane (100T)	290	X			0	0	0	0	0	0	2	3	3	3	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Crawler trencher	155	X			0	0	0	0	0	0	1	2	2	1	1	2	2	2	3	3	3	3	2	2	2	2	2	2	2	3	3	3	3	3	3	2	2	2	2	1	1	1
Dozer (D-8)	300	X			1	1	0	0	0	0	0	1	1	1	0	1	1	1	1	1	1	1	1	0	0	1	1	1	0	1	1	1	1	1	1	0	0	0	0	0	0	0
Excavator, Cat 235	195	X			1	1	0	1	1	0	0	1	1	1	0	1	1	1	1	1	1	1	1	0	0	1	1	1	0	1	1	1	1	1	1	0	0	0	0	0	0	0
Forklift (10T)	100	X			0	0	0	1	1	1	2	2	2	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gradeall	100	X			0	1	2	2	2	2	2	1	1	1	1	2	2	2	3	3	3	3	2	2	2	2	2	2	2	3	3	3	3	3	3	2	2	2	2	1	1	1
Grader (CAT-12)	135	X			1	1	0	1	1	0	0	1	1	1	0	1	1	1	1	1	1	1	1	0	0	1	1	1	0	1	1	1	1	1	1	0	0	0	0	0	0	0
High-reach bucket truck	220	X			0	0	0	0	0	0	1	1	2	3	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hydraulic auger drill	200	X			0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hydraulic mobile crane (15T)	130	X			0	2	2	2	2	1	1	3	3	3	3	4	4	4	6	6	6	6	4	4	4	4	4	4	4	6	6	6	6	6	6	4	4	4	4	2	2	2
Hydraulic mobile crane (35T)	175	X			0	1	2	2	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Line truck	220	X			0	0	0	0	0	0	3	3	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Manlift (scissors)	30	X			0	0	0	5	5	6	6	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Plate compactor	5	X			0	1	1	1	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pressure digger (truck-mounted)	220	X			0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Scraper, Cat 621B	330	X			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Truck (1-ton) conductor reel trailer	220	X			0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Truck (1-ton), maintenance	220	X			0	2	2	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Truck tractor	250	X			0	0	0	0	0	1	2	2	2	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Truck (1-ton) trailer	220	X			0	0	0	1	1	1	2	2	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Truck (1-ton) wire puller/tensioner	220	X			0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Vibrating hammer and generator	51	X			0	2	2	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Welding machine	50	X			0	0	0	0	2	2	2	2	2	2	2	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wheel loader (CAT 950)	130	X			1	2	1	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

TABLE H-2A (CONTINUED)
ESTIMATED CONSTRUCTION EQUIPMENT USAGE – 8-10 MW PER MONTH
CONCRETE BALLAST FOUNDATIONS

Construction Equipment Description	HP	D	G	P	Month after Construction Start																																	
					1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38
Hogger	175	X			0	0	0	0	0	0	0	1	0	0	0	1	0	0	1	0	0	0	0	0	0	1	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0
Vehicles with Onroad Engines for Emissions Estimates																																										
Concrete truck	250	X			0	0	3	0	1	2	4	5	1	1	1	2	2	2	3	3	3	3	2	2	2	2	2	2	2	3	3	3	3	3	3	2	2	2	2	1	1	1
Concrete pump truck	250	X			0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dump truck (15 cy)	275	X			3	3	3	1	2	1	1	2	2	1	0	4	4	1	1	1	1	1	1	0	0	1	1	1	0	1	1	1	1	1	1	0	0	0	0	0	0	0
Flatbed – stake body truck	220	X			0	0	0	2	2	2	5	10	10	10	7	12	12	10	15	15	15	15	10	10	10	10	10	10	10	15	15	15	15	15	15	10	10	10	10	5	5	5
Fuel truck	220	X			0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pickup truck	150	X			0	1	1	3	2	2	5	5	5	5	26	26	26	24	48	48	72	72	48	48	48	24	24	24	48	48	48	48	48	48	48	48	48	48	48	24	24	24
Water truck (4,000 gallon)	220	X			0	2	1	1	1	0	1	2	1	1	1	3	3	2	3	3	4	3	2	2	2	3	2	2	2	4	3	2	3	3	3	2	2	3	2	1	1	1
Total					7	24	24	35	33	27	46	56	51	47	50	71	67	55	93	92	117	116	79	74	74	57	55	55	74	94	92	91	93	92	92	74	74	75	74	37	37	37

HP = horsepower.
G = gasoline.
D = diesel.
P = propane.

TABLE H-2B
ESTIMATED CONSTRUCTION EQUIPMENT USAGE – 8-10 MW PER MONTH
PILE FOUNDATIONS

					Month after Construction Start																																					
Construction Equipment Description	HP	D	G	P	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38
AC paver					0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Backhoe (CAT-225)	135	X			0	0	0	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Butt fusion machine and generator	51	X			0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Carry lift, Pettibone	100	X			0	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Case backhoe/front end loader (580)	90	X			0	0	0	0	0	0	0	2	2	2	2	4	4	4	6	6	6	6	4	4	4	4	4	4	4	6	6	6	6	6	6	4	4	4	4	2	2	2
Compactor (Bomag BW211)	130	X			0	1	0	2	2	1	0	1	1	1	0	1	1	1	1	1	1	1	1	0	0	1	1	1	0	1	1	1	1	1	1	0	0	0	0	0	0	0
Conveyor Truck for rock/sand	250	X			0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Crane (100T)	290	X			0	0	0	0	0	0	2	3	3	3	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Crawler trencher	155	X			0	0	0	0	0	0	1	2	2	1	1	2	2	2	3	3	3	3	2	2	2	2	2	2	2	3	3	3	3	3	3	2	2	2	2	1	1	1
Dozer (D-8)	300	X			1	1	0	0	0	0	0	1	1	1	0	1	1	1	1	1	1	1	1	0	0	1	1	1	0	1	1	1	1	1	1	0	0	0	0	0	0	0
Excavator, Cat 235	195	X			1	1	0	1	1	0	0	1	1	1	0	1	1	1	1	1	1	1	1	0	0	1	1	1	0	1	1	1	1	1	1	0	0	0	0	0	0	0
Forklift (10T)	100	X			0	0	0	1	1	1	2	2	2	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gradeall	100	X			0	1	2	2	2	2	2	1	1	1	1	2	2	2	3	3	3	3	2	2	2	2	2	2	2	3	3	3	3	3	3	2	2	2	2	1	1	1
Grader (CAT-12)	135	X			1	1	0	1	1	0	0	1	1	1	0	1	1	1	1	1	1	1	1	0	0	1	1	1	0	1	1	1	1	1	1	0	0	0	0	0	0	0
High-reach bucket truck	220	X			0	0	0	0	0	0	1	1	2	3	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hydraulic auger drill	200	X			0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hydraulic mobile crane (15T)	130	X			0	2	2	2	2	1	1	11	11	11	11	18	18	18	20	12	20	20	18	18	18	20	20	20	20	20	20	20	18	18	18	16	16	16	16	8	8	8
Hydraulic mobile crane (35T)	175	X			0	1	2	2	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Line truck	220	X			0	0	0	0	0	0	3	3	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Manlift (scissors)	30	X			0	0	0	5	5	6	6	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Plate compactor	5	X			0	1	1	1	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pressure digger (truck-mounted)	220	X			0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Scraper, Cat 621B	330	X			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Truck (1-ton) conductor reel trailer	220	X			0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Truck (1-ton), maintenance	220	X			0	2	2	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Truck tractor	250	X			0	0	0	0	0	1	2	2	2	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Truck (1-ton) trailer	220	X			0	0	0	1	1	1	2	2	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Truck (1-ton) wire puller/tensioner	220	X			0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Vibrating hammer and generator	51	X			0	2	2	2	2	0	0	8	8	8	8	14	14	14	14	6	14	14	14	14	14	16	16	16	16	14	14	14	12	12	12	12	12	12	12	6	6	6
Welding machine	50	X			0	0	0	0	2	2	2	2	2	2	2	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wheel loader (CAT 950)	130	X			1	2	1	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

TABLE H-2B (CONTINUED)
ESTIMATED CONSTRUCTION EQUIPMENT USAGE – 8-10 MW PER MONTH
PILE FOUNDATIONS

					Month after Construction Start																																					
Construction Equipment Description	HP	D	G	P	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38
Hogger	175	X			0	0	0	0	0	0	0	1	0	0	0	1	0	0	1	0	0	0	0	0	0	1	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0
Vehicles with Onroad Engines for Emissions Estimates																																										
Concrete truck	250	X			0	0	3	0	1	2	4	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Concrete pump truck	250	X			0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dump truck (15 cy)	275	X			3	3	3	1	2	1	1	2	2	1	0	4	4	1	1	1	1	1	1	0	0	1	1	1	0	1	1	1	1	1	1	0	0	0	0	0	0	0
Flatbed – stake body truck	220	X			0	0	0	2	2	2	5	10	10	10	7	12	12	10	15	15	15	15	10	10	10	10	10	10	10	15	15	15	15	15	15	10	10	10	10	5	5	5
Fuel truck	220	X			0	1	1	1	1	0	0	1	1	1	1	2	2	2	3	3	3	3	2	2	2	1	1	1	1	2	2	2	3	3	3	2	2	2	2	1	1	1
Pickup truck	150	X			0	1	1	3	2	2	5	5	5	5	26	26	26	24	48	48	72	72	48	48	48	24	24	24	48	48	48	48	48	48	48	48	48	48	48	24	24	24
Water truck (4,000 gallon)	220	X			0	2	1	1	1	0	1	2	1	1	1	3	3	2	3	3	4	3	2	2	2	3	2	2	2	4	3	2	3	3	3	2	2	3	2	1	1	1
Total					7	24	24	35	33	27	46	72	67	63	66	99	95	83	121	104	145	144	107	102	102	88	86	86	105	121	119	118	117	116	116	98	98	99	98	49	49	49

HP = horsepower.
G = gasoline.
D = diesel.
P = propane.

TABLE H-3A
ESTIMATED CONSTRUCTION DELIVERIES SCHEDULE – 8-10 MW PER MONTH
CONCRETE BALLAST FOUNDATIONS

Construction Equipment Description	Construction Deliveries per Month																																						Total Pieces per Month
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	
Lightweight and delivery truck trips per month	10	11	11	16	16	16	9	33	33	33	31	55	55	48	72	72	72	72	48	48	48	48	48	48	48	72	72	72	72	72	72	48	48	48	48	24	24	24	1,697
Lightweight and delivery truck trips per day	0.5	0.5	0.5	0.7	0.7	0.7	0.4	1.5	1.5	1.5	1.4	2.5	2.5	2.2	3.3	3.3	3.3	3.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	3.3	3.3	3.3	3.3	3.3	3.3	2.2	2.2	2.2	2.2	1.1	1.1	1.1	
Truck tractor	10	37	37	43	43	17	32	46	36	26	26	50	50	48	72	72	72	72	48	48	48	48	48	48	48	72	72	72	72	72	72	48	48	48	48	24	24	24	1,821
Concrete truck	0	0	61	3	6	0	73	234	161	161	161	322	322	322	483	483	483	483	322	322	322	322	322	322	322	483	483	483	483	483	483	322	322	322	322	161	161	161	10,681
Heavy duty delivery truck trips per month	10	37	98	46	49	17	105	280	197	187	187	372	372	370	555	555	555	555	370	370	370	370	370	370	370	555	555	555	555	555	555	370	370	370	370	185	185	185	
Heavy duty delivery truck trips per day	0.5	1.7	4.5	2.1	2.3	0.8	4.8	12.9	9.1	8.6	8.6	17.2	17.2	17.1	25.6	25.6	25.6	25.6	17.1	17.1	17.1	17.1	17.1	17.1	17.1	25.6	25.6	25.6	25.6	25.6	25.6	17.1	17.1	17.1	17.1	8.5	8.5	8.5	
Total truck trips per month	20	48	109	62	65	33	114	313	230	220	218	427	427	418	627	627	627	627	418	418	418	418	418	418	418	627	627	627	627	627	627	418	418	418	418	209	209	209	14,199
Total truck trips per day	0.9	2.2	5.0	2.9	3.0	1.5	5.3	14.4	10.6	10.2	10.1	19.7	19.7	19.3	28.9	28.9	28.9	28.9	19.3	19.3	19.3	19.3	19.3	19.3	19.3	28.9	28.9	28.9	28.9	28.9	28.9	19.3	19.3	19.3	19.3	9.6	9.6	9.6	

Note: Truck trips per day calculated as total deliveries per month divided by work days per month (assumed to be 21.65).

TABLE H-3B
ESTIMATED CONSTRUCTION DELIVERIES SCHEDULE – 8-10 MW PER MONTH
PILE FOUNDATIONS

Construction Equipment Description	Construction Deliveries per Month																																						Total Pieces per Month
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	
Lightweight and delivery truck trips per month	10	11	11	16	16	16	9	33	33	33	31	55	55	48	72	72	72	72	48	48	48	48	48	48	48	72	72	72	72	72	72	48	48	48	48	24	24	24	1,697
Lightweight and delivery truck trips per day	0.5	0.5	0.5	0.7	0.7	0.7	0.4	1.5	1.5	1.5	1.4	2.5	2.5	2.2	3.3	3.3	3.3	3.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	3.3	3.3	3.3	3.3	3.3	3.3	2.2	2.2	2.2	2.2	1.1	1.1	1.1	
Truck tractor	10	37	37	43	43	17	32	144	134	124	124	217	217	215	239	141	238	238	214	214	214	241	241	241	241	238	238	238	215	215	215	191	191	191	191	97	97	97	6,270
Concrete truck	0	0	0	75	1	2	90	91	1	1	1	2	2	2	3	3	3	3	2	2	2	2	2	2	2	3	3	3	3	3	3	2	2	2	2	1	1	1	323
Heavy duty delivery truck trips per month	10	37	37	118	44	19	122	235	135	125	125	219	219	217	242	144	241	241	216	216	216	243	243	243	243	241	241	241	218	218	218	193	193	193	193	98	98	98	
Heavy duty delivery truck trips per day	0.5	1.7	1.7	5.4	2.0	0.9	5.6	10.8	6.2	5.8	5.8	10.1	10.1	10.0	11.2	6.6	11.1	11.1	10.0	10.0	10.0	11.2	11.2	11.2	11.2	11.1	11.1	11.1	10.1	10.1	10.1	8.9	8.9	8.9	8.9	4.5	4.5	4.5	
Total truck trips per month	20	48	48	134	60	35	131	268	168	158	156	274	274	265	314	216	313	313	264	264	264	291	291	291	291	313	313	313	290	290	290	241	241	241	241	122	122	122	8,290
Total truck trips per day	0.9	2.2	2.2	6.2	2.8	1.6	6.0	12.4	7.8	7.3	7.2	12.6	12.6	12.2	14.5	10.0	14.4	14.4	12.2	12.2	12.2	13.4	13.4	13.4	13.4	14.4	14.4	14.4	13.4	13.4	13.4	11.1	11.1	11.1	11.1	5.6	5.6	5.6	

Note: Truck trips per day calculated as total deliveries per month divided by work days per month (assumed to be 21.65).

APPENDIX I
NOISE TECHNICAL REPORT

This appendix presents the noise analysis report prepared for AV Solar Ranch One Project by URS. This report supports the noise assessment presented in Section 5.18 of the Draft EIR.

NOISE TECHNICAL REPORT

FOR THE

AV SOLAR RANCH ONE PROJECT
LOS ANGELES COUNTY, CALIFORNIA

Prepared for:

Los Angeles County Department of Regional Planning

and

AV Solar Ranch 1, LLC
353 Sacramento Street, Suite 2100
San Francisco, CA 94111

Prepared by:

URS
2020 East First Street, Suite 400
Santa Ana, CA 92705
(714) 835-6886 ◆ Fax: (714) 433-7701

URS Project Number 28907103

June 2010

TABLE OF CONTENTS

Section **Page**

Section | **Page**

List of Tables

List of Figures | **Follows Page**

List of Appendices

LIST OF ACRONYMS

ADT	Average Daily Traffic
ANSI	American National Standards Institute
AVSR1	AV Solar Ranch One
CDHS	California Department of Health Services
CEQA	California Environmental Quality Act
CFR	Code of Federal Regulations
CNEL	Community Noise Equivalent Level
dB	decibels
dB(A)	decibel □A-Weighted
dB(C)	decibel □C-Weighted
DNL	Day-Night Level
EMF	Electromagnetic Field
EPA	Environmental Protection Agency
EPRI	Electric Power Research Institute
FERC	Federal Energy Regulatory Commission
FHWA	Federal Highway Administration
FTA	Federal Transit Administration
HUD	Housing and Urban Development
Hz	hertz
I-5	Interstate 5
ISO	International Standard of Organization
JTWH	Joshua Tree Woodland Habitat
kHz	kilohertz
kV	kilovolts
Ldn	day-night sound level
Leq	equivalent sound level
LLC	Limited Liability Corporation
Lmax	maximum sound level
Lmin	minimum sound level
LORS	laws, ordinances, regulations and standards
Lxx	percentile-exceeded sound level
LT-x	long term measurement site x (x □site number)
Lw	sound power level
MMRP	Mitigation Monitoring and Reporting Plan
m/s	meters per second
mph	miles per hour
MW	megawatt
NEPA	National Environmental Policy Act
NIST	National Institute of Standards and Technology

NL	NextLight Renewable Power, LLC
NTIS	National Technical Information Service
O&M	operations and maintenance
OSHA	Occupational Safety and Health Administration
PV	Photovoltaic
R-x	Noise-sensitive receptor site x (x = site number)
RCNM	Road Construction Noise Model
RMS	root-mean-square
ROW	Right-of-way
SCE	Southern California Edison
SEA	Significant Ecological Area
SEL	sound exposure level
SLM	sound level meter
SPL	sound pressure level
SR	State Route
ST-x	short term measurement site x (x = site number)
TWA	Time-weighted average
μPa	micro-Pascals
U.S.C.	United States Code
VdB	Vibration velocity level in decibels

SECTION 1.0
INTRODUCTION

1.1 BACKGROUND

AV Solar Ranch 1, LLC is proposing to construct the AV Solar Ranch One Project (Project), which will be located in the Antelope Valley, California. Antelope Valley is located approximately 15 miles northwest of downtown Lancaster in unincorporated Los Angeles County, California.

The Project site was selected based on its desirable solar radiation characteristics, flat terrain, and close proximity to electrical transmission facilities. The property is approximately 2,100 acres. The Project site is currently generally undeveloped, but was used for agricultural production in the past. A single residential ranch is currently located on the property and will be removed as part of the proposed Project. The proposed Project site is bounded on the north by West Avenue B-8, on the south by West Avenue E, on the east by 155th Street West and on the west by 180th Street West. Surrounding land uses include open, undeveloped lands, agricultural uses, and rural residential sites. Figure 1 illustrates the proposed Project area including the surrounding environs.

The proposed Project would generate 230 megawatts (MW) of clean, renewable electrical power utilizing solar photovoltaic (PV) technology and integrate the electrical output of the Project into the electrical grid. The Project includes solar panels, construction of a 4.25-mile 230-kilovolt (kV) transmission line, transmission substation, roads, parking, fencing and associated operations and maintenance facilities. The proposed 230-kV transmission line is approximately 3.5 miles long off-site and 0.75 mile long on-site. The transmission line is proposed to run north along the public road right-of-way (ROW) of 170th Street West or adjacent private land to connect with Southern California Edison's (SCE) planned Whirlwind Substation that is located in southern Kern County.

Potential noise and vibration impacts are associated primarily with construction activities, including pile driving. This noise analysis also considers off-site 230-kV transmission line corona discharge during the operational phase. The analysis of potential noise impacts includes a description of the regulatory framework that guides the decision-making process, existing conditions of the proposed Project area, thresholds for determining if the proposed Project would result in significant impacts, anticipated impacts (direct, indirect, and cumulative), mitigation measures, and the expected level of significance after mitigation.

1.2 FUNDAMENTALS OF ACOUSTICS

This section describes the physical characteristics of sound. An understanding of these characteristics is useful for evaluating environmental noise from the proposed Project. The methods and metrics used to quantify noise exposure, human response, and relative judgment of loudness are also discussed and noise levels of common noise environments are presented. This section is intended to provide the reader with a basic understanding of the key fundamentals for assessing potential noise impacts.

Noise is generally defined as loud, unpleasant, unexpected, or undesired sound that is typically associated with human activity and interferes with or disrupts normal activities. The effects of noise on people can be grouped in four general categories:

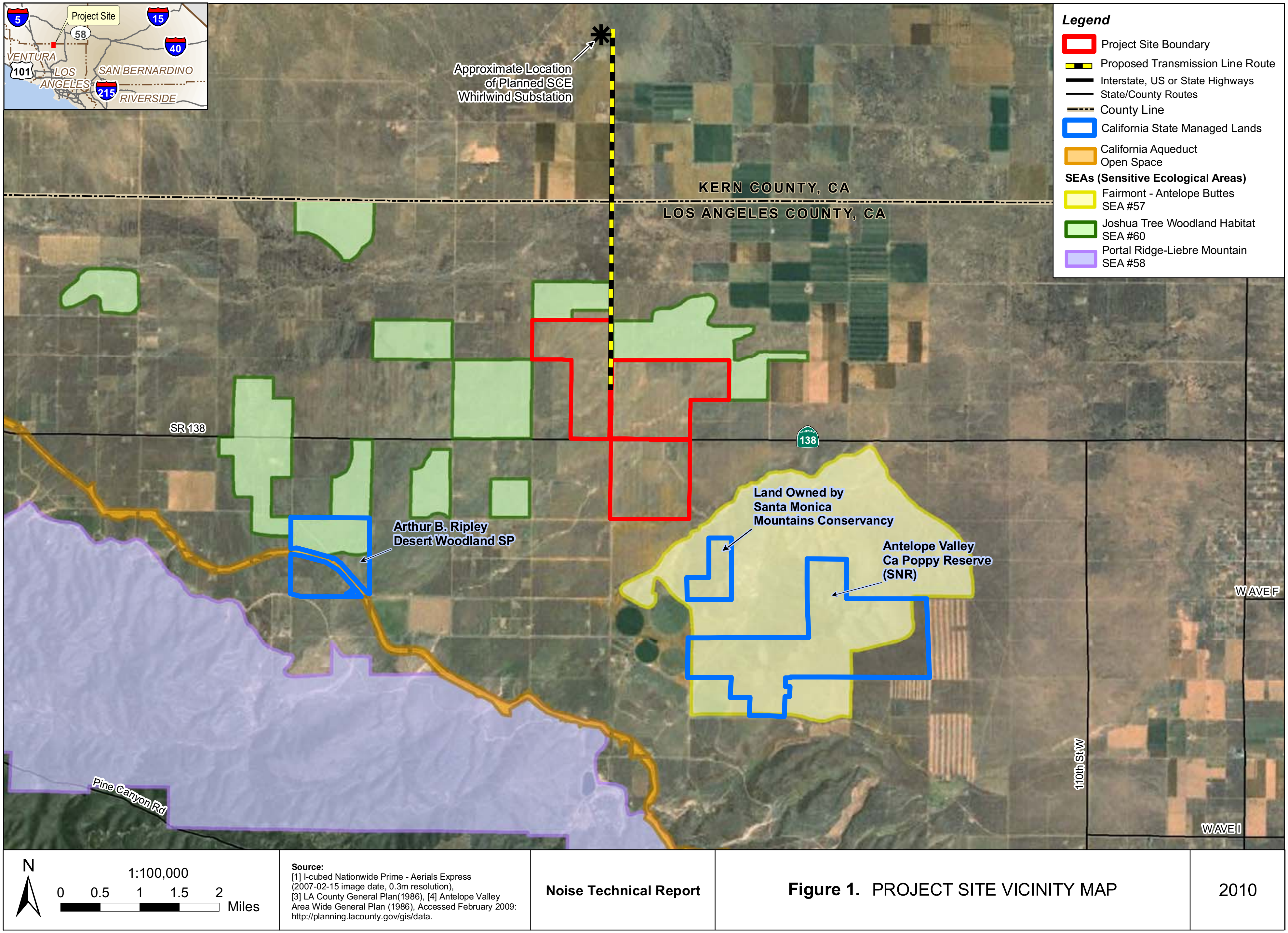
- Subjective effects (dissatisfaction, annoyance)
- Interference effects (communication and sleep interference, learning)
- Physiological effects (startle response)
- Physical effects (hearing loss)

Although exposure to high noise levels has been demonstrated to cause physical and physiological effects, the principal human responses to typical environmental noise exposure are related to subjective effects and interference with activities. The subjective responses of individuals to similar noise events are diverse and influenced by many factors including the type of noise, the perceived importance of the noise, its appropriateness to the setting, duration of the noise, the time of day and the type of activity during which the noise occurs, and individual noise sensitivity.

Sound is a physical phenomenon consisting of minute vibrations that travel through a medium, such as air, and are sensed by the human ear. Sound is generally characterized by several variables, including frequency and amplitude. Frequency describes the sound's pitch (tone) and is measured in cycles per second (Hertz [Hz]), while amplitude describes the sound's pressure (loudness). Because the range of sound pressures that occur in the environment is extremely large, it is convenient to express these pressures on a logarithmic scale that compresses the wide range of pressures into a more useful range of numbers. The standard unit of sound measurement is the decibel (dB).

Hz is a measure of how many times each second the crest of a sound pressure wave passes a fixed point. For example, when a drummer beats a drum, the skin of the drum vibrates a given number of times per second. If the drum vibrates 100 times per second it generates a sound pressure wave that is oscillating at 100 Hz, and this pressure oscillation is perceived by the ear/brain as a tonal pitch of 100 Hz. Sound frequencies between 20 and 20,000 Hz are within the range of sensitivity of the healthy human ear.

Sound levels are expressed by reference to a specified national/international standard. The Sound Pressure Level (SPL) is used to describe sound pressure (loudness) and is specified at a given distance or specific receptor location. In expressing sound pressure level



Source:
[1] I-cubed Nationwide Prime - Aerials Express (2007-02-15 image date, 0.3m resolution), [3] LA County General Plan(1986), [4] Antelope Valley Area Wide General Plan (1986), Accessed February 2009: http://planning.lacounty.gov/gis/data.

Noise Technical Report

Figure 1. PROJECT SITE VICINITY MAP

2010

T:\NextLight_AV_EIR\deliverables\AVSR1_EIR\Noise\App\Fig1_Project_Site_Vicinity_Map.mxd

on a logarithmic scale, sound pressure (dB) is referenced to a value of 20 micropascals (μPa). SPL depends not only on the power of the source; but also on the distance from the source to the receiver and the acoustical characteristics of the sound propagation path (absorption, reflection, etc.).

Outdoor sound levels decrease logarithmically as the distance from the source increases. This decrease is due to wave divergence, atmospheric absorption, and ground attenuation. Sound radiating from a source in a homogeneous and undisturbed manner travels in spherical waves. As the sound waves travel away from the source, the sound energy is dispersed over a greater area decreasing the sound pressure of the wave. Spherical spreading of the sound wave from a point source reduces the noise level at a rate of 6 dB per doubling of distance.

Atmospheric absorption also influences the sound levels received by an observer. The greater the distance traveled, the greater the influence of the atmosphere and the resultant fluctuations. Atmospheric absorption becomes important at distances greater than 1,000 feet. The degree of absorption varies depending on the frequency of the sound as well as the humidity and temperature of the air. For example, atmospheric absorption is lowest (i.e., sound carries further) at high humidity and high temperatures and lower frequencies are less readily absorbed (i.e., sound carries further) than higher frequencies. Over long distances, lower frequencies become dominant as the higher frequencies are more rapidly attenuated. Turbulence, gradients of wind and other atmospheric phenomena also play a significant role in determining the degree of attenuation. For example, certain conditions, such as temperature inversions can channel or focus the sound waves resulting in higher noise levels than would result from simple spherical spreading.

Sound from a tuning fork contains a single frequency (a pure tone), but most sounds one hears in the environment do not consist of a single frequency; but rather, a broad band of many frequencies differing in sound level. Because of the broad range of audible frequencies, methods have been developed to quantify these values into a single number representative of human hearing. The most common method used to quantify environmental sounds consists of evaluating all frequencies of a sound according to a weighting system that is reflective of human hearing characteristics. Human hearing is less sensitive at low frequencies and extremely high frequencies than at the mid-range frequencies. This process is termed “A weighting,” and the resulting dB level is termed the “A weighted” decibel (dBA).

Because “A weighting” is designed to emulate the frequency response characteristics of the human ear and reflect the way people perceive sounds, it widely used in local noise ordinances and state and federal guidelines including the State of California and Los Angeles and Kern counties. Unless specifically noted, the use of A-weighting is always assumed with respect to environmental sound and community noise even if the notation does not show the “A.”

In terms of human perception, a sound level of 0 dBA is approximately the threshold of human hearing and is barely audible by a healthy ear under extremely quiet listening conditions. This threshold is the reference level against which the amplitude of other sounds is compared. Normal speech has a sound level of approximately 60 dBA. Sound levels above about 120 dBA begin to be felt inside the human ear as discomfort progressing to pain at still higher levels. Humans are much better at discerning relative sound levels than absolute sound levels. The minimum change in the sound level of individual events that an average human ear can detect is about 1 to 3 dBA. A 3-to 5-dBA change is readily perceived. An increase (or decrease) in sound level of about 10 dBA is usually perceived by the average person as a doubling (or halving) of the sound's loudness.

Because of the logarithmic nature of the decibel, sound levels cannot be added or subtracted directly and are somewhat cumbersome to handle mathematically. However, some simple rules are useful in dealing with sound levels. First, if a sound's acoustical energy is doubled, the sound level increases by 3 dB, regardless of the initial sound level. Thus, for example: 60 dB + 60 dB = 63 dB, and 80 dB + 80 dB = 83 dB. However, an increase of approximately 10 dBA is required to double the perceived loudness of a sound and a doubling or halving of the acoustical energy (a 3-dB difference) is at the lower limit of readily perceived change.

Although dBA may adequately indicate the level of environmental noise at any instant in time, community noise levels vary continuously. Most ambient environmental noise includes a mixture of noise from nearby and distant sources that creates an ebb and flow of sound including some identifiable sources plus a relatively steady background noise in which no particular source is identifiable. A single descriptor termed the equivalent sound level (L_{eq}) is used to describe sound that is constant or changing in level. L_{eq} is the energy-mean dBA during a measured time interval. It is the "equivalent" sound level produced by a given constant source equal to the acoustic energy contained in the fluctuating sound level measured during the interval. In addition to the energy-average level, it is often desirable to know the acoustic range of the noise source being measured. This is accomplished through the maximum L_{eq} (L_{max}) and minimum L_{eq} (L_{min}) indicators that represent the root-mean-square (RMS) maximum and minimum noise levels measured during the monitoring interval. The L_{min} value obtained for a particular monitoring location is often called the acoustic floor for that location.

To describe the time-varying character of environmental noise, the statistical or percentile noise descriptors L_{10}, L_{50}, and L_{90} may be used. These are the noise levels equaled or exceeded during 10 percent, 50 percent, and 90 percent of the measured time interval. Sound levels associated with L_{10} typically describe transient or short-term events, L_{50} represents the median sound level during the measurement interval, while L_{90} levels are typically used to describe background noise conditions.

The Day-Night Average Sound Level (L_{dn} or DNL) represents the average sound level for a 24-hour day and is calculated by adding a 10 dBA penalty to sound levels during the night period (10:00 p.m. to 7:00 a.m.). The L_{dn} is the descriptor of choice used by nearly all federal, state, and local agencies throughout the United States to define acceptable land use compatibility with respect to noise. Within the State of California, the Community Noise Equivalent Level (CNEL) is sometimes used. CNEL is very similar to L_{dn}, except that an additional 4.8 dB penalty is applied to the evening hours (7:00 p.m. to 10:00 p.m.) Because of the time-of-day penalties associated with the L_{dn} and CNEL descriptors, the L_{dn} or CNEL dBA value for a continuously operating sound source during a 24-hour period will be numerically greater than the dBA value of the 24-hour L_{eq}. Thus, for a continuously operating noise source producing a constant noise level operating for periods of 24 hours or more, the L_{dn} will be 6 dB higher than the 24-hour L_{eq} value. For convenience, a summary of common noise metrics is provided in Table 1. To provide a frame of reference, common sound levels are presented in Table 2.

1.3 NOISE STANDARDS AND REGULATIONS

1.3.1 Federal Standards and Regulations

There are a number of laws and guidelines at the federal level that direct the consideration of a broad range of noise and vibration issues. Because the Project does not require discretionary approvals by federal agencies, the proposed Project is not directly subject to federal noise regulations other than the Occupational Safety and Health Administration (OSHA). For perspective, several of the more significant noise-related federal regulations and guidelines are provided below:

- National Environmental Policy Act (42 U.S.C. 4321, et seq.) (PL-91-190) (40 CFR 1506.5)

  The National Environmental Policy Act (NEPA) is the basic national charter for protection of the environment including the noise environment. It establishes policy, sets goals, and provides means for carrying out the policy. It also contains action-forcing provisions to ensure that federal agencies act according to the letter and spirit of the Act. The regulations that follow provide guidance to federal agencies regarding what they must do to comply with the procedures and achieve the goals of the Act.

- Noise Control Act of 1972 (42 U.S.C. 4910)

  This Act establishes a national policy to promote an environment for all Americans free from noise that jeopardizes their health and welfare. To accomplish this, the Act establishes a means for the coordination of Federal research and activities in noise control, authorizes the establishment of Federal noise emissions standards for products

TABLE 1
COMMON NOISE METRICS

Unit of Measure		Description
CNEL	Community noise equivalent level	The CNEL value represents noise as measured by an A-weighted sound level. The metric includes a 4.8-decibel penalty during relaxation hours (7 p.m. to 10 p.m.) and a 10-decibel penalty for sleeping hours (10 p.m. to 7 a.m.). CNEL is similar to Ldn (which does not include the evening penalty).
dB	Decibel	Units for measuring the volume of sound, decibels are measured on a logarithmic scale, representing points on a sharply rising curve. For example, 10 decibels are 10 times more intense than one decibel and 20 decibels are 100 times more intense. A 10-decibel increase in sound level is perceived by the human ear as a doubling of the loudness of the sound.
dBA	A-weighted decibel	A sound pressure level that has been weighted to quantitatively reduce the effect of the high and low frequency noise. It was designed to approximate the response of the human ear to sound.
L_{dn}	Day-night average noise	The 24 hour average sound level, expressed in a single decibel rating, for the period from midnight to midnight obtained after the addition of a 10.0-decibel penalty to sound levels for the periods between 10:00 p.m. and 7:00 a.m.
L_{eq}	Equivalent noise level	Equivalent Noise Level Total sound energy of time-varying noise over a sample period.
L_{max}	Maximum noise level	L_{max} is the highest exponential time-averaged sound level that occurs during a stated time period. It reflects peak operating conditions and addresses the annoying aspects of intermittent noise.
L_{min}	Minimum noise level	L_{min} is the minimum exponential time-averaged sound level that occurs during a stated time period. It reflects baseline operating conditions and is commonly referenced as the noise floor.
L_1, L_{10}, L_{50}, L_{90}	Percentile noise exceedance levels	The fast A-weighted noise levels that are equaled or exceeded by a fluctuating sound level 1 percent, 10 percent, 50 percent, and 90 percent of a stated time period.

Source: Compiled by URS Corporation.

distributed in commerce, and provides information to the public respecting the noise emission and noise reduction characteristics of such products.

- Environmental Protection Agency (EPA) recommendations in Information on Levels of Environmental Noise Requisite to Protect Health and Welfare with an Adequate Margin of Safety, NTIS 550\9-74-004, USEPA, Washington, D.C., March 1974.

  In response to a federal mandate, the U.S. EPA provided guidance in this document, commonly referenced as the, Levels Document, that establishes an L_{dn} of 55 dBA as the requisite level, with an adequate margin of safety, for areas of outdoor uses including residences and recreation areas. This document does not constitute U.S. EPA regulations or standards, but identifies safe levels of environmental noise exposure without

TABLE 2
SOUND LEVELS OF TYPICAL NOISE SOURCES AND NOISE ENVIRONMENTS (A-WEIGHTED SOUND LEVELS)

Noise Source (at Given Distance)	Scale of A-Weighted Sound Level in Decibels	Noise Environment	Human Judgment of Noise Loudness (Relative to a Reference Loudness of 70 Decibels)
Military jet take-off with after-burner (50 ft)	140	Carrier flight deck	–
Civil defense siren (100 ft)	130	–	–
Commercial jet take-off (200 ft)	120	–	Threshold of Pain 32 times as loud
Pile driver (50 ft)	110	Rock music concert	16 times as loud
Ambulance siren (100 ft) Newspaper press (5 ft) Power lawn mower (3 ft)	100		Very Loud 8 times as loud
Propeller plane flyover (1,000 ft) Diesel truck, 40 mph (50 ft) Motorcycle (25 ft)	90	Boiler room Printing press plant	4 times as loud
Garbage disposal (3 ft)	80	High urban ambient sound	2 times as loud
Passenger car, 65 mph (25 ft) Living room stereo (15 ft) Vacuum cleaner (3 ft)	70	–	Moderately Loud 70 decibels (Reference Loudness)
Air conditioning unit (100 ft) Normal conversation (5 ft)	60	Data processing center Department store	1/2 as loud
Light traffic (100 ft)	50	Private business office	1/4 as loud
Bird calls (distant)	40	Lower limit of urban ambient sound	Quiet 1/8 as loud
Soft whisper (5 ft)	30	Quiet bedroom	Very Quiet
	20	Recording studio	
	10	–	Extremely Quiet
	0	–	Threshold of Hearing

Source: Compiled by URS Corporation from various published sources and widely-used references such as The Handbook of Acoustical Measurements and Noise Control, Third Edition, edited by C.M. Harris, 1991; and Noise and Vibration Control, Second Edition, edited by L.L. Beranek, 1988 Institute of Noise Control Engineering.

consideration of costs for achieving these levels or other potentially relevant considerations. It is intended to provide State and Local governments as well as the Federal Government and the private sector with an informational point of departure for the purpose of decision making." The agency is careful to stress that the recommendations contain a factor of safety and do not consider technical or economic feasibility issues, and therefore should not be construed as standards or regulations.

- Federal Energy Regulatory Commission (FERC) Guidelines On Noise Emissions From Compressor Stations, Substations, And Transmission Lines (18 C.F.R. 157.206(d)5)

  These guidelines require that:

  > "the noise attributable to any new compressor stations, compression added to an existing station, or any modification, upgrade or update of an existing station, must not exceed a day-night level (L_{dn}) of 55 dBA at any pre-existing noise sensitive area (such as schools, hospitals, or residences)."

  This policy was adopted based on the U.S. EPA-identified level of significance of 55 L_{dn} dBA.

- Federal Highway Administration (FHWA) Noise Abatement Procedures (23 C.F.R. Part 772)

  The purpose of 23 CFR Part 772 is to provide procedures for noise studies and noise abatement measures to help protect the public health and welfare, to supply noise abatement criteria, and to establish requirements for information to be given to local officials for use in the planning and design of highways. It establishes five categories of noise sensitive receptors and prescribes the use of the Hourly L_{eq} as the criterion metric for evaluating traffic noise impacts.

- Department of Housing and Urban Development (HUD) Environmental Standards (24 C.F.R. Part 51)

  HUD Regulations set forth the following exterior noise standards for new home construction assisted of supported by the Department:

  - 65 L_{dn} or less □Acceptable
  - 65 L_{dn} and □75 L_{dn} □Normally unacceptable, appropriate sound attenuation measures must be provided
  - 75 L_{dn} □Unacceptable

  HUD's regulations do not contain standards for interior noise levels. Rather, a goal of 45 decibels is set forth and attenuation requirements are geared to achieve that goal.

- Federal Transit Administration (FTA) (2006) Ground-Borne Vibration Impact Criteria for General Assessment

  FTA impact criteria for the general assessment of ground-borne vibration is set forth in the standards presented in Table 3.

TABLE 3
GROUND-BORNE VIBRATION IMPACT CRITERIA
FOR GENERAL ASSESSMENT

	Ground-borne Vibration Impact Levels (VdB re: 1 micro-inch/sec)		
Land Use Category	Frequent Events[1]	Occasional Events[2]	Infrequent Events[3]
Category 1: Buildings where vibration would interfere with interior operations.	65 VdB[4]	65 VdB[4]	65 VdB[4]
Category 2: Residences and buildings where people normally sleep.	72 VdB	75 VdB	80 VdB
Category 3: Institutional land uses with primarily daytime use.	75 VdB	78 VdB	83 VdB

Source: Federal Transit Administration (FTA) Transit Noise and Vibration Impact Criteria Assessment, Table 8-1.
Notes:
1 "Frequent Events" is defined as more than 70 vibration events of the same source per day.
2 "Occasional Events" is defined as between 30 and 70 vibration events of the same source per day.
3 "Infrequent Events" is defined as fewer than 30 vibration events of the same kind per day.
4 This criterion limit is based on levels that are acceptable for most moderately sensitive equipment such as optical microscopes.

- Occupational Safety and Health Administration (OSHA) Occupational Noise Exposure; Hearing Conservation Amendment (FR 48 (46), 9738–9785 (1983).

  The standard stipulates that protection against the effects of noise exposure shall be provided for employees when sound levels exceed 90 dBA over an 8-hour exposure period. Protection shall consist of feasible administrative or engineering controls. If such controls fail to reduce sound levels to within acceptable levels, personal protective equipment shall be provided and used to reduce exposure of the employee. Additionally, a Hearing Conservation Program must be instituted by the employers whenever employee noise exposure equals or exceeds the Action Level of an 8-hour time-weighted average (TWA) sound level of 85 dBA. The Hearing Conservation Program requirements consist of periodic area and personal noise monitoring, performance and evaluation of audiograms, provision of hearing protection, annual employee training, and record keeping.

The most relevant federal guidelines applicable to community noise exposure are those provided by the USEPA in "Information of Levels on Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety." (EPA 550/9-74-004). It should be noted that this document does not constitute EPA regulations or standards, but rather, identifies safe levels of environmental noise exposure without consideration for achieving these levels or other potentially relevant considerations. It is intended to "provide State and Local governments as well as the Federal Government and the private sector with an informational point of departure for the purpose of decision making." These guidelines are not adopted or recommended by the State of California or any local jurisdiction. The agency is careful to stress that the recommendations contain a factor of safety and do not consider technical or economic feasibility issues needed to implement these guidelines.

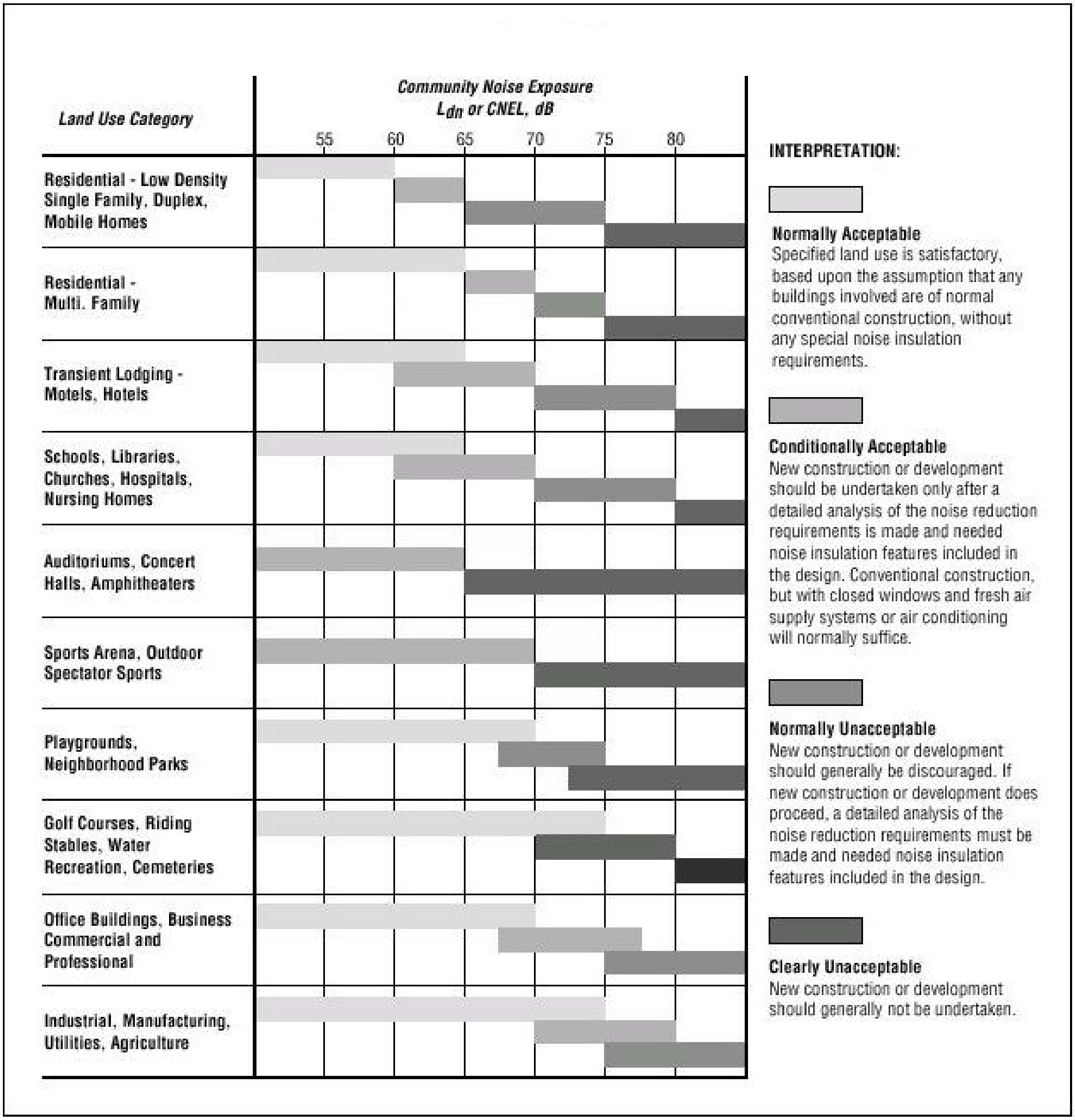
1.3.2 State of California Standards and Regulations

The California Department of Health Services (CDHS) has studied the correlation of noise levels and their effects on various land uses and has established guidelines for evaluating the compatibility of various land uses as a function of community noise exposure. The State of California requires that all municipalities prepare and adopt a comprehensive long-range General Plan. General Plans must contain a Noise Element (California Government Code Section 65302(f) and Section 46050.1 of the Health and Safety Code). The requirements for the Noise Element of the General Plan include describing the noise environment quantitatively using a cumulative noise metric such as CNEL or DNL, establishing noise/land use compatibility criteria, and establishing programs for achieving and/or maintaining land use compatibility. Noise elements shall address all major noise sources in the community including mobile and stationary noise sources.

Figure 2 presents general State of California guidelines for environmental noise levels and land use compatibility. These guidelines are used by many agencies, environmental planners, and acoustical specialists as a starting point to evaluate the potential for noise impact on and by the project and methods for achieving noise compatibility with respect to the nearby existing uses.

Occupational exposure to noise is regulated by Cal-OSHA in Title 8, Group 15, Article 105, Sections 5095-5100. The standard stipulates that protection against the effects of noise exposure shall be provided when sound levels exceed 90 dBA over an 8-hour exposure period. Protection shall consist of feasible administrative or engineering controls. If such controls fail to reduce sound levels to within acceptable levels, personal protective equipment

FIGURE 2
STATE OF CALIFORNIA COMMUNITY NOISE EXPOSURE GUIDELINES



shall be provided and used to reduce exposure of the employee. Additionally, a Hearing Conservation Program must be instituted by the employers whenever employee noise exposure equals or exceeds the Action Level of an 8-hour time-weighted average (TWA) sound level of 85 dBA. The Hearing Conservation Program requirements consist of periodic area and personal noise monitoring, performance and evaluation of audiograms, provision of hearing protection, annual employee training, and record keeping.

The California Environmental Quality Act (CEQA) (California Public Resources Code section 21000 et seq.) requires identification of "significant" environmental impacts and their feasible mitigation. Section XI of Appendix G of CEQA Guidelines (Cal. Code Regs., Title 14, App. G) lists some indicators of potentially significant impacts that include the following:

a. Exposure of persons to or generation of noise levels in excess of standards established in the local General Plan or noise ordinance, or applicable standards of other agencies,

b. Exposure of persons to or generation of excessive ground-borne vibration or ground-borne noise levels,

c. A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the Project,

d. A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the Project,

e. For a project located within an airport land use plan or, where such a plan has not been adopted, within 2 miles of a public airport or public use airport, the Project exposes people residing or working in the project area to excessive noise level, and,

f. For a project within the vicinity of a private airstrip, the project exposes people residing or working in the project area to excessive noise levels.

CEQA does not define a threshold of "significant increase" regarding noise exposure; however, based on human response and commonly applied industry standard, the following thresholds of significance will be applied to the proposed project as set forth by CEQA guidelines, a significant impact related to operational noise would result if:

- The project causes the ambient noise level measured at the property line of affected uses to increase by 3 dBA in CNEL to or within the "normally unacceptable" or "clearly unacceptable" noise/land use compatibility category; or
- The project causes any 5 dBA or greater noise increase.

1.3.3 Local Standards and Regulations

The proposed Project solar PV site is located in Los Angeles County. Portions of the proposed off-site 230-kV transmission line extend into Kern County. All noise-sensitive receptors potentially impacted by the proposed Project are located within unincorporated areas of Los Angeles and Kern counties. Most jurisdictions have unique standards and guidelines regarding noise and nuisance. These are set out in county and municipal codes and General Plans. Each noise ordinance or noise element within a municipal/county code will address noise levels that create a nuisance to surrounding communities. Noise ordinances and noise elements occasionally classify different areas within these communities based on zoning standards. Such zones can include residential areas (analyzed further based on the density of the population), industrial areas, commercial areas, agricultural areas and rural areas, among many more. The possible adverse effects of construction noise are included within the noise standards.

Ambient noise level, type of noise source, distance to the noise source, time of day, duration of the noise and zoning of the areas are variables considered when assessing the adverse effects of noise on noise-sensitive receptors. Virtually all municipal/county codes categorize noise by decibel levels that are A-weighted (dBA). Many standards will use a continuous noise equivalent level (L_{eq}) in order to express the sound levels over a given timeframe.

The Los Angeles County Noise Element, which can be found in Chapter 7 of the Los Angeles County General Plan, and the Kern County Noise Element (Chapter 7 of the Kern County General Plan), are the blueprints that contain goals and policies that guide the physical development of the unincorporated areas under each respective county’s discretionary land use authority. The General Plans also influence the development of incorporated cities, state and federal lands within the counties that bear relation to the County’s planning.

1.3.3.1 Los Angeles County

The Los Angeles County Noise Ordinance is designed to limit the exposure of the community to excessive noise levels by specifying noise standards at noise-sensitive receptors. Exterior noise guidelines are set forth in the Los Angeles County’s Noise Element for noise-sensitive land use areas that include residential properties, commercial properties, industrial properties and other noise-sensitive areas where “quiet” is considered an essential part of the environment (examples include homes, parks, hospitals, schools, churches). The Los Angeles County Noise Ordinance uses the Noise Element as a reference to define the local noise standards. These standards are in terms of L_{eq} at the nearest affected land use. The most restrictive standards are for residential land uses and other noise-sensitive areas. Table 4 represents the exterior noise standards in Los Angeles County for each different type of noise zone land use for noise-receiving properties.

The exterior noise levels presented in Table 1 are in terms of L_{50}, which means that the exterior noise level can not exceed the level found in Table 4 for more than 30 minutes per hour. As the noise levels increase, the maximum time of exposure allowed at that respective

TABLE 4
LOS ANGELES COUNTY EXTERIOR NOISE STANDARDS[1]

Noise Zone	Designated Noise Zone Land Use (Receptor Property)	Time Interval	Exterior Noise Level[2] (dBA)
I	Noise-sensitive area	Anytime	45
II	Residential properties	10:00 p.m. to 7:00 a.m. (nighttime)	45
II	Residential properties	7:00 a.m. to 10:00 p.m. (daytime)	50
III	Commercial properties	10:00 p.m. to 7:00 a.m. (nighttime)	55
III	Commercial properties	7:00 a.m. to 10:00 p.m. (daytime)	60
IV	Industrial properties	Anytime	70

1 Source: Los Angeles County, CA. County Code, Chapter 12.

2 Levels reduced by 5 dBA for impact noise.

noise level decreases. The Los Angeles County Noise Ordinance refers to the levels found in Table 4 as Standard No. 1. If Standard No. 1 is exceeded by an existing ambient noise level that is higher than the noise level limit, then the existing ambient level becomes the new standard. Standard No. 2 is the exterior noise level that can not be exceeded for more than 15 minutes in an hour. This noise level is known as the L_{25}. Five dBA is added to each level found in Table 4 in order to adjust the given noise standard limit for the time of exposure. Standard No. 3 is the exterior noise level that can not be exceeded for more than 5 minutes in an hour. This noise level is known as the $L_{8.3}$. Ten dBA is added to each level found in Table 4 in order to adjust the given noise standard limit for the time of exposure. Standard No. 4 is the exterior noise level that can not be exceeded for more than 1 minute in an hour. This noise level is known as the $L_{1.7}$. Fifteen dBA is added to each level found in Table 3 in order to adjust the given noise standard limit for the time of exposure. Standard No. 5 is the exterior noise level that can not be exceeded at any period of time. This noise level is known as the L_{max}. Twenty dBA is added to each level found Table 4 in order to adjust the given noise standard limit for the time of exposure. The Standards shown in Table 4 are applicable to Project operation.

Los Angeles County's construction noise limitations are defined at the exterior of residential structures (versus the property line for non-construction [i.e., operations] noise activities). Noise from construction is not allowed to cause a disturbance at the property line between the times of 7:00 p.m. and 7:00 a.m. during weekdays, and all day Sundays, and holidays. Furthermore, the Los Angeles County Noise Ordinance states that noise from stationary construction sources cannot exceed 50 dBA at the affected structure from 8:00 p.m. to 7:00 a.m. at single-family homes on weekdays, Sundays and holidays. The Los Angeles County

Noise Ordinance delineates construction activity from mobile and stationary construction equipment. The construction noise level limitations from mobile construction equipment are defined in the Los Angeles County Noise Ordinance as maximum noise levels for nonscheduled, intermittent, short-term operation (less than 10 days), and the construction noise level limitations from stationary construction equipment are defined as maximum noise levels for repetitively scheduled and relatively long-term operation (periods of 10 days or more). Table 5 represents the noise standards for mobile construction equipment and Table 6 represents the noise standards for stationary construction equipment at single-family, multi-family and semi-residential areas as well as commercial areas. All relevant noise standards are subject to the noise levels found at the property line. All internal-combustion-engine powered equipment shall be equipped with suitable exhaust and air-intake silencers in proper working order. A 5 dBA penalty is applied to noises that are considered impact noises.

TABLE 5
LOS ANGELES COUNTY CONSTRUCTION NOISE LIMITATIONS – MOBILE SOURCES[1]

Time/Hours	Single-family Residential	Multi-family Residential	Semiresidential/ Commercial
Daily, except Sundays and legal holidays, 7:00 a.m. to 8:00 p.m.	75 dBA	80 dBA	85 dBA
Daily, 8:00 p.m. to 7:00 a.m. and all day Sunday and legal holidays	60 dBA	64 dBA	70 dBA

1 Levels reduced by 5 dBA for impact noise.

TABLE 6
LOS ANGELES COUNTY CONSTRUCTION NOISE LIMITATIONS – STATIONARY SOURCES[1]

Time/Hours	Single-family Residential	Multi-family Residential	Semiresidential/ Commercial
Daily, except Sundays and legal holidays, 7:00 a.m. to 8:00 p.m.	60 dBA	65 dBA	70 dBA
Daily, 8:00 p.m. to 7:00 a.m. and all day Sunday and legal holidays	50 dBA	55 dBA	60 dBA

1 Levels reduced by 5 dBA for impact noise.

1.3.3.3.1 <u>Antelope Valley Area Wide General Plan</u>. The Antelope Valley Area Wide General Plan designates areas within the 60-dBA noise contour from transportation sources such as airports, railroads, and major highways as Noise Management Areas. Plan policy for these areas call for the reduction of noise impacts on adjacent land uses through both hazard avoidance actions, where practical, and hazard mitigation practices in other cases.

The Antelope Valley Area Wide General Plan is currently in the process of being updated. The current version of the updated Antelope Valley Area Wide General Plan does not contain any specific guidelines or standards related to noise.

1.3.3.2 Kern County

The Noise Element of the Kern County General Plan is designed to limit the exposure of the community to excessive noise levels by specifying noise guidelines at noise-sensitive receptors. In the Noise Element of Kern County, exterior noise guidelines are established for noise-sensitive land use areas. These standards are defined in terms of L_{eq} at the nearest affected land use. The most restrictive standards are for residential land uses.

Table 7 represents the noise standards in Kern County for stationary noise sources. Within Kern County both construction noise and project operational noise are considered noise from a stationary noise. Construction noise is temporary in nature while project operational noise is not.

TABLE 7
KERN COUNTY NOISE STANDARDS[1]

Noise Levels Not To Be Exceeded In Residential Zone[2]			
Maximum Time of Exposure	Noise Metric	7:00 a.m. to 10:00 p.m. (Daytime)	10:00 p.m. to 7:00 a.m. (Nighttime)
30 minutes/hour	L_{50}	55 dBA	50 dBA
15 minutes/hour	L_{25}	60 dBA	55 dBA
5 minutes/hour	$L_{8.3}$	65 dBA	60 dBA
1 minute/hour	$L_{1.7}$	70 dBA	65 dBA
Any period of time	L_{max}	75 dBA	70 dBA

1 Construction Noise Exemption Times:
6:00 a.m. – 9:00 p.m. Monday through Friday
8:00 a.m. – 9:00 p.m. Saturday and Sunday

2 Levels reduced by 5 dBA for impact noise.

Source: County of Kern, CA; Chapter 7 of Kern County General Plan.

Kern County□s Noise Element states that residential areas have no more than an L_{eq} of 55 dBA for 30 minutes during any hour (L_{50}) throughout daytime hours (7:00 a.m. to 10:00 p.m.) and no more than an L_{eq} of 50 dBA for 30 minutes during any hour (L_{50}) throughout nighttime hours (10:00 p.m. to 7:00 a.m. of the following day). The maximum time of exposure for increasing noise levels is shown in Table 6. Construction noise is exempt from 6:00 a.m. to 9:00 p.m. Monday through Friday and from 8:00 a.m. to 9:00 p.m. on Saturdays and Sundays. Impact noise or noise that consists of a single tone reduces the standard for both daytime and nighttime L_{eq} levels by 5 dBA.

1.4 SIGNIFICANT IMPACT CRITERIA

The following tables (Tables 8 through 10) summarize the applicable significance criteria for assessing noise exposure in the Project study area. These tables categorize noise exposure criteria by jurisdiction for Project operation and construction.

TABLE 8
SIGNIFICANT NOISE IMPACT CRITERIA – PROJECT OPERATION

Jurisdiction	Criteria	Noise Metric	Noise Level	Notes
State of California	CEQA	CNEL	3 dBA increase in “normally unacceptable” or “clearly unacceptable” noise/land use compatibility categories	
State of California	CEQA	CNEL	5 dBA increase	
Los Angeles County	Noise Ordinance	L_{eq}	45 dBA Night 50 dBA Day	Zone II Residential
Kern County	Noise Element	L_{50}	50 dBA Night 55 dBA Day	Residential

TABLE 9
SIGNIFICANT NOISE IMPACT CRITERIA – PROJECT CONSTRUCTION

Jurisdiction	Criteria	Noise Metric	Noise Level	Notes
Los Angeles County	Noise Ordinance	L_{eq}	50 dBA Night 60 dBA Day	Construction-stationary sources 5-dBA reduction for impact devices
Kern County	None	N/A	Exempt	

TABLE 10
SIGNIFICANT VIBRATION IMPACT CRITERIA –
PROJECT CONSTRUCTION

Jurisdiction	Criteria	Metric	Level	Notes
Federal	FTA	VdB	72 VdB	65 VdB is the human threshold of perception for vibration

SECTION 2.0
AFFECTED ENVIRONMENT

2.1 PROJECT SUMMARY

The proposed Project site consists of approximately 2,100 acres, and is located within Sections 11, 13, 14, and 24 in Township 8 North, Range 15 West, and within Section 18 in Township 8 North, Range 14 West (San Bernardino Base and Meridian). This site occupies an area both north and south of SR-138, and is approximately bounded on the north by West Avenue B-8, on the south by West Avenue E, on the east by 155th Street West and on the west by 180th Street West. Most of the Project site is undeveloped or has been used for agricultural production since the 1940s. The Project site includes a residential ranch area that will be removed as part of the solar field construction. The Project site is located in an area with suitable solar radiation characteristics, flat terrain, and close proximity to existing electrical transmission facilities.

The Project includes an approximately 3.5-mile-long off-site 230-kV transmission line that is proposed within or adjacent to the public road ROW of 170th Street West between the northern site boundary and SCE□s planned Whirlwind Substation in southern Kern County (refer to Figure 1).

The area surrounding the Project site is similar to the site itself and generally consists of agricultural or undeveloped land with occasional residential or farm-related structures. Fairmont Butte is near the southeast corner of the property, and the Antelope Valley Poppy Reserve (Poppy Reserve) is located approximately 1.5 miles to the southeast. Santa Monica Mountains Conservancy land is located approximately 0.5 to 1 mile to the southeast, and includes a portion of Fairmont Butte. Arthur B. Ripley Desert Woodland State Park is located approximately 2.5 miles to the southwest, and SEA □60 is adjacent to the Project on the north and east. The Fairmont-Antelope Butte SEA □57 is located approximately 850 feet to the southeast of the Project property. Refer to Figure 1 for the proposed Project site and vicinity.

2.2 NOISE-SENSITIVE RECEPTORS

Noise-sensitive receptors are defined as areas where there is a reasonable degree of sensitivity to noise. These areas include residential areas, hospitals, schools, churches, libraries, sensitive species habitat and other areas where quiet is an important attribute of the environment. Figure 3, Project Noise Measurement Locations and Noise Sensitive Receptors, depicts the locations of the nearest noise-sensitive receptors. All noise-sensitive receptors in the vicinity of the proposed Project site are single-family residences. They are identified on Figure 3 by the □R-□□ designations. For example, the single-family residence known as Residence 1 is represented on Figure 3 as □R-1.□ Ambient noise level measurements were conducted in the vicinity of these residences.

There are six noise-sensitive receptors located in Los Angeles County and two noise-sensitive receptors located in Kern County. The noise-sensitive receptors R-1 through R-5, as well as R-8, are located within Los Angeles County. Noise-sensitive receptors R-6 and R-7 are located in Kern County. Table 11 lists the coordinates for each noise-sensitive receptor location. Table 11 also lists the distances to the Project boundary, array centerline and proposed transmission line for each respective noise-sensitive receptor. Most of the noise-sensitive receptors within Los Angeles County are located less than 0.5 mile from the Project boundary. The two noise-sensitive receptors located in Kern County are more located more than 2 miles north of the Project site, but near (70 feet for R-7 and 150 feet for R-6) the proposed transmission line route.

TABLE 11
DISTANCES (IN FEET) TO PROJECT SITE FROM NOISE-SENSITIVE RECEPTOR LOCATIONS

Site ID	Latitude	Longitude	Project Boundary	Array Centerline	Proposed Transmission Line[1]
R-1	34º47.798’ N	118º27.365’ W	1,999	2,122	7,241
R-2	34º48.069’ N	118º27.266’ W	2,043	2,300	6,620
R-3	34º48.250’ N	118º26.186’ W	2,668	2,908	1,310
R-4	34º48.679’ N	118º26.136’ W	5,206	5,444	1,065
R-5	34º48.698’ N	118º25.807’ W	5,570	5,780	330
R-6	34º50.008’ N	118º25.850’ W	13,275	13,500	150[2]
R-7	34º50.023’ N	118º25.963’ W	13,180	13,406	70
R-8	34º46.367’ N	118º25.146’ W	3,666	3,812	7,192

1 Distances from transmission line are based on use of public road ROW for installation of line versus adjacent private lands.

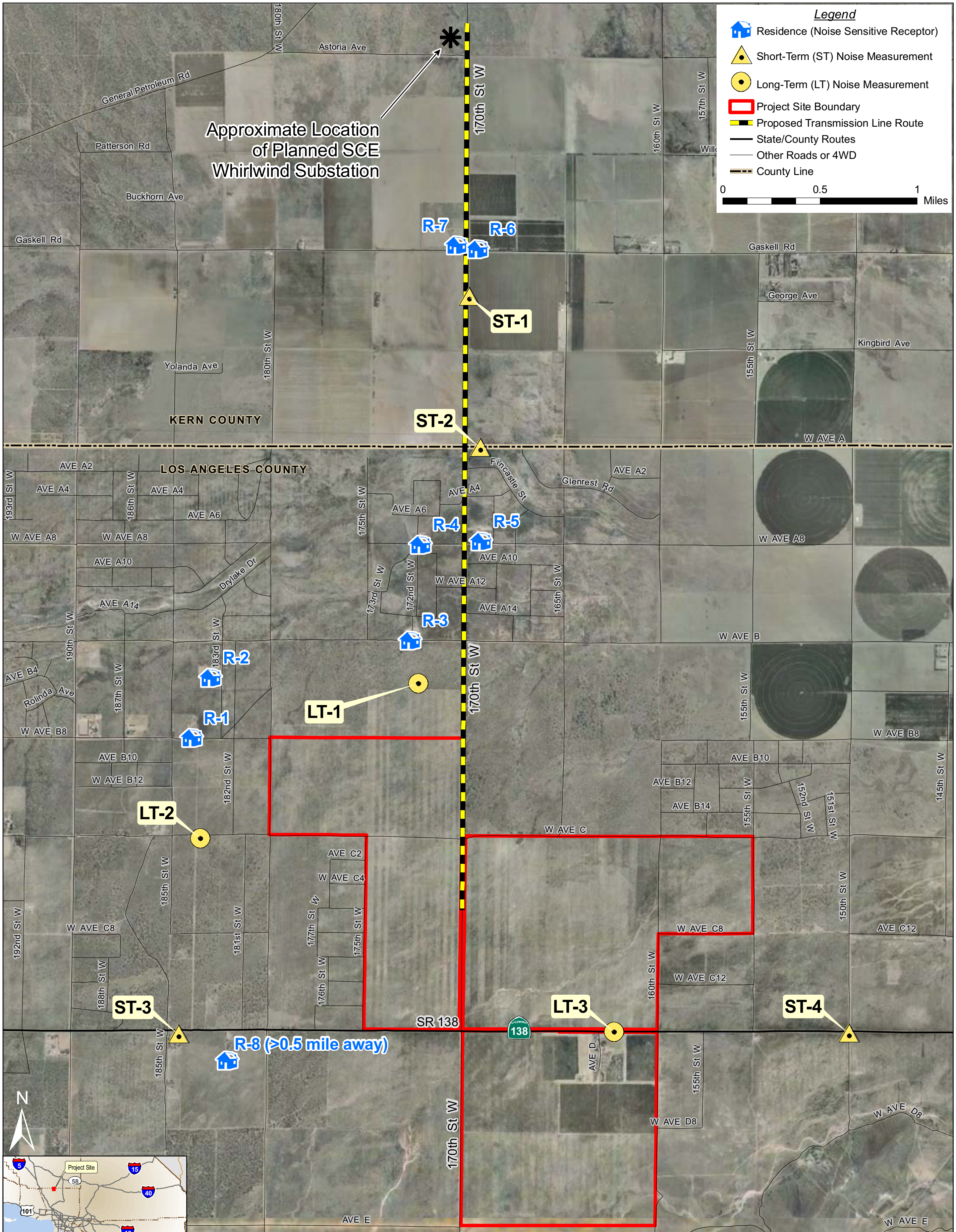
2 R-6 is a residence located on the east side of 170th Street West north of the intersection with Gaskell Road. This residence is planned to be vacated prior to construction of the AV Solar Ranch One transmission line (Skinner 2010).

2.3 AMBIENT NOISE SURVEY

2.3.1 Survey Methods

An ambient noise measurement survey was conducted in the Project study area on November 9 and November 10, 2009 in order to accurately characterize and quantify the existing ambient noise conditions. Meteorological conditions throughout the noise measurement period were favorable for accurate noise measurements. Temperatures ranged from 69 degrees Fahrenheit during the day to a low of 42 degrees Fahrenheit during nighttime hours. Wind speeds ranged from calm to 3 miles per hour. Relative humidity over the two days ranged from 20 percent to 40 percent.

The survey consisted of three long-term (LT) measurement locations and four short-term (ST) locations at nearby noise-sensitive receptors. Table 11 lists the coordinates for each LT and ST ambient noise level measurement location as well as the distances to the Project



Source:
[1] I-cubed Nationwide Prime - Aerials Express (2007-02-15 image date, 0.3m resolution), [2] ESRI StreetMap USA (2007), [3] URS Corporation.

Noise Technical Report

Figure 3. PROJECT NOISE MEASUREMENT LOCATIONS AND NOISE SENSITIVE RECEPTORS

2010

T:\NextLight_AV_EIR\deliverables\AVSR1_EIR\Noise\Appl\Fig3_ProjectNoiseMeasurementLocations&NoiseSensitiveReceptors.mxd

boundary, array centerline and transmission line. The duration of the long-term ambient noise level measurements was 24 hours. The short-term ambient noise level measurements consisted of two 20-minute measurements. One 20-minute short-term measurement was conducted during daytime hours and the other 20-minute measurement was conducted during nighttime hours at each ST measurement location.

The long-term measurements were conducted using three Larson Davis Model 820 American National Standards Institute (ANSI) Type 1 Integrating Sound Level Meters (Serial Numbers 1470, 1528, and 1597). The sound level meters were placed inside a utility box and either mounted to a tripod or bolted to a wooden pole approximately 5 feet above the ground in order to approximate the height of the human ear. The meters were tilted to the side at a 45 degree angle to avoid interference from the poles on the microphones when necessary.

Short-term monitoring was conducted using a Brüel and Kjær Model 2250 (Serial Number 2672071), Brüel and Kjær Model 2236 (Serial Number 2015788), or Brüel and Kjær Model 2231 (Serial Number 1413404). All sound level meters used for the ambient survey at the short-term monitoring locations are classified as ANSI Type 1. To ensure accuracy and to verify laboratory calibration, the instruments were also checked in the field before and after each measurement period with a Larson and Davis CAL200 calibrator (Serial Number 2794). The accuracy of the acoustical calibrator is maintained through a program established through the manufacturer and traceable to the National Institute of Standards and Technology (NIST). Certificates of Calibration are included in Appendix A. All sound measurement instruments meet the requirements of the ANSI Standard S1.4-1983 and the International Electrotechnical Commission Publications 804 and 651.

The sound measuring instruments used for the survey were set to slow time response using the A-weighted decibel (dBA) scale. A-weighting is used so that the instrument's response is similar to human hearing which is less sensitive to low and very high-pitched sounds. In all cases, the microphone height was 5 feet above the ground and the microphone was equipped with a windscreen. The SLM used for the short-term measurements was tripod mounted. Each sound measuring instrument was programmed to record Equivalent sound levels (L_{eq}), Maximum and Minimum sound levels (L_{max}, L_{min}), and statistical distributions of sound level (L_{10}, L_{50}, and L_{90}) for each measurement period. All field procedures were consistent with professional practice and ANSI Standards for measuring environmental noise.

2.3.2 Long-term Noise Monitoring Results

Three long-term measurement sites were selected (refer to Figure 3 and Table 12 for locations) and 24-hour measurements were conducted from November 9 to November 10, 2009. Table 13 summarizes the ambient data collected at the long-term measurement locations. The noise environment in the vicinity of the Project is relatively homogeneous and

TABLE 12
DISTANCES (IN FEET) TO PROJECT SITE FROM AMBIENT NOISE MEASUREMENT LOCATIONS

Site ID	Latitude	Longitude	Project Boundary	Array Centerline	Proposed Transmission Line[1]
ST-1	34º49.798' N	118º25.897' W	12,005	12,198	73
ST-2	34º49.122' N	118º25.826' W	7,915	8,122	407
ST-3	34º46.473' N	118º27.419' W	5,051	5,188	8,376
ST-4	34º46.519' N	118º23.778' W	5,183	5,315	11,024
LT-1	34º48.057' N	118º26.138' W	1,470	1,647	1,212
LT-2	34º47.349' N	118º27.309' W	1,864	1,990	7,090
LT-3	34º46.509' N	118º25.047' W	25,080	167	5,305

1 Distances from transmission line are based on use of public road ROW.

TABLE 13
LONG-TERM NOISE MEASUREMENT RESULTS

Site ID	Start Date	Start Time	Duration (Hours)	Hourly L_{eq} – Minimum (dBA)	Hourly L_{eq} – Maximum (dBA)	24-hour L_{eq} (dBA)	CNEL (dBA)	L_{dn} (dBA)
LT-1	11/9/2009	15:10:00	24	22.6	46.3	38.7	40.0	38.9
LT-2	11/9/2009	15:40:00	24	23.9	36.4	32.0	37.6	37.2
LT-3	11/9/2009	16:27:00	24	58.4	71.1	68.5	73.7	73.3

the ambient noise level data collected at LT-1 is representative of the ambient noise levels at R-3, R-4, and R-5.

The ambient noise level data collected from the LT-2 measurement site is representative of the ambient noise levels at R-1 and R-2. The measurements at LT-2 were conducted along West Avenue C and in between 182nd Street West and 185th Street West. The predominant noise sources at LT-1 and LT-2 were distant traffic and distant overhead aircraft.

The ambient noise level data collected from the LT-3 measurement site is representative of the ambient noise level at R-8. The measurements at LT-3 were conducted on the project site at the existing ranch residence (to be removed). The measurement was conducted along State Route 138 (SR-138) near Avenue D. The data collected at LT-3 is representative of the ambient noise levels at R-8 as both located along SR-138. Traffic along SR-138 was the predominant noise source at LT-3. Refer to Figure 3 for locations of all long-term noise-sensitive receptor measurement locations.

The data in Table 13 indicate that the hourly L_{eq}s range from 22.6 dBA to 46.3 dBA at LT-1, 23.9 dBA to 36.4 dBA at LT-2 and 58.4 dBA to 71.1 dBA at LT-3. Higher hourly L_{eq} values were found at LT-3 because of its proximity to SR 138. SR 138 is the predominant noise source in the project environs. The 24-hour L_{eq} at LT-1 was 38.7 dBA, while the CNEL and L_{dn} were 40.0 dBA and 38.9 dBA, respectively. The 24-hour L_{eq} at LT-2 was 32.0 dBA, while the CNEL and L_{dn} were 37.6 dBA and 37.2 dBA, respectively. The 24-hour L_{eq} at LT-3 was 68.5 dBA, while the CNEL and L_{dn} were 73.7 dBA and 73.3 dBA, respectively.

2.3.3 Short-term Noise Monitoring Results

Four short-term measurements were conducted during daytime and nighttime hours at locations meant to be representative of noise levels at nearby noise-sensitive receptor locations. Table 14 summarizes the measurement data collected. Each measurement period lasted for a total of 20 minutes. The ambient noise level data collected from the ST-1 measurement site is representative of the ambient noise levels at R-6 and R-7 as well as along the proposed transmission line ROW. The measurements at ST-1 were conducted approximately 0.25 mile south of R-6 and R-7 along 170th Street West. The ambient noise level data collected from the ST-2 measurement site is representative of the ambient noise levels along the proposed transmission line ROW. The measurements at ST-2 were conducted at the intersection of West Avenue A and 170th Street West. The ambient noise level data collected from the ST-3 measurement site is representative of the ambient noise levels at R-8. The measurements at ST-3 were conducted approximately 0.25 mile west of R-8 near the intersection of 185th Street West and SR-138. The ambient noise level data collected from the ST-4 measurement site is also representative of the ambient noise levels at R-8 because of its proximity to SR-138. The measurements at ST-4 were conducted at the intersection of 150th Street West and SR 138. Refer to Figure 3 for locations of all short-term noise-sensitive receptor measurement locations.

TABLE 14
SHORT-TERM NOISE MEASUREMENT RESULTS

Site ID	Date	Period	Start Time (20 min. Measurements)	L_{min} (dBA)	L_{max} (dBA)	L_{eq} (dBA)
ST-1	11/09/2009	Night	23:50:00	17.8	71.1	36.5
ST-1	11/10/2009	Day	13:20:00	33.0	81.8	60.2
ST-2	11/09/2009	Night	23:50:00	20.0	46.5	23.2
ST-2	11/10/2009	Day	13:20:00	22.0	78.0	55.6
ST-3	11/09/2009	Night	23:50:00	20.0	76.0	54.5
ST-3	11/10/2009	Day	13:20:00	32.2	80.7	63.5
ST-4	11/10/2009	Night	0:50:00	20.1	82.5	65.6
ST-4	11/09/2009	Day	14:10:00	16.2	80.7	56.4

The data presented in Table 14 indicate that daytime ambient noise levels range from approximately 55 dBA L_{eq} to 65 dBA L_{eq} at the four ST measurement locations. Nighttime ambient noise levels range from approximately 23 dBA L_{eq} at ST-2 to 66 dBA L_{eq} at ST-4.

SECTION 3.0
POTENTIAL NOISE IMPACTS

3.1 PROJECT CONSTRUCTION

Noise from construction activities are unique to the construction period and are analyzed separately from operational-phase impacts. Construction of the Project is scheduled to begin in the fourth quarter of 2010 and be completed in the fourth quarter of 2013. The overall construction period is expected to last up to approximately 38 months. The rate of construction activity during this period will vary. The rate of solar field construction is expected to be 8–10 MW of installed capacity per month. Two basic construction scenarios for the solar arrays are proposed: 1) pile foundations; and 2) concrete ballast foundations. The pile foundations scenario represents the worst case for assessment of Project noise impacts during construction.

Construction hours will comply with applicable local ordinances. For Los Angeles County, noise from construction is not allowed to cause a disturbance between the times of 7:00 p.m. and 7:00 a.m. during weekdays, and all day Sundays, and holidays. Furthermore, the Los Angeles County Noise Ordinance states that noise from construction cannot exceed 50 dBA at the affected structure from 8:00 p.m. to 7:00 a.m. at single-family homes on weekdays, Sundays and holidays. Construction noise is exempt from 6:00 a.m. to 9:00 p.m. on weekdays and 8:00 a.m. and 9:00 p.m. on Saturdays and Sundays within Kern County. It is anticipated that construction will generally occur between 7:00 a.m. and 5:00 p.m., Monday through Friday, but some construction may be completed outside of these hours. Additional hours may be necessary to make up schedule deficiencies, or to complete critical construction activities. Construction hours will be monitored as part of the Mitigation Monitoring and Reporting Plan (MMRP) that will be prepared in accordance with CEQA requirements (California Public Resources Code, Section 21081.6).

A database of common construction activities and noise levels is available in the Federal Highway Administration's (FHWA) Roadway Construction Noise Model (RCNM) User's Guide (FHWA RCNM, Version 1.0 User's Guide). These data were obtained from empirical measurements at major construction projects and are considered to be the best data available for assessing noise from construction activities. Source noise levels from this database were used for this analysis. Additional data for noise sources not available in this database were collected at sites of similar construction activity. A key component not included in the FHWA database and expected to be used during construction of the Project is the hydraulic vibratory pile driver. This equipment would be used to install the pile foundations for the fixed-tilt solar panels (if selected instead of trackers, which utilize concrete ballast foundations).

Major construction components include: 1) Project substation (10 months); 2) O&M facilities (9 months); 3) Drainage A cutoff wall (4 months); 4) solar field areas (30–31 months); and 5) on-site/off-site 230-kV transmission line (4 months). Noise levels and potential impacts from each of these component activities are evaluated.

3.1.1 Project Substation and Operation and Maintenance Building

The Project Substation will include a microwave tower, a control house, and two 50 percent high voltage transformers. The Operation and Maintenance (O&M) building will be a pre-engineered steel building. It is expected to be supported on structural mat foundations, which consist of reinforced concrete pads typically installed at or just below grade. The O&M building will include administrative and operational offices as well as a material storage and equipment warehouse.

The construction of the Project Substation and O&M building will take place over a period of approximately 10 months. Typical noise levels associated with the construction of a Project substation, O&M building and other similar structures are expected to be 89 dBA L_{eq} at a distance of 50 feet. The Project substation and O&M building are being constructed near the center of the proposed Project site. The nearest sensitive receiver is R-1 and is located approximately 8,700 feet from the Substation and O&M Building construction activity. Noise levels from the construction of the Substation and O&M Building are predicted to be 50 dBA at R-1. This noise level is well below the noise level thresholds established by Los Angeles and Kern counties and noise associated with the construction of the Project Substation and O&M building would be less than significant.

A temporary concrete batch plant would be located in the vicinity of the Substation and O&M Building during the construction period if tracker units with concrete ballast foundations are used. Noise levels associated with construction and operation of the concrete batch plant are estimated to be similar to noise levels associated with construction of the Substation and O&M Building and would not be significant.

3.1.2 Infiltration and Cutoff Wall

An existing incised drainage channel located on-site has the potential to naturally meander during large storm events due to bank and bed erosion. The solar panel foundations have been set back 100 feet from the edge of the existing incised channel, however the potential still exists for the channel to meander beyond these limits. As a protective measure, a cutoff wall consisting of sheet piling may be installed along each side of the existing incised channel. Installation of the sheet piling is the loudest activity associated with construction of the Drainage A Cutoff Wall.

The sheet piling material will be steel or PVC. Each sheet pile will be interlocking, and measure approximately 18 inches wide by 7/16 inch thick by 15 feet long. Sheet piling requires no excavation or grading work, and the top of the sheet pile will be installed at or slightly below existing grades. The depth of the sheet piling will be approximately 1.5 times the existing channel depth, which would result in a depth of about 15 feet. Final depths will be determined during detailed design when a detailed scour analysis will be prepared.

Noise levels associated with the installation of the sheet piles are expected to be approximately 95 dBA at a distance of 50 feet. The nearest noise sensitive receiver is R-3. The distance from the sheet pile installation to R-3 is approximately 10,300 feet. Noise levels at R-3 from the installation of the piles are estimated to be 49 dBA. This noise level is well below the noise level thresholds established by Los Angeles and Kern counties and noise associated with the construction of the cutoff wall would not be significant.

3.1.3 Solar Field

The construction of the solar field is projected to occur over a period of 30–31 months. The rate of construction is expected to be 8–10 MW of installed capacity per month. Installation of the solar field will occur over the majority of the Project site. The nearest noise sensitive receiver to the solar field is R-1. R-1 is located approximately 2,000 feet from the closest proposed solar panel location.

Construction of the solar field will occur in 6 stages and includes pile installation (e.g., fixed-tilt option), installation of ballast foundations for tracker units (tracker option only), trenches for underground wiring and conduits, and installation of overhead 34.5-kV transmission lines for connection. Of these activities, pile driving associated with the fixed-tilt option is the loudest activity and noise levels from pile driving operations are used as the basis for determining potential noise impacts from installation of the solar field. This represents a worst-case analysis.

Construction of the solar field may encompass some nighttime work. No pile driving or earthwork will be conducted during nighttime hours. There will also be no heavy equipment utilized during nighttime hours. The following activities can be expected to periodically occur during nighttime construction:

- PV module/tracker assembly (inside and outside)
- PV module installation in the field
- Electrical wiring installation
- Electrical system testing and interconnection to grid
- Dust control watering

These activities would not result in noise impact.

The fixed-tilt option for the solar panels would require the installation of approximately 465,000 steel piles approximately 6 inches in diameter driven to a depth of approximately 10 feet. Due to the potential for noise impact from pile driving operations and the variety of pile driving options available, various pile drivers were evaluated based on noise emissions. As the result of this evaluation, vertical hydraulic vibratory pile drivers were selected by the Applicant. The noise emissions for these drivers are significantly lower than noise emissions from other pile driving equipment. Typical pile driver noise is between 95□100 dBA at a distance of 50 feet.

Noise measurements specific to vertical hydraulic pile drivers were conducted to verify the noise emission data. Based on noise measurement data conducted during pile driving operations at a similar facility, noise levels for this class of equipment under operating conditions similar to the operating conditions expected during the construction of the proposed Project, are 88 dBA L_{eq} at a distance of 50 feet from the front of the equipment and 81 dBA L_{eq} at a distance of 50 feet from the rear of the equipment. Noise levels at the rear of the equipment are shielded by the equipment itself.

Noise modeling analysis indicates that noise levels from pile driving operations at R-1 are predicted to be 61 dBA L_{eq}. Pile drivers are classified as impact device in the Los Angeles County Noise Ordinance and the applicable standard is 55 dBA L_{eq}. Further analysis indicates that the minimum distance from pile driving operations to a noise sensitive receiver needed to comply with the 55 dBA standard is 3,000 feet. Pile driving operations conducted within 3,000 feet may exceed the 55 dBA L_{50} standard and result in significant noise impact. Pile driving operations will be conducted over a large area and the overwhelming majority of the proposed piles are located at distances well beyond 3,000 feet. The average distance from the potential pile installation to the nearest noise sensitive receiver is approximately 2 miles (10,560 feet) and noise levels from pile driving operations would be approximately 47 dBA L_{eq} when attenuated over this distance.

Pile driving operations will generate ground-borne vibration. The Federal Transit Administration (FTA) has established ground-borne vibration impact criteria for specific land use categories. The most stringent criterion for ground-borne vibration is at buildings where vibration would interfere with interior operations. Impacts occur when vibration levels exceed 65 VdB at these locations. Ground-borne vibration levels below 65 VdB are usually not perceptible. Vibration data was not collected for the pile driver that is proposed for use during the construction and installation of the solar field equipment. Typical impact pile drivers generate vibration levels of 104 VdB at a distance of 25 feet. The vertical hydraulic pile driver that is proposed for Project use will generate significantly lower levels of ground-borne vibration than a typical impact pile driver. Vibration levels from a typical impact pile driver will exceed the 65 VdB impact criterion level at any noise sensitive receiver within a distance of 500 feet. The closest noise sensitive receiver is 2,000 feet from the Project boundary. There will be no significant impacts at noise sensitive receivers due to ground-borne vibration caused by the installation of the solar field equipment.

3.1.4 On-site/Off-site 230-kV Transmission Line

The proposed 230-kV transmission line consists of an approximately 3.5-mile-long off-site segment and a 0.75-mile-long on-site segment. The total transmission line length is approximately 4.25 miles long and is proposed to run along or adjacent to the public ROW of 170th Street West to interconnect to SCE's planned Whirlwind Substation north of the Project site in southern Kern County.

Construction of the proposed 230-kV transmission line along or adjacent to 170th Street West is expected to take place over a period of 4 months, and is planned to occur in time to deliver first power from the Project in the third quarter of 2011. The centerline of the transmission line route will first be surveyed, with each pole location clearly staked. The proposed transmission line is expected to require a total of approximately 36 tubular steel poles. The transmission line route and pole locations will be located approximately 5 feet inside of the public road ROW or on adjacent private lands.

Pole holes will typically be approximately 6 to 10 feet in diameter, 20 to 30 feet deep, and will be augured with a truck mounted pole auger/pressure digger with rock teeth. Once the hole is complete, poles will be set in poured concrete foundations within the holes. Structures and conductor support hardware will be assembled at each pole location to minimize damage during transport.

Construction of the transmission line will require a laydown area at each pole location for use as temporary laydown or as a staging area for equipment, poles, and hardware. The typical laydown area at each pole location is expected to be approximately 100 feet in length by 50 feet in width. The equipment that is expected to be used for construction of the off-site transmission line is listed in Table 15.

The construction equipment associated with the construction of the 230-kV overhead transmission line is considered mobile construction equipment and is subject to different noise standards in Los Angeles County than the noise standards used for the stationary construction standards applicable to construction of the solar farm. For mobile construction equipment, the Los Angeles County Noise Ordinance states that noise levels can not exceed 75 dBA L_{eq} at single-family residences between the hours of 7:00 a.m. and 8:00 p.m. on weekdays. This standard is applicable to noise sensitive receivers located in Los Angeles County. These include R-1, R-2, R-3, R-4, R-5, and R-8. Sensitive receivers R-6 and R-7 are located in Kern County. Construction noise occurring between 6:00 a.m. to 9:00 p.m. during weekdays is exempt from noise regulation in Kern County.

TABLE 15
LIST OF EQUIPMENT FOR 230-KV TRANSMISSION LINE CONSTRUCTION

Number of Units	Equipment	Function
1	Backhoe or tracked tractor with blade	Prepare temporary staging areas and site restoration throughout the alignment
1	Corner-mount pole hole auger/pressure digger mounted on the back of a rubber-tired truck	Excavate pole holes for direct embedded poles or for poured concrete piers
1	Forklift	Load/unload material at temporary lay-down yards
2	Crane	Lift and set assembled towers (or tower sections when space is limited)
1	Flatbed trucks	Carry crews and materials to assemble the towers. Haul crossarms, and materials Pull miscellaneous equipment trailers as required
1	Conductor reel trailer	Haul conductor reels
1	Pole trailers	Haul pole sections to the temporary lay-down yards
2	High-reach bucket trucks	Aerial framing, installing and un-installing conductor stringing sheaves, installing dampers, and conductor clipping
1	Truck-mounted conductor tensioner	Stringing conductor
1	Truck-mounted conductor puller	Stringing conductor
1	Concrete truck	Pouring pole foundations

The predominant noise source associated with the construction of the transmission line is the corner-mount pole hole auger/pressure digger. This equipment is expected to generate noise levels of 84 dBA L_{eq} at a distance of 50 feet. R-7 is the only noise-sensitive receptor that will receive noise levels higher than 75 dBA L_{eq} during construction (assuming transmission line constructed in public road ROW versus adjacent private lands on east side of 170th Street West). R-7 is located in Kern County and construction noise at this location is not subject to regulation.

3.2 TRAFFIC NOISE

Project-related traffic is expected to use existing routes along I-5 and SR-14, SR-138, and finally 170th Street West to the Project site. Traffic noise was modeled using the increase in noise from existing conditions to project operation conditions.

There are three different scenarios for changes in traffic that are addressed. The first scenario is associated with the increase in traffic noise from existing traffic conditions to expected traffic conditions in the year 2013 with □No Project□ conditions, the second is Year 2013 Project construction traffic, and the third is Project operations traffic.

Table 16 displays the existing and anticipated Average Daily Traffic (ADT) volumes in 2013 with no Project along the eight road segments that are associated with the proposed Project. The corresponding CNEL levels, at a distance of 15 meters from the road, along each segment for both ADT volumes is calculated and the expected change in level is listed in the column on the right. The "2013 No Project CNEL" for each road segment can now be used to compare changes in traffic noise due to construction and operation in 2013 and 2014, respectively.

TABLE 16
INCREASE IN TRAFFIC NOISE LEVELS FROM EXISTING CONDITIONS TO 2013 NO PROJECT CONDITIONS

Road Segment	Existing ADT	Existing CNEL (dBA)	2013 No Project ADT	2013 No Project CNEL (dBA)	Increase in CNEL Above Existing (dBA)
I-5 north of SR-138	71,000	77.3	80,159	77.8	0.5
I-5 south of SR-138	71,000	77.3	80,159	77.8	0.5
SR-138 west of 170th Street West	2,730	63.1	3,082	63.7	0.6
SR-138 east of 170th Street West	2,730	63.1	3,082	63.7	0.6
170th Street West north of SR-138	254	47.7	287	48.2	0.5
170th Street West south of SR-138	88	43.0	99	43.6	0.6
SR-14 north of SR-138	37,500	74.5	42,338	75.0	0.5
SR-14 south of SR-138	36,000	74.3	40,644	74.9	0.6

As shown in Table 16, minor increases in traffic-related noise are expected in Year 2013 as compared to Existing Conditions.

For the pile foundation construction scenario there are up to 906 one-way worker trips (453 workers) and 30 one-way truck trips (15 trucks) per day added to 2013 "No Project" conditions. The distribution of the worker and truck trips varies by road segment.

Table 17 displays the expected increases in CNEL at a distance of 50 feet (15 meters) from the respective segment, in 2013, due to construction at the 8–10 MW-per-month construction rate. The increases in CNEL along both segments of 170th Street West for both construction alternatives are at or above the allowable 5 dBA increase. The calculated increases in CNEL are at a distance of 50 feet (15 meters). The highest increase in CNEL is 9.0 dBA along the south segment of 170th Street West. Based on CEQA guidelines, an increase in traffic noise above 5 dBA CNEL is the significance threshold for assessment of traffic noise. The closest noise-sensitive receptor to this segment, R-8, is approximately 6,400 feet northwest from where construction traffic along 170th Street West. The CNEL from construction traffic along 170th Street West is anticipated to be 52.6 dBA at a distance of 50 feet. Over a distance of

TABLE 17
INCREASE IN TRAFFIC NOISE LEVELS DUE TO
8-10 MW/MONTH CONSTRUCTION RATE

Road Segment	2013 No Project ADT	2013 No Project CNEL (dBA)	2013 8-MW/ Month ADT	2013 8-10 MW/ Month CNEL (dBA)	Increase in CNEL Above No Project Conditions (dBA)
I-5 north of SR-138	80,159	77.8	80,394	77.8	0
I-5 south of SR-138	80,159	77.8	80,159	77.8	0
SR-138 east of 170th Street West	3,082	63.7	3,318	64.0	0.3
SR-138 east of 170th Street West	3,082	63.7	3,786	64.5	0.8
170th Street West north of SR-138	287	48.2	755	53.6	5.4
170th Street West south of SR-138	99	43.6	567	52.6	9.0
SR-14 north of SR-138	42,338	75.0	42,384	75.0	0
SR-14 south of SR-138	40,644	74.9	41,299	74.9	0

approximately 6,400 feet, the CNEL will be attenuated approximately 21 dBA. Construction traffic noise along 170th Street West will not be heard at R-8, or any other noise-sensitive receptor, due to its remote distance and existing ambient noise levels. The ambient noise level measurement data collected at LT-3 is representative of ambient noise levels at R-8. The minimum hourly L_{eq} value measured at LT-3 was 58.4 dBA. Noise from construction traffic along 170th Street West will be attenuated well below a level of 58.4 dBA at R-8. Noise impacts due to construction traffic would be less than significant.

For Project operational traffic noise, there will be 32 daily trips (16 workers) made by workers at the Project site and periodic, but minimal, truck deliveries. The distribution of the daily trips varies by road segment. In Table 18, 2014 “No Project” conditions and 2014 Project conditions are listed for each respective road segment. The increase in CNEL from “No Project” to “Project” is less than 0.5 dBA for all of the road segments. There are no anticipated noise impacts as a result of Project operational traffic conditions.

3.3 OPERATIONAL NOISE

After construction is completed there will be the solar field and ancillary facilities located on-site and the 230-kV transmission line originating on-site and connecting to the planned SCE Whirlwind substation located approximately 3.5 miles north of the site. Under worst-case noise assumptions, on-site operational noise would consist of noise from the tracking drive motors (one tracking motor per 1,200 feet of trackers), 185 pads containing three enclosed inverters and one transformer, a substation containing two transformers, and operations and maintenance facilities. Off-site operational noise would consist of corona discharge noise from the 230-kV transmission line.

TABLE 18
INCREASE IN TRAFFIC NOISE LEVELS DUE TO PROJECT OPERATION CONDITIONS

Road Segment	2014 No Project ADT	2014 No Project CNEL (dBA)	2014 Project ADT	2014 Project CNEL (dBA)	Increase in CNEL Above No Project Conditions (dBA)
I-5 north of SR-138	83,365	78.0	83,369	78.0	0
I-5 south of SR-138	83,365	78.0	83,365	78.0	0
SR-138 west of 170th Street West	3,205	63.8	3,209	63.8	0
SR-138 east of 170th Street West	3,205	63.8	3,234	63.9	0.1
170th Street West north of SR-138	298	48.3	330	48.8	0.5
170th Street West south of SR-138	103	43.7	103	43.7	0
SR-14 north of SR-138	44,031	75.2	44,031	75.2	0
SR-14 south of SR-138	42,270	75.0	42,299	75.0	0

3.3.1 On-site Noise

Assuming tracker units are installed, the tracking drive motors and 185 pads would be distributed throughout the solar field and operation of these components would generally be limited to daylight hours. The transformers located throughout the solar field will all be enclosed and will not be audible at any nearby noise sensitive receivers. The inverters are expected to be the primary contributor of operational noise at nearby noise-sensitive receivers. Inverters will be operational during daytime periods. Facility design specifications indicate that three inverters generate noise levels of 70 dBA at a distance of 3 feet. The nearest noise-sensitive receiver is located approximately 2,000 feet from the solar field. Based on these data, acoustical modeling indicates that noise from the inverters, transformers, and tracking motors will be below existing ambient noise levels at all nearby noise-sensitive receivers. Noise from the tracking drive motors and the 185 pads containing the inverters and transformers will not be audible at any noise-sensitive receivers. The substation and operations and maintenance facilities are centrally located within the solar field. The Project Substation will have two transformers at its location. Each transformer has a sound pressure level of 85 dBA from a distance of 6 feet. At a distance of 2,000 feet, the combined sound pressure levels from these two transformers will be about 37.5 dBA. This sound pressure level will not be audible at any of the noise sensitive receivers.

There will be on-site work occurring at the O□M building during daytime and nighttime hours. During daytime hours, material from transport trucks will be received at the O□M building. Nighttime work at the O□M building is essentially the same as daytime work except that it is less frequent. The O□M building is far removed from potential noise sensitive receivers and noise from these operations will not be audible at any potential noise sensitive receivers.

Maintenance activities for the solar field have the potential to occur during both daytime and nighttime hours. For the purposes of this report, worst case scenarios are assumed and it is assumed that any maintenance activities will occur during nighttime hours. These activities are expected to consist of periodic cleaning of the solar panels and equipment maintenance. Maintenance work can be categorized by light, medium and major maintenance work. Each intensity level has distinct maintenance activities, number of personnel and equipment that will be used. Light work is likely to occur four days per week and consist of fuse replacement at the combiner box, module replacement, string wiring, bolt tightening and minor tracker work. Two men, one pick-up truck, a small battery powered light stand, battery powered hand tools and other hand tools will likely be used for light maintenance work. Medium work is likely to occur two days per week and consist of combiner box replacement, minor inverter repairs, main DC fuses or AC switches replacement, and tracker motor and linkage repairs. Two men, one pick-up truck, a gas powered light stand with a 10-kW portable generator, battery powered hand tools and other hand tools will likely be used for medium maintenance work. Major work is likely to occur one day per month with the potential for work to continue for two to three consecutive days. Major work will consist of DC or AC wiring replacement, major inverter repairs, transformer repair or replacement and tracker replacement. Four men, two pick-up trucks, one forklift, a gas powered light stand with a 5 kW portable generator, battery powered hand tools and other hand tools will likely be used for heavy maintenance work. The closest residence is 2,000 feet away and nighttime maintenance activities would not be audible at this location or at any other noise-sensitive receivers. Nighttime maintenance activity within 3,000 feet of a noise sensitive receiver would be scheduled prior to 10:00 p.m. to avoid potential noise impacts. This limitation only applies to the northwest portion of the Project site.

3.3.2 Off-site Noise

Potential off-site operational noise would consist of corona discharge noise from the 230-kV transmission line. The off-site portion of the transmission line would be aligned along or adjacent to the east side of 170th Street West in Los Angeles County, and on or adjacent to the west and east sides of 170th Street West in Kern County (refer to Figure 2).

Approximately 46 tubular steel poles (50 to 125 feet tall) will be used for the transmission poles. The poles will be approximately 4 to 8 feet in diameter and will be spaced approximately 700 feet apart (on average). All poles will be grounded using grounding rods or other suitable means. Additionally, shield wire will be attached to the ground wire for lightning protection.

Corona is a phenomenon associated with all energized transmission lines. Under certain conditions, the localized electric field near an energized conductor can be sufficiently concentrated to produce a tiny electric discharge that can ionize air close to the conductors. This partial discharge of electrical energy is called corona discharge, or corona, and the resulting ionization of air at the surface of the conductor is a source of audible noise. When corona is produced, it is heard as snaps, crackles, and pops. Several factors, including conductor voltage, shape, and diameter, and surface irregularities such as scratches, nicks, dust, or water drops can affect a conductor□s electrical surface gradient and its corona performance. Transmission line designers have two options to reduce the surface voltage gradient at the conductor surface and thus minimize corona effects: 1) increase the diameter of the conductor; or 2) increase the effective diameter by using multiple conductors held apart by spacers. To minimize the potential for corona noise from the proposed 230-kV transmission line, the diameter of the conductors has been optimized and corona rings will be installed at all conductor attachment points.

The nearest noise sensitive receivers potentially affected by noise from the transmission line are receiver R-3, R-4, R-5, R-6, and R-7. The distance from each of these receivers to the transmission line are shown in Table 19.

TABLE 19
DISTANCES (IN FEET) TO PROPOSED OFF-SITE TRANSMISSION LINE FROM NOISE-SENSITIVE RECEPTORS

Site ID	Latitude	Longitude	Distance to Proposed Transmission Line (Feet)[1]
R-3	34º48.250’ N	118º26.186’ W	1,310
R-4	34º48.679’ N	118º26.136’ W	1,065
R-5	34º48.698’ N	118º25.807’ W	330
R-6	34º50.008’ N	118º25.850’ W	150
R-7	34º50.023’ N	118º25.963’ W	70

1 Distances from transmission line are based on use of public road ROW versus adjacent private land.

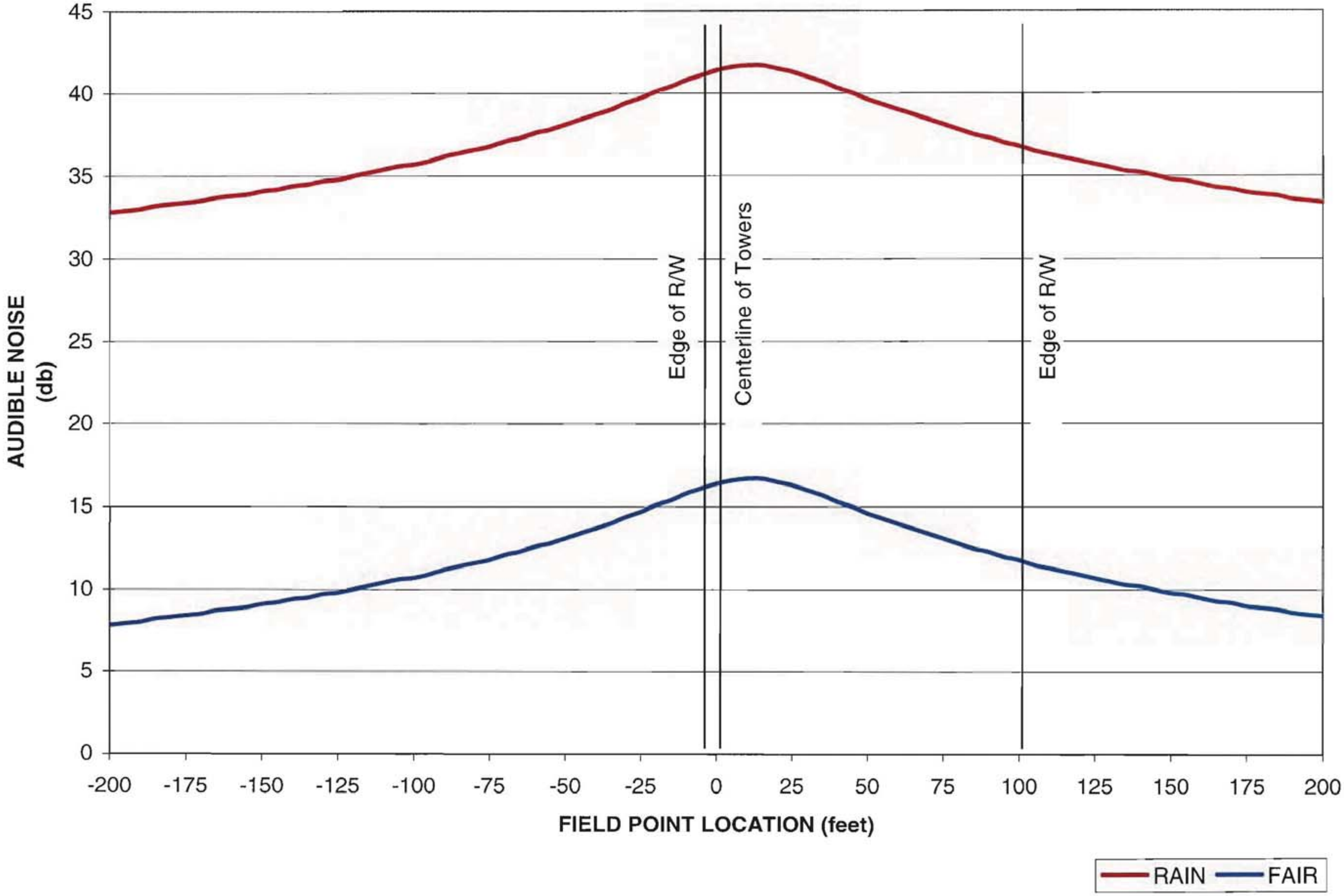
The proposed 230-kV transmission line will be designed and constructed with conventional transmission line methods, configurations, and materials that specifically incorporate design practices to control corona losses. These design methods are standard industry practices, and pertain to the appropriate sizing of conductors, use of a three-phase conductor transmission system, and use of external corona shielding rings. These types of 230-kV facilities have generally performed well throughout the United States in fair weather, and without unacceptable electromagnetic corona noise generation, even in foul (i.e., rainy) weather, where the small diameters of rain droplets on the conductors increase voltage gradients and lead to ionization of air in the vicinity of the conductors.

The Project 230-kV transmission line EMF noise levels during operation, which include consideration of corona effects, were modeled with the results presented on Figure 4. As shown, the maximum transmission line noise level during operation is approximately 42 dB during rainy conditions, and occurs directly under the conductors. During fair weather, the maximum transmission line noise is approximately 17 dB directly under the conductors. Since the decibel is a logarithmic unit of measurement, this noise attenuates exponentially with distance from the conductor. Noise levels from a line source attenuate at a rate of 3 dBA per doubling of distance.

The Project corona noise levels were calculated using methodology provided in Chapter 8 of the *Transmission Line Reference Book, 345-kV and Above* (EPRI 1987). These methods are considered industry-accepted methods for calculating corona noise levels for transmission lines 115 kV and greater. The calculation tools used to make the audible noise estimates consist of a suite of Microsoft Excel spreadsheets developed by Bonneville Power Administration that follow the previously developed program titled, Corona and Field Effect Program (Version 3). This program and others like it have been used with confidence to predict electric and magnetic field levels, and audible noise levels, for many years. To estimate audible noise, calculations are performed for a height of 1 meter above the ground, and at mid-span where the conductor is positioned at its lowest point between structures (the estimated maximum sag point).

As shown on Figure 4, the maximum noise levels occur directly under the transmission line. The transmission line is slightly offset from the poles. The maximum noise level from corona discharge directly under the transmission line during typical fair weather conditions is approximately 18 dBA. This noise level is below ambient noise levels and would likely be inaudible in consideration the existing noise environment. The maximum noise level directly under the transmission line during typical rain conditions is approximately 43 dBA. Ambient noise measurements during rainy conditions were not conducted; however, this outdoor noise level during periods of inclement weather is not significant in view of the higher than normal ambient noise levels that typically accompany rainy conditions.

Under most conditions corona discharge noise will not be audible; however, regardless of weather conditions, potential corona discharge noise, even at locations directly under the transmission line, is below the most restrictive nighttime noise standards established by Los Angeles and Kern counties. These standards are 45 dBA for nighttime noise in Los Angeles County and 50 dBA for nighttime noise in Kern County. No noise impacts would result due to corona discharge noise.



Source: TriAxis Engineering Co. Dated 2009 Graph 5	**Noise Technical Report**	**Figure 4.** EMF AUDIBLE NOISE (FAIR WEATHER AND RAIN)	2010

SECTION 4.0
MITIGATION MEASURES AND CONCLUSIONS

4.1 MITIGATION

Construction hours will comply with applicable local ordinances. These hours are 7:00 a.m. to 7:00 p.m. within Los Angeles County and 6:00 a.m. to 9:00 p.m. on weekdays and from 8:00 a.m. to 9:00 p.m. on Saturdays and Sundays within Kern County. It is anticipated that construction will generally occur between 7:00 a.m. and 5:00 p.m., Monday through Friday. Additional hours may be necessary to make up schedule deficiencies, or to complete critical construction activities. Construction hours are expected to be monitored as part of the Mitigation Monitoring and Reporting Plan (MMRP) that will be prepared in accordance with CEQA requirements (California Public Resources Code, Section 21081.6).

As stipulated below in Mitigation Measure NOISE-2, each piece of construction equipment will be fitted with efficient, well-maintained mufflers that reduce equipment noise emissions in order to reduce noise emission levels from equipment and vehicles at the Project site. The Applicant/construction contractor will ensure that Project construction equipment and vehicles will be well maintained.

The only exceedence of applicable noise standards occurs when pile driving, associated with the fixed-tilt option, occurs in the northwest portion of the Project site within 3,000 feet of a sensitive receiver location. Based on the location of the Project site and the location of noise sensitive receivers, the vibratory pile driver may exceed the noise standard for the noise-sensitive receptors at R-1, R-2, and R-3 if the front of the pile driver is facing the direction of the respective noise-sensitive receptor within a distance of 3,000 feet.

Mitigation Measure NOISE-1: In order to reduce the noise levels generated by the vibratory pile driver and comply with all applicable noise standards, the pile driver shall be oriented such that the rear of the pile driver faces toward the noise-sensitive receptors when the vibratory pile driver is being utilized within 3,000 feet of the receptors.

Mitigation Measure NOISE-2: Construction equipment and vehicles shall be fitted with efficient and well-maintained mufflers to reduce noise emission levels. In addition, the Project construction equipment and vehicles shall be maintained according to the manufacturers instructions and recommendations.

4.2 CONCLUSIONS

No significant noise impacts are expected as a result of project operations. A potentially significant impact associated with project construction was identified. With the implementation of Mitigation Measure NOISE-1, this impact would be reduced to less than significant levels.

SECTION 5.0
REFERENCES

Bolt, Beranek, and Newman, Inc. 1973. Fundamentals and Abatement of Highway Traffic Noise. U.S. Department of Transportation Contract Number DOT-FH-11-7976, Office of Environmental Policy, Federal Highway Administration.

CEQA. Public Resources Code (PRC), Section 21081.6. 2006.

County of Kern. 2007. Kern County General Plan. Noise Element. March 13.

2005. Zoning Ordinance of Kern County. Chapter 8.36 Noise Control. February.

County of Los Angeles. 1978. Los Angeles County Noise Ordinance. Chapter 12.08 Noise Control.

1975. Los Angeles County General Plan. Noise Element. January, 1975.

EPRI. 1987. Transmission Line Reference Book, 345-kV and Above. Electric Power Research Institute. Palo Alto, CA.

Federal Transit Administration—Department of Transportation. 2006. Transit Noise and Vibration Impact Assessment Manual. Vanasse Hangen Brustlin, Inc.

Federal Transit Administration (FTA). 2006. Transit Noise and Vibration Impact Assessment. FTA-VA-90-1003-06, May 2006.

Harris, Cyril M., ed. 1991. Handbook of Acoustical Measurements and Noise Control. Third Edition. McGraw-Hill, Inc. New York, NY.

Reherman, Clay N., Judith L. Rochat, et al. 2006. FHWA RCNM, Version 1.0 User's Guide. U.S. Department of Transportation, Federal Highway Administration. Cambridge, MA.

APPENDIX A
CERTIFICATION OF CALIBRATION FOR AMBIENT NOISE SURVEY EQUIPMENT

OB. NR	LOC.

MANUFACTURER'S CERTIFICATE OF CONFORMANCE

We certify that Brüel & Kjær -2250--- Serial No 2672071
has been tested and passed all production tests, confirming compliance with the manufacturer's published specification at the date of the test.

The final test has been performed using calibrated equipment, traceable to National or International Standards or by ratio measurements.

Brüel & Kjær is certified under ISO 9001:2000 assuring that all calibration data for test equipment are retained on file and are available for inspection upon request.

Nærum 28-jan-2009

Torben Bjørn
Vice President
Operations

Please note that this document is not a calibration certificate, for information on our calibration services please contact your nearest Brüel & Kjær Service Center.

BA 0238 – 15

WORLD HEADQUARTERS: DK-2850 Nærum · Denmark
Telephone: +45 45 80 05 00 · Fax: +45 45 80 14 05 · http://www.bksv.com · e-mail: info@bksv.dk

Brüel & Kjær

PCB [illegible]
A PCB GROUP COMPANY

Certificate of Calibration and Conformance

Certificate Number 2008 108100

Instrument Model 820, Serial Number 1470, was calibrated on 27JUN2008. The instrument meets factory specifications per Procedure D0001.8160, ANSI S1.4 1983, IEC 651-Type 1 1979, and IEC 804-Type 1 1985.

Instrument found to be in calibration as received: YES
Date Calibrated: 27JUN2008
Calibration due: 27JUN2010

Calibration Standards Used

MANUFACTURER	MODEL	SERIAL NUMBER	INTERVAL	CAL DUE	TRACEABILITY NO.
Larson Davis	[illegible]C0209	[illegible]	12 Months	21APR2009	2008-105057

Reference Standards are traceable to the National Institute of Standards and Technology (NIST)

Calibration Environmental Conditions

Temperature: 23 ° Centigrade

Relative Humidity: 27 %

Affirmations

This Certificate attests that this instrument has been calibrated under the stated conditions with Measurement and Test Equipment (M&TE) Standards traceable to the U.S. National Institute of Standards and Technology (NIST). All of the Measurement Standards have been calibrated to their manufacturers' specified accuracy / uncertainty. Evidence of traceability and accuracy is on file at Provo Engineering & Manufacturing Center. An acceptable accuracy ratio between the Standard(s) and the item calibrated has been maintained. This instrument meets or exceeds the manufacturer's published specification unless noted.

This calibration complies with the requirements of ISO 17025 and ANSI Z540. The collective uncertainty of the Measurement Standard used does not exceed 25% of the applicable tolerance for each characteristic calibrated unless otherwise noted.

The results documented in this certificate relate only to the item(s) calibrated or tested. A one year calibration is recommended, however calibration interval assignment and adjustment are the responsibility of the end user. This certificate may not be reproduced, except in full, without the written approval of the issuer.

"AS RECEIVED" data same as shipped data.
Tested with [illegible]

Signed: [signature]
Technician: Ron Harris

Provo Engineering and Manufacturing Center 1681 West 820 North Provo, Utah 84601
Toll Free: 888.258.3222 Telephone: 716.926.8243 Fax: 716.926.8215
ISO 9001:2000 Certified

PCB PIEZOTRONICS
A PCB GROUP COMPANY

Certificate of Calibration and Conformance

Certificate Number 2008-108099

Instrument Model 820, Serial Number 1528, was calibrated on 27JUN2008. The instrument meets factory specifications per Procedure D0001.8160, ANSI S1.4 1983, IEC 651-Type 1 1979, and IEC 804-Type 1 1985.

Instrument found to be in calibration as received: YES
Date Calibrated: 27JUN2008
Calibration due: 27JUN2010

Calibration Standards Used

MANUFACTURER	MODEL	SERIAL NUMBER	INTERVAL	CAL. DUE	TRACEABILITY NO.
Larson Davis	LDSigGn/2209	0599/0104	12 Months	[illegible]JAN2009	[illegible]

Reference Standards are traceable to the National Institute of Standards and Technology (NIST)

Calibration Environmental Conditions

Temperature: 23 ° Centigrade

Relative Humidity: 27 %

Affirmations

This Certificate attests that this instrument has been calibrated under the stated conditions with Measurement and Test Equipment (M&TE) Standards traceable to the U.S. National Institute of Standards and Technology (NIST). All of the Measurement Standards have been calibrated to their manufacturers' specified accuracy / uncertainty. Evidence of traceability and accuracy is on file at Provo Engineering & Manufacturing Center. An acceptable accuracy ratio between the Standard(s) and the item calibrated has been maintained. This instrument meets or exceeds the manufacturer's published specification unless noted.

This calibration complies with the requirements of ISO 17025 and ANSI Z540. The collective uncertainty of the Measurement Standard used does not exceed 25% of the applicable tolerance for each characteristic calibrated unless otherwise noted.

The results documented in this certificate relate only to the item(s) calibrated or tested. A one year calibration is recommended; however calibration interval assignment and adjustment are the responsibility of the end user. This certificate may not be reproduced, except in full, without the written approval of the issuer.

"AS RECEIVED" data same as shipped data.
Tested with 828-2457

Signed: [signature]
Technician: Ron Harris

Provo Engineering and Manufacturing Center, 1681 West 820 North, Provo, Utah 84601
Toll Free: 888.258.3222 Telephone: 716.926.8243 Fax: 716.926.8215
ISO 9001-2000 Certified

PCB PIEZOTRONICS
A PCB GROUP COMPANY

Certificate of Calibration and Conformance

Certificate Number 2008-108097

Instrument Model 820, Serial Number 1597, was calibrated on 27JUN2008. The instrument meets factory specifications per Procedure D0001.8160, ANSI S1.4 1983, IEC 651-Type 1 1979, and IEC 804-Type 1 1985.

Instrument found to be in calibration as received: YES
Date Calibrated: 27JUN2008
Calibration due: 27JUN2010

Calibration Standards Used

MANUFACTURER	MODEL	SERIAL NUMBER	INTERVAL	CAL. DUE	TRACEABILITY NO.
Larson Davis	LDSigGen2209	[illegible]	12 Months	23JAN2009	2008-102650

Reference Standards are traceable to the National Institute of Standards and Technology (NIST)

Calibration Environmental Conditions

Temperature: 23 ° Centigrade

Relative Humidity: 27 %

Affirmations

This Certificate attests that this instrument has been calibrated under the stated conditions with Measurement and Test Equipment (M&TE) Standards traceable to the U.S. National Institute of Standards and Technology (NIST). All of the Measurement Standards have been calibrated to their manufacturers' specified accuracy / uncertainty. Evidence of traceability and accuracy is on file at Provo Engineering & Manufacturing Center. An acceptable accuracy ratio between the Standard(s) and the item calibrated has been maintained. This instrument meets or exceeds the manufacturer's published specification unless noted.

This calibration complies with the requirements of ISO 17025 and ANSI Z540. The collective uncertainty of the Measurement Standard used does not exceed 25% of the applicable tolerance for each characteristic calibrated unless otherwise noted.

The results documented in this certificate relate only to the item(s) calibrated or tested. A one year calibration is recommended, however calibration interval assignment and adjustment are the responsibility of the end user. This certificate may not be reproduced, except in full, without the written approval of the issuer.

"AS RECEIVED" data same as shipped data
Tested with 828-2491

Signed:
Technician: Ron Harris

Provo Engineering and Manufacturing Center, 1681 West 820 North, Provo, Utah 84601
Toll Free: 888.258.3222 Telephone: 716.926.8243 Fax: 716.926.8215
ISO 9001-2000 Certified

Excalibur Engineering
9201 Irvine Blvd
Irvine, CA 92618
Phone : (949) 454-6603
Fax : (949) 454-6642

Certificate Of Calibration

Customer	URS CORPORATION	**Dept.**	N/A
Report #	47645-4	**Bar Code #**	
Date Received	MONDAY, SEPTEMBER 15, 2008	**P.O. #**	01158200.00031
Manufacturer	BRUEL & KJAER	**Serial #**	1413404
Model #	2231	**Asset #**	NAN
Description	TYPE 1 SOUND LEVEL METER		

Calibration Information

Date Calibrated 9/17/2008 **Calibration Due Date** 9/17/2010 **Calibration Interval** 24

Maintenance Procedure 4226

Temperature 22 ° C **Humidity** 50 % **Calibration Performed By** 28

Accuracy ANSI TYPE 1

Condition Received

Received In Tolerance

Remarks

Condition Returned

Returned In Tolerance

Remarks Meets ANSI TYPE 1 specifications under laboratory conditions.

Standards Employed

ID #	Manufacturer	Model #	Description	Calibration Expires
878	BRUEL & KJAER	4226	SLM CALIBRATOR	12/8/2008
713	FLUKE	8920A	20 MHZ TRUE RMS VOLTMETER	7/11/2009

Excalibur Engineering, Inc. certifies that the instrument specified above meets the manufacturer's specifications and has been calibrated using Standards and Instruments also listed above whose accuracies are traceable to the National Institute of Standards and Technology(NIST), and the calibration systems and records are in compliance to ISO-10012 and ANSI Z540-1-1994.

This certificate/report shall not be reproduced without written approval of Excalibur Engineering, Inc.

Larry A. Wenn

EEQA 8

SEP 1 9 2008

Approved By

Excalibur Engineering is not liable for any damages, consequences or any remedy regarding this certification with the exception of the calibration within 30 days

Page #: 1

Excalibur Engineering
9201 Irvine Blvd
Irvine, CA 92618
Phone : (949) 454-6603
Fax : (949) 454-6642

Certificate Of Calibration

Customer	URS CORPORATION	**Dept.**	N/A
Report #	47645-2	**Bar Code #**	
Date Received	MONDAY, SEPTEMBER 15, 2008	**P.O. #**	01158200.00031
Manufacturer	BRUEL & KJAER	**Serial #**	2015788
Model #	2236	**Asset #**	NAN
Description	SOUND LEVEL METER		

Calibration Information

Date Calibrated 9/17/2008 **Calibration Due Date** 9/17/2010 **Calibration Interval** 24

Maintenance Procedure 4226

Temperature 22 ° C **Humidity** 51 % **Calibration Performed By** 28

Accuracy ANSI TYPE 1

Condition Received

Received In Tolerance

Remarks

Condition Returned

Returned In Tolerance

Remarks Meets ANSI TYPE 1 specifications under laboratory conditions.

Standards Employed

ID #	Manufacturer	Model #	Description	Calibration Expires
878	BRUEL & KJAER	4226	SLM CALIBRATOR	12/8/2008
713	FLUKE	8920A	20 MHZ TRUE RMS VOLTMETER	7/11/2009

Excalibur Engineering, Inc. certifies that the instrument specified above meets the manufacturer's specifications and has been calibrated using Standards and Instruments also listed above whose accuracies are traceable to the National Institute of Standards and Technology(NIST), and the calibration systems and records are in compliance to ISO-10012 and ANSI Z540-1-1994.

This certificate/report shall not be reproduced without written approval of Excalibur Engineering, Inc.

Larry W[illegible] SEP 1 0 2008

Approved By

Excalibur Engineering is not liable for any damages, consequences or any remedy regarding this certification with the exception of the calibration within 30 days

PCB PIEZOTRONICS
A PCB GROUP COMPANY

Certificate of Calibration and Conformance

Certificate Number 2009-122846

Instrument Model CAL200, Serial Number 2794, was calibrated on 09OCT2009. The instrument meets factory specifications per Procedure D0001.8190.

Instrument found to be in calibration as received: YES
Date Calibrated: 09OCT2009
Calibration due:

Calibration Standards Used

MANUFACTURER	MODEL	SERIAL NUMBER	INTERVAL	CAL. DUE	TRACEABILITY NO.
Larson Davis	2900	0661	12 Months	07APR2010	2009-117163
Hewlett Packard	34401A	US36033460	12 Months	16JUN2010	4382218
Hewlett Packard	34401A	3146A10352	12 Months	13JUL2010	4413817
PCB	1502C02FJ15PSIA	1429	12 Months	11AUG2010	3332861395
Larson Davis	2559	2506	12 Months	03SEP2010	16868-1
Larson Davis	PRM915	0112	12 Months	09SEP2010	2009-121809
Larson Davis	PRM902	0480	12 Months	09SEP2010	2009-121820
Larson Davis	MTS1000/2201	0111	12 Months	09SEP2010	SM090909-1

Reference Standards are traceable to the National Institute of Standards and Technology (NIST)

Calibration Environmental Conditions

Environmental test conditions as shown on calibration report.

Affirmations

This Certificate attests that this instrument has been calibrated under the stated conditions with Measurement and Test Equipment (M&TE) Standards traceable to the U.S. National Institute of Standards and Technology (NIST). All of the Measurement Standards have been calibrated to their manufacturers' specified accuracy / uncertainty. Evidence of traceability and accuracy is on file at Provo Engineering & Manufacturing Center. An acceptable accuracy ratio between the Standard(s) and the item calibrated has been maintained. This instrument meets or exceeds the manufacturer's published specification unless noted.

This calibration complies with the requirements of ISO 17025 and ANSI Z540. The collective uncertainty of the Measurement Standard used does not exceed 25% of the applicable tolerance for each characteristic calibrated unless otherwise noted.

The results documented in this certificate relate only to the item(s) calibrated or tested. A one year calibration is recommended, however calibration interval assignment and adjustment are the responsibility of the end user. This certificate may not be reproduced, except in full, without the written approval of the issuer.

"As Received" data is the same as shipped data.

Signed: Scott Montgomery
Technician: Scott Montgomery

Provo Engineering and Manufacturing Center, 1681 West 820 North, Provo, Utah 84601
Toll Free: 888.258.3222 Telephone: 716.926.8243 Fax: 716.926.8215
ISO 9001-2000 Certified

LARSON DAVIS
A PCB PIEZOTRONICS DIV.

Larson Davis CAL200 Acoustic Calibrator, SN: 2794
Certificate of Measured Output

Performance at Reference Conditions

Nominal Level (dB SPL):	94	114
Measured Level (dB SPL):	**93.99**	**113.99**
Expanded Uncertainty (dB):	0.129	0.126
Level Error Limit (dB):	±0.33	±0.33
Nominal Frequency (Hz):	1000	1000
Measured Frequency (Hz):	**1000.1**	**1000.0**
Expanded Uncertainty (Hz):	0.2	0.2
Frequency Error Limit (Hz):	±10.0	±10.0
Measured Distortion (%):	0.39	0.30
Expanded Uncertainty (%):	0.25	0.25
Distortion Limit (%):	2.0	2.0

The data is aquired by the insert voltage calibration method using the reference microphone's open circuit sensitivity.

Environmental Conditions

Temperature (°C):	24	24
Relative Humidity (%):	26	26
Static Pressure (kPa):	101.1	101.2

Reference Microphone
Model: Larson Davis 2559
Serial Number: 2506
Open Circuit Sensitivity: 12.324 mV/Pascal
Uncertainty: 0.100 dB

Influence of Static Pressure

Nominal Level (dB SPL): 114

Nominal Pressure (kPa)	Pressure (kPa)	Level Change (dB)	Frequency Change (Hz)	Distortion (%)
108.0	108.0	-0.05	0.00	0.31
101.3	101.3	0.00	0.00	0.30
92.0	92.1	0.05	-0.00	0.29
83.0	83.0	0.06	0.00	0.28
74.0	73.9	0.03	0.00	0.29
65.0	65.0	-0.07	0.00	0.30
Expanded Uncertainty:	1.0	0.04	0.20	0.25
Limit:		±0.30	±10.0	2.0

Reference microphone corrections applied.

Environmental Conditions

Temperature (°C):	24
Relative Humidity (%):	26

Reference Microphone
Model: Larson Davis 2559
Serial Number: 2506

Static pressure was measured with a calibrated Motorola pressure sensor MPX2100AP.
Expanded uncertainty of environmental measurements: 2 °C, 3 %RH, 1.0 kPa
Uncertainty values are given at 95% confidence level (k = 2).

A Sound Level Meter can be calibrated to a level (L) defined as: L = measured level + pressure sensitivity
or if a Sound Level Meter is calibrated using the nominal level, the adjustments to data (X) are defined as:
X = measured level - nominal level - pressure sensitivity

Scott Montgomery — Larson Davis Calibrator Calibration System — 10 / 09 / 2009

APPENDIX B
LONG-TERM MEASUREMENT SITE DATA

LT-1 Ambient Measurement Site Data

Begin Date	Begin Time	End Date	End Time	Leq	Lmax	Lmin	L(2)	L(8)	L(10)	L(25)	L(50)	L(90)
9-Nov-09	15:30	9-Nov-09	16:30	46.3	75.2	19.4	52.4	49.2	48.3	40.1	29.8	20.6
9-Nov-09	16:30	9-Nov-09	17:30	38.1	58.6	18.7	47.9	42.4	41.2	36.0	28.6	19.6
9-Nov-09	17:30	9-Nov-09	18:30	34.2	54.5	18.9	44.9	38.1	36.4	27.9	23.3	19.9
9-Nov-09	18:30	9-Nov-09	19:30	31.9	54.1	20.1	40.5	33.8	32.7	29.4	26.9	22.9
9-Nov-09	19:30	9-Nov-09	20:30	27.1	39.7	19.3	31.7	29.8	29.6	28.1	26.3	22.9
9-Nov-09	20:30	9-Nov-09	21:30	26.7	38.5	20.3	32.2	29.6	29.2	27.4	25.6	22.3
9-Nov-09	21:30	9-Nov-09	22:30	28.8	51.3	19.4	34.8	30.5	29.9	27.7	25.3	21.6
9-Nov-09	22:30	9-Nov-09	23:30	30.5	53.3	19.6	36.0	32.7	31.9	28.7	26.0	22.1
9-Nov-09	23:30	10-Nov-09	0:30	24.9	41.6	18.5	35.2	27.2	25.7	21.3	19.7	18.7
10-Nov-09	0:30	10-Nov-09	1:30	22.6	32.8	18.6	27.7	25.6	25.1	23.2	21.5	19.0
10-Nov-09	1:30	10-Nov-09	2:30	28.3	53.5	18.5	36.8	27.6	26.7	23.5	20.7	18.7
10-Nov-09	2:30	10-Nov-09	3:30	24.7	42.7	18.6	30.3	26.4	25.9	23.7	21.4	19.4
10-Nov-09	3:30	10-Nov-09	4:30	26.3	45.6	18.6	33.0	27.0	26.4	24.2	21.8	19.5
10-Nov-09	4:30	10-Nov-09	5:30	32.1	55.9	19.5	41.4	30.7	29.5	26.0	23.9	21.1
10-Nov-09	5:30	10-Nov-09	6:30	33.0	56.2	19.7	42.8	35.7	33.8	26.6	24.2	21.8
10-Nov-09	6:30	10-Nov-09	7:30	39.8	57.4	21.5	49.6	42.9	41.6	37.1	33.5	26.6
10-Nov-09	7:30	10-Nov-09	8:30	38.5	58.3	27.9	45.0	41.1	40.5	38.0	35.5	31.1
10-Nov-09	8:30	10-Nov-09	9:30	39.3	60.8	21.0	49.7	40.8	39.7	33.6	27.3	22.8
10-Nov-09	9:30	10-Nov-09	10:30	33.6	51.4	21.2	43.5	37.6	36.1	29.9	26.1	22.9
10-Nov-09	10:30	10-Nov-09	11:30	43.9	64.1	20.5	54.5	45.0	43.9	30.8	26.0	22.5
10-Nov-09	11:30	10-Nov-09	12:30	42.1	62.6	22.3	50.3	45.2	44.0	41.9	37.6	29.8
10-Nov-09	12:30	10-Nov-09	13:30	34.9	52.4	20.0	44.8	40.1	38.0	29.8	25.2	21.4
10-Nov-09	13:30	10-Nov-09	14:30	36.9	59.8	19.9	47.2	39.8	39.0	33.0	26.0	21.1
10-Nov-09	14:30	10-Nov-09	15:30	45.8	69.4	19.9	51.0	46.6	45.8	42.2	40.3	21.5

LT-2 Ambient Measurement Site Data

Begin Date	Begin Time	End Date	End Time	Leq	Lmax	Lmin	L(2)	L(8)	L(10)	L(25)	L(50)	L(90)
9-Nov-09	16:00	9-Nov-09	17:00	36.4	59.8	19.3	43.2	34.7	33.7	29.8	25.7	22.3
9-Nov-09	17:00	9-Nov-09	18:00	31.9	51.6	18.7	42.1	35.2	33.9	29.6	26.6	22.1
9-Nov-09	18:00	9-Nov-09	19:00	33.2	56.0	19.4	40.7	36.7	35.8	32.3	28.9	24.6
9-Nov-09	19:00	9-Nov-09	20:00	32.9	44.3	21.3	39.8	37.0	36.4	33.7	30.7	25.6
9-Nov-09	20:00	9-Nov-09	21:00	32.9	42.8	21.3	38.7	36.6	36.2	34.0	31.5	25.8
9-Nov-09	21:00	9-Nov-09	22:00	30.4	42.7	20.2	38.3	34.4	33.8	30.8	27.5	23.2
9-Nov-09	22:00	9-Nov-09	23:00	29.8	40.6	19.8	36.5	33.8	33.3	30.6	27.8	22.8
9-Nov-09	23:00	10-Nov-09	0:00	27.7	40.2	19.9	34.9	31.0	30.6	27.9	25.3	22.3
10-Nov-09	0:00	10-Nov-09	1:00	23.9	35.0	18.1	29.2	27.0	26.7	24.5	22.5	19.6
10-Nov-09	1:00	10-Nov-09	2:00	29.3	52.0	18.5	34.2	31.4	30.7	26.9	23.2	20.4
10-Nov-09	2:00	10-Nov-09	3:00	31.3	50.2	18.7	39.9	34.9	33.9	29.6	25.1	21.0
10-Nov-09	3:00	10-Nov-09	4:00	30.7	44.1	20.7	39.2	34.9	34.2	30.7	26.4	22.5
10-Nov-09	4:00	10-Nov-09	5:00	30.2	41.2	20.1	36.3	34.1	33.7	31.2	28.1	23.7
10-Nov-09	5:00	10-Nov-09	6:00	31.8	48.3	21.6	38.9	35.5	34.9	32.3	29.6	25.5
10-Nov-09	6:00	10-Nov-09	7:00	33.1	53.4	24.3	38.6	35.7	35.2	32.9	30.6	27.4
10-Nov-09	7:00	10-Nov-09	8:00	37.8	53.9	23.5	45.5	41.5	40.9	37.3	34.3	29.4
10-Nov-09	8:00	10-Nov-09	9:00	30.4	47.5	22.5	36.5	33.7	33.2	31.1	28.4	25.0
10-Nov-09	9:00	10-Nov-09	10:00	31.9	48.1	20.5	42.3	35.7	33.9	27.7	24.5	21.6
10-Nov-09	10:00	10-Nov-09	11:00	29.0	54.1	19.9	34.2	29.2	28.5	25.7	23.4	21.6
10-Nov-09	11:00	10-Nov-09	12:00	33.0	55.4	19.8	39.9	28.6	28.0	25.6	23.5	21.2
10-Nov-09	12:00	10-Nov-09	13:00	30.4	53.5	19.6	35.4	30.6	29.6	26.7	24.2	21.2
10-Nov-09	13:00	10-Nov-09	14:00	28.4	47.9	19.8	35.2	30.2	29.4	26.3	24.0	21.6
10-Nov-09	14:00	10-Nov-09	15:00	30.0	52.0	19.3	40.3	32.4	31.1	26.2	23.0	20.7
10-Nov-09	15:00	10-Nov-09	16:00	31.1	55.5	19.2	35.4	27.4	26.8	24.6	22.7	20.6

LT-3 Ambient Measurement Site Data

Begin Date	Begin Time	End Date	End Time	Leq	Lmax	Lmin	L(2)	L(8)	L(10)	L(25)	L(50)	L(90)
9-Nov-09	16:30	9-Nov-09	17:30	71.1	92.2	24.4	81.8	76.0	74.8	65.3	55.4	40.3
9-Nov-09	17:30	9-Nov-09	18:30	69.0	87.1	24.0	79.6	74.1	72.4	61.7	52.6	36.7
9-Nov-09	18:30	9-Nov-09	19:30	68.4	86.4	21.8	79.3	72.6	70.1	58.9	47.8	32.0
9-Nov-09	19:30	9-Nov-09	20:30	68.9	89.5	21.9	80.5	71.5	69.3	58.0	45.5	30.2
9-Nov-09	20:30	9-Nov-09	21:30	67.4	86.8	22.1	79.1	69.4	66.5	55.2	42.8	28.9
9-Nov-09	21:30	9-Nov-09	22:30	67.3	88.2	22.0	78.9	67.7	64.9	54.6	43.5	25.1
9-Nov-09	22:30	9-Nov-09	23:30	65.0	86.3	21.5	76.5	62.0	59.7	47.5	37.0	24.5
9-Nov-09	23:30	10-Nov-09	0:30	58.4	84.2	19.8	64.2	49.0	46.6	25.2	21.3	20.0
10-Nov-09	0:30	10-Nov-09	1:30	60.6	85.0	19.8	67.6	52.4	49.7	33.2	22.3	20.0
10-Nov-09	1:30	10-Nov-09	2:30	63.2	85.3	19.8	73.4	59.1	56.0	40.3	22.5	20.1
10-Nov-09	2:30	10-Nov-09	3:30	66.4	92.2	20.3	76.3	61.8	59.3	46.7	33.1	21.4
10-Nov-09	3:30	10-Nov-09	4:30	65.9	89.6	20.1	76.4	63.1	60.4	47.9	34.7	21.8
10-Nov-09	4:30	10-Nov-09	5:30	67.7	87.2	21.1	78.5	71.0	68.6	58.4	47.0	28.8
10-Nov-09	5:30	10-Nov-09	6:30	68.9	87.0	23.8	79.5	74.1	72.6	62.8	54.2	37.2
10-Nov-09	6:30	10-Nov-09	7:30	69.8	87.4	29.6	80.5	75.0	73.4	62.9	54.4	42.3
10-Nov-09	7:30	10-Nov-09	8:30	68.9	86.3	28.8	79.9	73.7	72.2	59.6	48.7	35.7
10-Nov-09	8:30	10-Nov-09	9:30	70.4	95.4	27.5	80.2	74.0	72.3	60.1	48.3	35.4
10-Nov-09	9:30	10-Nov-09	10:30	69.5	86.5	24.3	80.7	74.5	73.0	60.8	46.5	29.9
10-Nov-09	10:30	10-Nov-09	11:30	69.3	88.1	22.5	80.2	74.2	72.7	60.0	45.4	28.1
10-Nov-09	11:30	10-Nov-09	12:30	69.0	87.3	23.1	80.3	73.8	71.8	57.4	43.2	29.8
10-Nov-09	12:30	10-Nov-09	13:30	69.4	87.5	25.0	80.8	74.2	72.5	58.8	43.5	30.5
10-Nov-09	13:30	10-Nov-09	14:30	69.8	87.8	23.4	80.5	74.8	73.5	61.7	46.0	30.3
10-Nov-09	14:30	10-Nov-09	15:30	70.6	87.9	24.5	81.7	75.7	74.5	63.1	49.5	31.3
10-Nov-09	15:30	10-Nov-09	16:30	70.7	86.4	22.4	81.7	75.9	74.7	64.0	51.6	35.2

APPENDIX C
SHORT-TERM MEASUREMENT SITE DATA

FIELD MEASUREMENT DATA SHEET

URS Project Name: NextLight Solar Ambient Noise Measurement Job # 28907103.30014

SITE IDENTIFICATION: LT-1 OBSERVER(s): BV/TL/PM/RR
START DATE & TIME: 11/09/09 3:10pm END DATE & TIME: 11-10-09 15:50
ADDRESS: Approx ¼ mi south of R3 along dirt road

GPS coordinates: N 34° 46.057' W 118° 26.138'

ID

TEMP: 69 °F HUMIDITY: 20 % R.H. WIND: CALM LIGHT MODERATE VARIABLE
WINDSPEED: 2-3 mph MPH DIR: N NE E SE S SW W NW STEADY GUSTY ___ MPH
SKY: CLEAR SUNNY DARK PARTLY CLOUDY OVRCST FOG DRIZZLE RAIN Other: ___

Weather

INSTRUMENT: LD 820 (TYPE: 1 2 SERIAL #: 1528 (Red)
CALIBRATOR: CAL 200 SERIAL #: 2794
CALIBRATION CHECK: PRE-TEST 94.0 dBA SPL POST-TEST 93.7 dBA SPL WINDSCREEN ✓
SETTINGS: A-WEIGHTED SLOW FAST FRONTAL RANDOM ANSI OTHER: ___

Rec #	Start Time	End Time							
			: L_{eq}	L_{max}	L_{min}	L_{90}	L_{50}	L_{10}	
			: L_{eq}	L_{max}	L_{min}	L_{90}	L_{50}	L_{10}	
			: L_{eq}	L_{max}	L_{min}	L_{90}	L_{50}	L_{10}	
			: L_{eq}	L_{max}	L_{min}	L_{90}	L_{50}	L_{10}	

COMMENTS: 3:15 Departed & Helo overflight

Acoustic Measurements

PRIMARY NOISE(S): TRAFFIC AIRCRAFT RAIL INDUSTRIAL AMBIENT OTHER
ROADWAY TYPE:
COUNT DURATION: ___-MINUTE SPEED (mph) #2 COUNT: SPEED (mph)

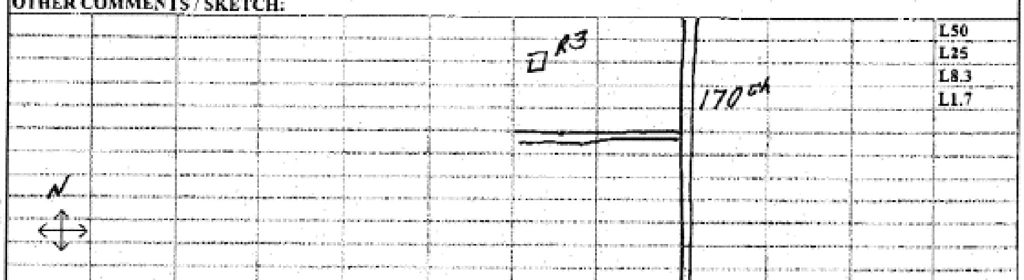
	NB / EB	SB / WB	SPEED NB EB	SPEED SB WB	#2 NB / EB	#2 SB / WB	SPEED NB EB	SPEED SB WB
AUTOS:								
MED. TRUCKS:								
HVY TRUCKS:								
BUSES:								
MOTORCYCLES:								

SPEED ESTIMATED BY: RADAR / DRIVING / OBSERVER

OTHER NOISE SOURCES: distant AIRCRAFT overhead / RUSTLING LEAVES / distant BARKING DOGS / BIRDS
distant CHILDREN PLAYING / distant TRAFFIC / distant LANDSCAPING / distant TRAINS
OTHER:

Source Info and Traffic Counts

TERRAIN: HARD SOFT MIXED FLAT OTHER:
PHOTOS:
OTHER COMMENTS / SKETCH:



Description / Sketch

2020 East First Street, Suite 400, Santa Ana, CA 92705, 714-835-6886 fax 714-433-7701

Sunrise 6:22
Sunset 16:53

FIELD MEASUREMENT DATA SHEET

URS **Project Name:** NextLight Solar Ambient Noise Measurement **Job #** 28907103.30014

SITE IDENTIFICATION: LT-2 **OBSERVER(s):** BU / TL / pm / ER
START DATE & TIME: 11/9/09 3:40pm **END DATE & TIME:** 11-10-09 16:05
ADDRESS: Intersection of 182 and West Avenue B8 - approx 50 feet SE of intersection.

GPS coordinates: N 34° 47.349' W 118° 27.309'

ID

TEMP: 69 °F HUMIDITY: 20 % R.H. WIND: CALM **LIGHT** MODERATE VARIABLE
WINDSPEED: 2-5 MPH DIR: N NE E SE **S** SW W NW STEADY GUSTY ____ MPH
SKY: CLEAR SUNNY DARK **PARTLY CLOUDY** OVRCST FOG DRIZZLE RAIN Other: ______

Weather

INSTRUMENT: 8pm LDL 820 **TYPE:** **1** 2 **SERIAL #:** 1470
CALIBRATOR: CAL 200 **SERIAL #:** 2794
CALIBRATION CHECK: **PRE-TEST** 94.1 **dBA SPL** **POST-TEST** 94.1 **dBA SPL** **WINDSCREEN** ✓
SETTINGS: **A-WEIGHTED SLOW** FAST FRONTAL RANDOM ANSI OTHER: ______

Rec #	Start Time / End Time							
___	___ / ___	L_{eq} ___	L_{max} ___	L_{min} ___	L_{90} ___	L_{50} ___	L_{10} ___	___
___	___ / ___	L_{eq} ___	L_{max} ___	L_{min} ___	L_{90} ___	L_{50} ___	L_{10} ___	___
___	___ / ___	L_{eq} ___	L_{max} ___	L_{min} ___	L_{90} ___	L_{50} ___	L_{10} ___	___
___	___ / ___	L_{eq} ___	L_{max} ___	L_{min} ___	L_{90} ___	L_{50} ___	L_{10} ___	___

COMMENTS:

Acoustic Measurements

PRIMARY NOISE(S): **TRAFFIC AIRCRAFT** RAIL INDUSTRIAL AMBIENT OTHER
ROADWAY TYPE:

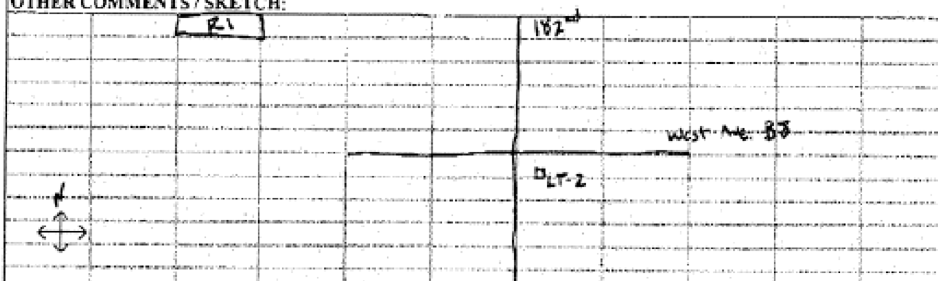
COUNT DURATION: ___ MINUTE	NB / EB / SB / WB	SPEED (mph) NB EB / SB WB	#2 COUNT: NB / EB / SB / WB	SPEED (mph) NB EB / SB WB
AUTOS:	/	/	/	/
MED. TRUCKS:	/	/	/	/
HVY TRUCKS:	/	/	/	/
BUSES:	/	/	/	/
MOTORCYCLES:	/	/	/	/

SPEED ESTIMATED BY: RADAR / DRIVING / OBSERVER

OTHER NOISE SOURCES: distant AIRCRAFT overhead / RUSTLING LEAVES / distant BARKING DOGS / BIRDS
distant CHILDREN PLAYING / distant TRAFFIC / distant LANDSCAPING / distant TRAINS
OTHER:

Source Info and Traffic Counts

TERRAIN: HARD **SOFT** MIXED FLAT OTHER:
PHOTOS:
OTHER COMMENTS / SKETCH:



L50
L25
L8.3
L1.7

Description / Sketch

2020 East First Street, Suite 400, Santa Ana, CA 92705. 714-835-6886 fax 714-433-7701

FIELD MEASUREMENT DATA SHEET

URS Project Name: NextLight Solar Ambient Noise Measurement Job # 28907103.30014

ID

SITE IDENTIFICATION: LT-3 OBSERVER(s): BV / TL / PM / RR
START DATE & TIME: 11/9/09 4:27pm END DATE & TIME: 11-10-09 16:32
ADDRESS: along avenue D - 1/4 mile West of 160th

GPS coordinates: N 34° 46.509' W118° 25.047'

Weather

TEMP: 61.3 °F HUMIDITY: 22.7 % R.H. WIND: CALM LIGHT MODERATE VARIABLE
WINDSPEED: 2-3 mph MPH DIR: N NE E SE S SW W NW STEADY GUSTY ___ MPH
SKY: CLEAR SUNNY DARK PARTLY CLOUDY OVRCST FOG DRIZZLE RAIN Other: ___

Acoustic Measurements

INSTRUMENT: LDL 820 TYPE: 1 2 SERIAL #: 1597
CALIBRATOR: CAL 200 SERIAL #: 2794

CALIBRATION CHECK: PRE-TEST 94.1 dBA SPL POST-TEST 94.1 dBA SPL WINDSCREEN ✓

SETTINGS: A-WEIGHTED SLOW FAST FRONTAL RANDOM ANSI OTHER: ___

Rec # / Start Time / End Time	L_{eq}	L_{max}	L_{min}	L_{90}	L_{50}	L_{10}	
/ /	68.5						
/ /							
/ /							
/ /							

COMMENTS:

Source Info and Traffic Counts

PRIMARY NOISE(S): TRAFFIC AIRCRAFT RAIL INDUSTRIAL AMBIENT OTHER

ROADWAY TYPE:

COUNT DURATION: ___ -MINUTE

	NB / EB / SB / WB	SPEED (mph) NB EB / SB WB	#2 COUNT: NB / EB / SB / WB	SPEED (mph) NB EB / SB WB
AUTOS:	/	/	/	/
MED. TRUCKS:	/	/	/	/
HVY TRUCKS:	/	/	/	/
BUSES:	/	/	/	/
MOTORCYCLES:	/	/	/	/

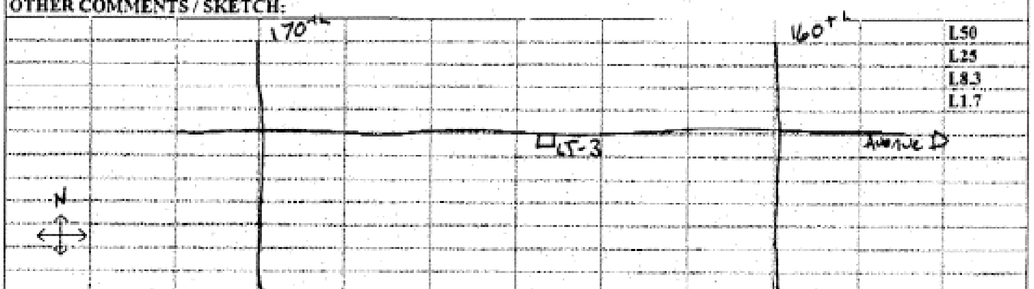
SPEED ESTIMATED BY: RADAR / DRIVING / OBSERVER

OTHER NOISE SOURCES: distant AIRCRAFT overhead / RUSTLING LEAVES / distant BARKING DOGS / BIRDS
distant CHILDREN PLAYING / distant TRAFFIC / distant LANDSCAPING / distant TRAINS

OTHER

Description / Sketch

TERRAIN: HARD SOFT MIXED FLAT OTHER:
PHOTOS:
OTHER COMMENTS / SKETCH:



2020 East First Street, Suite 400, Santa Ana, CA 92705, 714-835-6886 fax 714-433-7701

FIELD MEASUREMENT DATA SHEET

URS Project Name: ~~Fresno to Bakersfield Labor~~ Job # ~~27560811.53030100~~

SITE IDENTIFICATION: ST-1 OBSERVER(s): TL
START DATE & TIME: 11-09-09 23:50 END DATE & TIME: 11-10-09 @ 00:10
ADDRESS:

GPS coordinates: N 34° 49.798' W 118° 25.897

TEMP: 41.9 °F HUMIDITY: 40.6 % R.H. WIND: CALM LIGHT MODERATE VARIABLE
WINDSPEED: 2-3 MPH DIR: N NE E SE S SW W NW STEADY GUSTY ___ MPH
SKY: CLEAR SUNNY DARK PARTLY CLOUDY OVRCST FOG DRIZZLE RAIN Other:

INSTRUMENT: B&K 2250 TYPE: 1 2 SERIAL #:
CALIBRATOR: CAL 200 SERIAL #: 2794
CALIBRATION CHECK: PRE-TEST 94.0 dBA SPL POST-TEST 94.0 dBA SPL WINDSCREEN X

SETTINGS: A-WEIGHTED SLOW FAST FRONTAL RANDOM ANSI OTHER:

	Rec #	Start Time / End Time							
	16	23:50 / 00:10	Leq	Lmax	L10	L50	L90	Lmin	
		/	Leq	Lmax	L10	L50	L90	Lmin	
93.9	18	13:20 / 13:40	Leq	Lmax	L10	L50	L90	Lmin	
		/	Leq	Lmax	L10	L50	L90	Lmin	

COMMENTS: NIGHT - RADIO @ HOME C R7
DAY - TRUCKS IN THE FIELD E OF SITE - HARVESTING
TRAFFIC ON 170TH

PRIMARY NOISE(S): TRAFFIC AIRCRAFT RAIL INDUSTRIAL AMBIENT OTHER
ROADWAY TYPE: 2 LANE

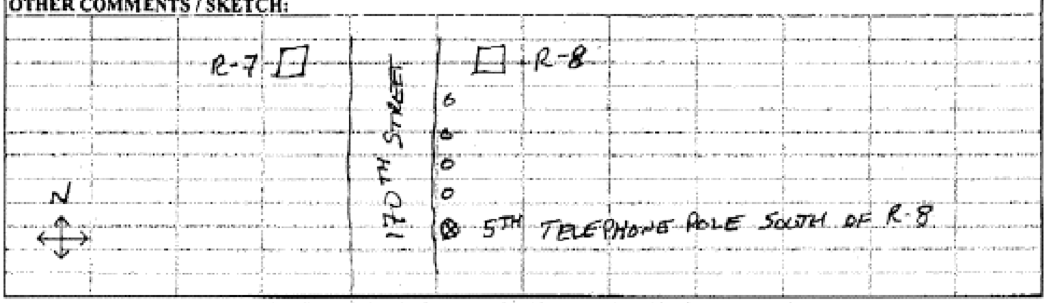
COUNT DURATION: 20 -MINUTE

	NB EB / SB WB	SPEED (mph) NB EB / SB WB	#2 COUNT: NB EB / SB WB	SPEED (mph) NB EB / SB WB
AUTOS:	/ 1	/ 45	HHT /	45 /
MED. TRUCKS:	/		1 /	
HVY TRUCKS:	/		111 /	
BUSES:	/		/	
MOTORCYCLES:	/		/	

SPEED ESTIMATED BY: RADAR / DRIVING / OBSERVER

OTHER NOISE SOURCES: distant AIRCRAFT overhead / RUSTLING LEAVES / distant BARKING DOGS / BIRDS
distant CHILDREN PLAYING / distant TRAFFIC / distant LANDSCAPING / distant TRAINS
OTHER:

TERRAIN: HARD SOFT MIXED FLAT OTHER:
PHOTOS: ✓
OTHER COMMENTS / SKETCH:



FIELD MEASUREMENT DATA SHEET

URS Project Name: ~~Fresno to Bakersfield Labor~~ PM   Job # ~~27560811-53030100~~ PM

SITE IDENTIFICATION: ST - 2   OBSERVER(s): Peter Meier
START DATE & TIME: 11/9/2009 11:50 pm   END DATE & TIME: 11/10/2009 12:10:07 am
ADDRESS: 200 feet east of intersection of A st. and 170th,
GPS coordinates: N 54° 49.122' W 118° 25.826'

ID

TEMP: 41.9 °F HUMIDITY: 40.6 % R.H. WIND: CALM LIGHT MODERATE VARIABLE
WINDSPEED: 2-3 MPH DIR: N NE E SE S SW W NW STEADY GUSTY ____ MPH
SKY: CLEAR SUNNY DARK PARTLY CLOUDY OVRCST FOG DRIZZLE RAIN Other: ______

Weather

INSTRUMENT: B and K 2236   TYPE: 1 2   SERIAL #: ~~2015...~~ 2015788
CALIBRATOR: CAL 200   SERIAL #:
CALIBRATION CHECK: PRE-TEST 94.0 dBA SPL   93.9 11/10/09   POST-TEST ______ dBA SPL   WINDSCREEN ___
SETTINGS: A-WEIGHTED SLOW FAST FRONTAL RANDOM ANSI OTHER: ______

Rec #	Start Time / End Time	Leq	Lmax	L10	L50	L90	Lmin	
1	11:50pm / 12:10:07am	20.5	40.6	25.0	0.0	0.0	0.0	
2	1:20pm / 1:40:11pm	54.1	79.4	47.5	27.0	24.0	21.8	
	/							
	/							

COMMENTS: (one) 1 minute after test complete, a loud older model vehicle passed by my location. No vehicles passed during the test.
- @ 12:08-12:09am - Two more cars passed my location and were fairly noisy.

Acoustic Measurements

PRIMARY NOISE(S): TRAFFIC AIRCRAFT RAIL INDUSTRIAL AMBIENT OTHER
ROADWAY TYPE:

COUNT DURATION: ____-MINUTE	NB EB / SB WB	SPEED (mph) NB EB / SB WB	#2 COUNT: NB EB / SB WB	SPEED (mph) NB EB / SB WB
AUTOS:	/	/	/	/
MED. TRUCKS:	/		/	
HVY TRUCKS:	/		/	
BUSES:	/		/	
MOTORCYCLES:	/		/	

SPEED ESTIMATED BY: RADAR / DRIVING / OBSERVER

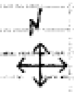
OTHER NOISE SOURCES: distant AIRCRAFT overhead / RUSTLING LEAVES / distant BARKING DOGS / BIRDS
distant CHILDREN PLAYING / distant TRAFFIC / distant LANDSCAPING / distant TRAINS
OTHER:

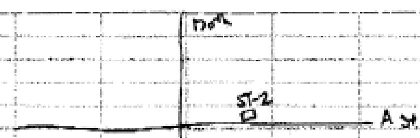
Source Info and Traffic Counts

TERRAIN: HARD SOFT MIXED FLAT OTHER:
PHOTOS:
OTHER COMMENTS / SKETCH:

@ 1pm 11/10/09 (daytime test)
humidity - 21.5%
temp - 66.6°F
wind - ~~2-4 mph~~ 2-5 mph
with stronger gusts
coming from west
→ See reverse for notes

N





Description / Sketch

FIELD MEASUREMENT DATA SHEET

URS Project Name: Fresno to Bakersfield Labor Job # 27560811.53030100

SITE IDENTIFICATION: ST-33 OBSERVER(s): B.//V

START DATE & TIME: 11-9-09 / 8/11-5-09 END DATE & TIME:

ADDRESS: 18340 West Aven D

GPS coordinates: N 34° 46' 473" W 118° 27' 419"

ID

TEMP: ____ °F HUMIDITY: ____ % R.H. WIND: CALM LIGHT MODERATE VARIABLE

WINDSPEED: ____ MPH DIR: N NE E SE S SW W NW STEADY GUSTY ____ MPH

SKY: CLEAR SUNNY DARK PARTLY CLOUDY OVRCST FOG DRIZZLE RAIN Other: ____

Weather

INSTRUMENT: BK 2231 TYPE: 2 SERIAL #:

CALIBRATOR: LDN CAL 200 SERIAL #:

CALIBRATION CHECK: PRE-TEST 93.6 / 93.5 dBA SPL POST-TEST ____ dBA SPL WINDSCREEN ✓

SETTINGS: A-WEIGHTED SLOW FAST FRONTAL RANDOM ANSI OTHER: ____

Rec #	Start Time / End Time	Leq	Lmax	L10	L50	L90	Lmin	
	11:50 / 12:10	54.5	76.0	48.5	28.0	21.5	under	L1 = 65.5
	1:20 / 1:40	63.5	80.7	67.5	53.5	37.5	32.2	" = 75.0
	/							
	/							

Acoustic Measurements

COMMENTS: HT 11:52 76.0 HT - 75.8 Scary
HT 80.1 2 HT 76 80.7 Air brakes HT stopped Idled [illegible]
car delivering [illegible] boxes

PRIMARY NOISE(S): TRAFFIC AIRCRAFT RAIL INDUSTRIAL AMBIENT OTHER

ROADWAY TYPE:

COUNT DURATION: ____ -MINUTE

	NB EB / SB WB	SPEED (mph) NB EB / SB WB	#2 COUNT: NB EB / SB WB	SPEED (mph) NB EB / SB WB
AUTOS:	/	/	/	/
MED. TRUCKS:	/		/	
HVY TRUCKS:	/		/	
BUSES:	/		/	
MOTORCYCLES:	/		/	

SPEED ESTIMATED BY: RADAR / DRIVING / OBSERVER

OTHER NOISE SOURCES: distant AIRCRAFT overhead / RUSTLING LEAVES / distant BARKING DOGS / BIRDS singing

distant CHILDREN PLAYING / distant TRAFFIC / distant LANDSCAPING / distant TRAINS

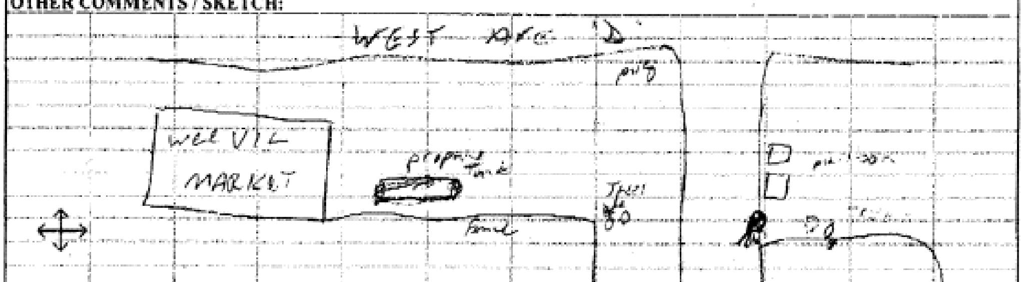
OTHER: people talking

Source Info and Traffic Counts

TERRAIN: HARD SOFT MIXED FLAT OTHER:

PHOTOS:

OTHER COMMENTS / SKETCH:



Description / Sketch

2020 E. First Street, Suite 400, Santa Ana, CA 92705, 714-835-6886 fax 714-433-7701

FIELD MEASUREMENT DATA SHEET

URS Project Name: Fresno to Bakersfield Labor Job # 27560811.53030100

SITE IDENTIFICATION: ST-4 OBSERVER(s): TL - BV - PM
START DATE & TIME: 11-10-09 00:50 END DATE & TIME: 11-10-09 01:10
ADDRESS: AVE D @ 150TH STREET WEST
GPS coordinates: N 34° 46.519' W 118° 23.778'

ID

TEMP: 40 °F HUMIDITY: 40 % R.H. WIND: CALM LIGHT MODERATE VARIABLE
WINDSPEED: ____ MPH DIR: N NE E SE S SW W NW STEADY GUSTY ____ MPH
SKY: CLEAR SUNNY DARK PARTLY CLOUDY OVRCST FOG DRIZZLE RAIN Other: ____

Weather

INSTRUMENT: B&K 2250 TYPE: 1 2 SERIAL #:
CALIBRATOR: LDL CAL 200 SERIAL #:
CALIBRATION CHECK: PRE-TEST 94 dBA SPL POST-TEST ____ dBA SPL WINDSCREEN ____
SETTINGS: A-WEIGHTED SLOW FAST FRONTAL RANDOM ANSI OTHER: ____

Rec #	Start Time / End Time								
17	00:50 / 01:10	Leq	Lmax	L10	L50	L90	Lmin		
	/	Leq	Lmax	L10	L50	L90	Lmin		
18	14:10 / 14:30	Leq	Lmax	L10	L50	L90	Lmin		
	/	Leq	Lmax	L10	L50	L90	Lmin		

COMMENTS: TRAFFIC ON AVE. D (HWY 138)

Acoustic Measurements

PRIMARY NOISE(S): TRAFFIC AIRCRAFT RAIL INDUSTRIAL AMBIENT OTHER
ROADWAY TYPE:
COUNT DURATION: ____ -MINUTE

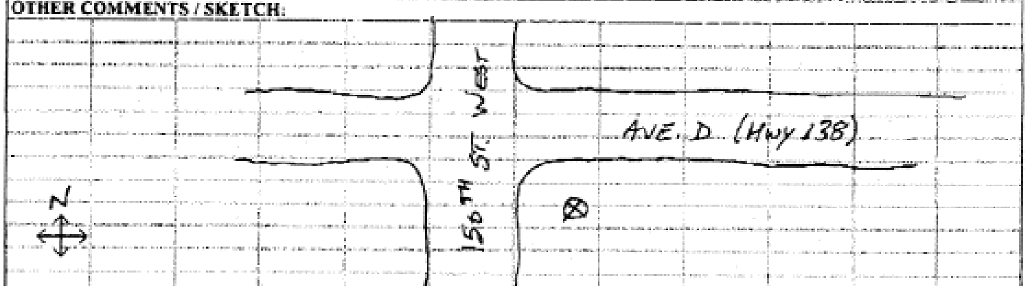
	NB EB / SB WB	SPEED (mph) NB EB / SB WB	#2 COUNT: NB EB / SB WB	SPEED (mph) NB EB / SB WB
AUTOS:	/	/	/	/
MED. TRUCKS:	/		/	
HVY TRUCKS:	/		/	
BUSES:	/		/	
MOTORCYCLES:	/		/	

SPEED ESTIMATED BY: RADAR / DRIVING / OBSERVER

OTHER NOISE SOURCES: distant AIRCRAFT overhead / RUSTLING LEAVES / distant BARKING DOGS / BIRDS
distant CHILDREN PLAYING / distant TRAFFIC / distant LANDSCAPING / distant TRAINS
OTHER:

Source Info and Traffic Counts

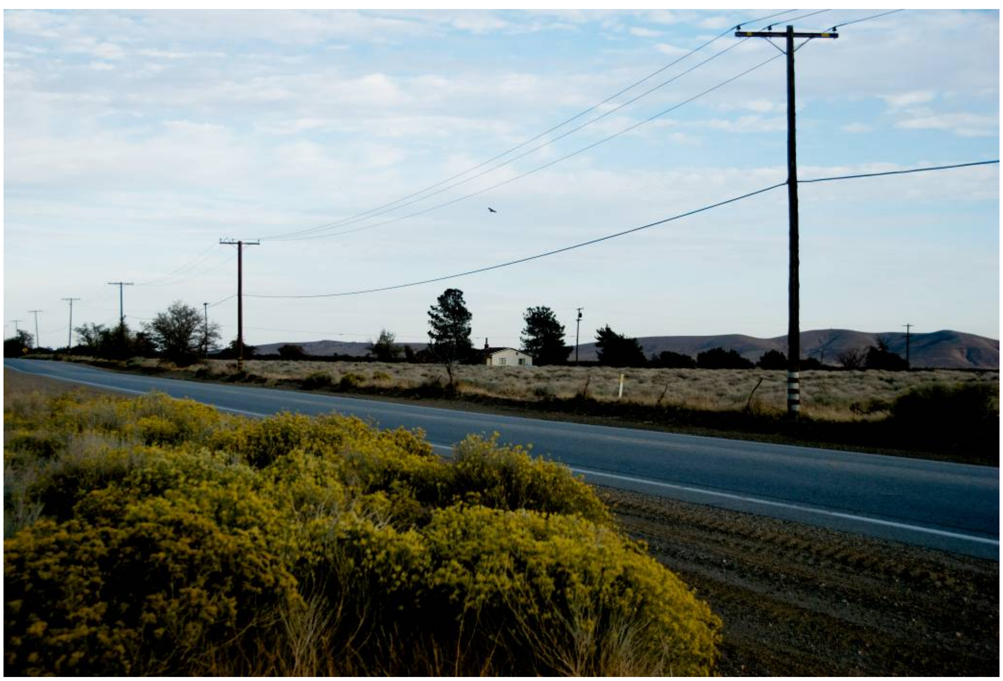
TERRAIN: HARD SOFT MIXED FLAT OTHER:
PHOTOS: ✓
OTHER COMMENTS / SKETCH:



Description / Sketch

2020 E. First Street, Suite 400, Santa Ana, CA 92705, 714-835-6886 fax 714-433-7701

APPENDIX D
AMBIENT MEASUREMENT SURVEY PHOTOGRAPHS




URS

CONFIDENTIAL APPENDIX B
ARCHAEOLOGICAL ISOLATE FORMS

This appendix contains confidential archaeological site (isolates) records information and is not appropriate for public distribution. The Los Angeles County Department of Regional Planning will consider requests for this information from individuals that meet the U.S. Secretary of the Interior's Professional standards or California State Personnel Board criteria for Associate State Archaeologist or State Historian II. Disclosure to individuals not meeting these criteria violates the California Office of Historic Preservation's records access policy.

APPENDIX J
GROUNDWATER CHARACTERISTICS
AT THE AV SOLAR RANCH ONE SITE

This appendix presents the groundwater characteristics report prepared for the AV Solar Ranch One Project by URS. This report supports the water quality and supply assessments presented in Sections 5.5 and 5.14, respectively, of the Draft EIR.

A technical Memorandum (Water Requirements and Groundwater Supply AV Solar Ranch One) and accompanying cover letter from the Los Angeles County Development of Public Works (LACDPW 2010) is presented as Appendix J.2 for reference. The information in Appendix J.2 supports the water supply assessment presented in Section 5.14 of the Draft EIR.

GROUNDWATER CHARACTERISTICS AT THE AV SOLAR RANCH ONE SITE, SOUTHWESTERN ANTELOPE VALLEY, LOS ANGELES COUNTY, CALIFORNIA

Prepared for

AV Solar Ranch 1, LLC
353 Sacramento Street, Suite 2100
San Francisco, California 94111

November 2009

URS

2020 First Street, Suite 400
Santa Ana, California 92705
714-835-6886 Fax: 714-667-7147
URS Project Number 28907103.00041

TABLE OF CONTENTS

SECTION PAGE

List of Tables

List of Figures

Appendices

1.0 INTRODUCTION

AV Solar Ranch 1, LLC has proposed the development of a 230 megawatt (MW) solar photovoltaic (PV) project (Project) in northern Los Angeles County. This site is located within the Antelope Valley area of unincorporated Los Angeles County, approximately 15 miles northwest of downtown Lancaster, near the intersection of State Route (SR)138 and 170th Street West (Figure 1). The Project encompasses about 2,100 acres of undeveloped land previously used for agricultural production. The land in the immediate site vicinity is also undeveloped land or agricultural land.

URS understands that approximately 150 acre-feet per (afy) year of water will be required during construction to support concrete manufacturing, dust control, panel washing, and sanitary use. Once the facility is fully operational, approximately 12 afy of water will be required by the facility for domestic use and process water.

As part of the Conditional Use Permit (CUP) application, AV Solar Ranch 1, LLC has been asked to provide information on the historic and current groundwater resources of the area of the proposed Project, including testing of an on-site irrigation well located on the Project property (Well No. 8N15W-24B3). In response to this request, URS researched available documents on water use in the area, performed pump/recovery testing and a video log for the irrigation well, and also conducted water quality testing for that well.

The results of this study, as presented in this report, indicate that aquifer conditions and water quality produced from Well No. 8N/15W-24B3 are favorable for meeting the construction and long-term operational needs of the facility without adverse impacts on the groundwater aquifer, including wells on adjacent properties.

The on-site irrigation well which was investigated does not contain a sanitary seal, and although the water quality is high, it is therefore not considered acceptable for and will not be used for Project domestic/potable water use. However, as evidenced by the data from wells in the Project area as summarized in Appendix C, the water quality of the tested irrigation well is indicative of the aquifer groundwater quality at the site. Thus, any new well drilled in the vicinity of the irrigation well or within the Project site (for domestic or other purposes) would likely have similar water quality.

Additionally, available data show that the average yield (or pumping rate) for wells within approximately a 5-mile radius of the on-site irrigation well is approximately 1,100 gallons per minute (gpm). Consistently high yields and specific capacities for wells in the surrounding area as well as the tested irrigation well indicate that any new wells that may be drilled within the Project site would likely have similar yields and pumping characteristics.

2.0 AREA TOPOGRAPHY AND SURFACE WATER

The surface area of the entire Antelope Valley Groundwater Basin is over 1 million acres (1,580 square miles) and is topographically closed. All rainfall within the basin drains through ephemeral creeks and streams to three dry lakes in the east-central portion of the Antelope Valley, located within the Edwards Air Force Base. Little Rock Creek is the only developed surface water supply in the Antelope Valley, and collects runoff from the San Gabriel Mountains. Due to the relatively impervious nature of the dry lake soil and high evaporation rates, water that collects on the dry lakes eventually evaporates and is not a significant source of recharge to aquifers (RWMG, 2007).

The closest surface water bodies to the Project site are ephemeral drainages that typically flow in a northeasterly direction across the Project site. Surface drainage in the vicinity of the site flows toward Rosamond Lake, which is undrained and located about 20 miles east of the Project site (within the boundaries of Edwards Air Force Base).

3.0 AREA GEOLOGY

The Antelope Valley is a westward-pointing, wedge-shaped structural depression formed by the San Andreas, and Garlock, zones, shown on Figure 1. The basin is bounded on the northwest and north by the Garlock fault zone at the base of the Tehachapi Mountains; on the southwest and south by the San Andreas fault zone at base of the San Gabriel Mountains; and on the east by ridges, buttes and low hills that form a surface and groundwater drainage divide. These features separate the Antelope Valley from the upper Mojave Valley, which lies to the east (RWMG 2007).

4.0 AREA HYDROGEOLOGY

The primary water-bearing materials in the basin are Pleistocene and Holocene age unconsolidated alluvial and lacustrine deposits that consist of compact gravels, sand, silt and clay. The deposits are coarse and rich in gravel nearest the mountains and hills that become finer grained and better sorted toward the central parts of the valley (RWMG 2007). The deposits are formed of eroded materials from the hills and mountains that surround the valley and the maximum thickness has been reported to be 8,000 feet (Durbin 1978). The thickness of the aquifer system has been reported to be up to 1,600 feet. The total storage capacity of the Antelope Valley Groundwater Basin has been reported at 68 million acre feet (MAF) (DWR 1975 as cited in RWMG 2007).

Older units of the alluvium are somewhat coarser grained, more compact and consolidated, more weathered, and more poorly sorted than the younger units. Hydraulic conductivity decreases with increasing depth (RWMG 2007).

Groundwater levels at the Project site appear to have remained steady from 1915 to 1961 and have been stable or increasing since that time. This implies that the Project site is not in an area of overdraft within the Antelope Valley Groundwater Basin and is actually receiving more groundwater recharge from the west and south than is being extracted on a yearly basis. However, this is an area of recharge for wells downgradient of the Project site, and pumping in this area may have effects on water levels in downgradient wells.

4.1. ANTELOPE VALLEY SUB-BASINS

The Antelope Valley Groundwater Basin has been divided into at least seven distinct subbasins based upon water level differences that exist across faults throughout the Basin. In addition to the Garlock and San Andreas fault zones, the Randsburg-Mojave, Cottonwood, Willow Springs, Rosamond, and Neenach faults impede groundwater flow and displace the water table in the western part of the basin (DWR 2004).

The proposed Project area is located in the westernmost Lancaster Groundwater Sub-Basin in a triangular subarea formed by the apex intersection with the northwestern boundary being the Neenach Fault (Durbin 1978), The southwestern boundary being the southern edge of the Antelope Valley Groundwater Basin and the eastern boundary being a southwest to northeast trending line through the Antelope Buttes and the Little Buttes. For purpose of this report, this area will be referred to as the Antelope Buttes Recharge Triangle.

4.2. HYDROGEOLOGIC UNITS

Older and younger alluvium make up the principal aquifers in the basin. Lithologic logs from wells in the area indicate a mix of gravel, sand, silt and clay (Durbin 1978). During the depositional history of the Basin, a large lake has at times occupied parts of the Lancaster and North Muroc subbasins. Fine-grained lacustrine deposits were formed, which separate the principal (upper) aquifer from the lower aquifer. The principal aquifer, which is the primary source of groundwater for the valley, is generally unconfined whereas the lower aquifer is generally confined. Based on water levels measured in wells screened at deeper and shallower elevations, there does not appear to be any significant confinement of water within the Project area.

4.3. GROUNDWATER FLOW

A groundwater model was developed for the Antelope Valley Groundwater Basin by Durbin (1978). Based on water level maps created for water years 1915 and 1961 (reproduced here as Figures 2 and 3), groundwater flow in the vicinity of the Project site is northeasterly to easterly, and then east around the north side of the Antelope Buttes. At the western edge of the lacustrine deposits, located about 10 miles east of the Project site, groundwater flow bifurcates vertically, with part of the groundwater moving above the lacustrine deposits and into the principal aquifer and part moving below the lacustrine deposits and into the deeper aquifer. Figure 4 shows the groundwater flow conditions for the year 2006 based on data collected for this Project. The 2,500 foot contour line along the northeastern part of the Project site has shifted to the northeast between 1961 and 2006, indicating that recharge must have exceeded discharge in that area as water levels rose.

4.4. GROUNDWATER RECHARGE AND HISTORICAL DISCHARGE

The Basin is principally recharged by deep percolation of precipitation and runoff from the surrounding mountains and hills. Other sources include artificial recharge and return flows from agricultural irrigation, urban irrigation, and wastewater management activities. Because annual precipitation over the Antelope Valley Floor is generally less than 10 inches per year and evapotranspiration rates are quite high, recharge from direct infiltration of precipitation is considered negligible (Durbin 1978; RWMG 2007).

Groundwater recharge maps developed in the 1978 Antelope Valley model by Durbin, indicate that the average annual recharge to the Antelope Buttes Recharge Triangle and the aquifer directly below the Solar Ranch site is about 3,000 afy (Durbin 1978, Plate 6). This estimate is based on the groundwater recharge required for water balance as calculated during the model calibration.

Groundwater was the principal source of water for economic development in the valley, and before agricultural pumping began, artesian conditions existed in the north-central portion of the Lancaster Sub-Basin (Durbin 1978). As the valley was developed with agricultural fields and cities such as Lancaster grew, excessive pumping resulted in water level declines and subsidence. By 1972, the overdraft was approximately 9 million acre-feet (Durbin 1978). Based on water needs which exceeded supply, local water districts contracted with the California Water Project to begin water deliveries to the area, which began in 1972 and increased to the full allotment of 158,000 afy after approximately two decades. As pumping for municipal and industrial use decreased and agricultural activity declined in the region, water levels rebounded.

Data were reviewed from wells within the Antelope Butte Recharge Triangle dating back to 1960, and indicated that water levels have risen in most wells in the area of the Project site. In one well, located adjacent to the proposed Project site, on the east side of 160th Street West (Well No. 8N/14W-18N1, see Figure 2), the water level rose 50 feet between 1960 and 1988 and has stabilized at it present water level for the past 20 years (see Figure 5). In the irrigation well at the Project site (Well No. 8N/15W-24B3, see Figure 2), the water level has declined about 2 feet since 1960 (Figure 6). As shown on Figures 7 and 8, groundwater levels just west of the site (Well Nos. 8N/15W-10P1 – 2) declined about 20 feet between 1946 and 1982, but rose back up to the previous high in the late 1990's and into the early 2000's. However, water levels declined as much as 200 feet locally in wells located throughout the rest of the Antelope Valley from the 1960's to the present as result of increased agricultural and public supply pumping. Many of the groundwater levels north and east of the Project site appear to have declined from 1960 to 2006, similar to those in the larger Antelope Valley Groundwater Basin.

4.5. HISTORIC WELL YIELDS IN VICINITY OF THE PROJECT SITE

Data for wells in the vicinity of the Project site are presented in the table below, along with that of the on-site irrigation well (Well No. 8N/15W-24B3) that was tested as part of this investigation. Also provided in the table are distances from those wells to the tested irrigation well. The location of the wells and their well yields are plotted on Figure 9.

As shown in the table, the average yield (or pumping rate) for the wells within approximately a 5-mile radius of Well No. 8N15W-24B3 is approximately 1,100 gpm. These consistently high yields and specific capacities for wells in the surrounding area, indicate that any new wells that may be drilled within the Project site would likely have similar yields and pumping characteristics.

Well Number	Distance from Irrigation Well No. 8N/15W-24B3	Depth (feet)	Yield (gpm)	Drawdown (feet)	Specific Capacity (gpm/foot)
8N/14W-					
5E1	3.25 miles NE	600	2,070	21	97.6
5H1	3.3 miles NE	706	2,100	19	110.5
8B1	2.8 miles NE	1,036	1,100	95	11.6
15B1	4 miles ENE	418	1,007	25.7	39.1
15G1	4 miles ENE	469	916	7.5	122
15G2	4 miles ENE	421	1,436	13.2	108.7
17M1	1.75 miles E	828	450	36.8	1.2
18N1	0.5 miles NE	865	2,250	40	56.2
23G2	5 miles E	396	1,100	23	47.8
8N/15W-					
7N1	5 .5 miles NW	653	918	36.8	24.9
22A1	1.8 miles W	202	365	55	6.75
22A2	1.8 miles W	425	610	56	10.9
24B2	0.25 miles NE	252	270	98.6	2.7
24B3[1]	*0*	*600*	*700*	*105*	*6.6*
24B3[2]	*0*	*600*	*220*	*44*	*5*

Notes:
[1]Initial test results using the existing turbine pump
[2]Test results from the 24-hour pump test

5.0 AREA WATER QUALITY

Water quality in the Basin is reportedly excellent near the boundaries of the Basin, and deteriorates with proximity to the dry lakes. Groundwater is typically calcium bicarbonate in character near the surrounding mountains and is sodium bicarbonate or sodium sulfate character in the central part of the Basin. Data from 213 public supply wells across the entire Antelope Valley basin show an average total dissolved solids (TDS) content of 374 milligrams per liter (mg/L), and range from 123 to 1,790 mg/L (DWR 2004).

The inorganic water quality test results presented in Appendix C show that the natural water quality in the Antelope Buttes Recharge Triangle is excellent and does not appear to have changed significantly over time. Figure 9 shows the location of the wells listed in Appendix C along with the most recent TDS concentration for that well. The historic water quality analyses for the wells within the Antelope Buttes Recharge Triangle indicate total dissolved solids concentrations from 174-476 mg/L averaging about 249 mg/L for 9 wells sampled between 1949 and 2008 (DWR 1965).

There are no readily available water quality analyses for the wells in the area for organics, bacteriological, radionuclides, nor pesticides or herbicides. Therefore, a groundwater sampling program was undertaken for the AV Solar Ranch One Project as part of the CUP process; the results are included in Section 6.0.

6.0 EXISTING ON-SITE IRRIGATION WELL INVESTIGATION

As an extension of the investigation of historic groundwater resources for the proposed site, an evaluation of the existing irrigation well (Department of Water Resources [DWR] Well No. 8N/15W-24B3) for water quality and quantity was been undertaken by URS and is reported herein.

6.1. DATA REVIEW

6.1.1. Historic Data

Well No. 8N/15W-24B3 is located at the southwestern corner of the site about □ mile south of Highway 138 and about 1.3 mile west of 160th Street West on the former Larsen Ranch site (Figure 2). This well was reported to have been drilled in 1956 to a depth of 700 feet below ground surface (bgs), with a 14 inch diameter steel casing (DWR 1965). Following installation, the well was pumped at a rate of 900 gpm (DWR 1965). Reported depth to water on May 7, 1962 was 141.9 feet bgs. The well was used for irrigation and in 2004 the irrigated crop was onions.

6.1.2. Current Data

On June 11, 2009, URS and Bakersfield Well □ Pump staff visited the well and measured the water level at 144.3 feet bgs. They also noted that the well was equipped with a Hollowshaft turbine pump rated at 100 horsepower.

On July 27, 2009, Bakersfield Well □ Pump personnel began setting up the well for and aquifer test by installing a submersible pump and check valve, 400 feet of discharge piping, flow meter, and restrictor valve to decrease flow from the well for purposes of conducting a pumping test. The well discharge was measured at 1,100 gpm before the flow restrictor was applied. When the well was choked down to only 700 gpm, the drawdown was about 104.57 feet lower than the initial head after about 20 minutes of pumping at 700 gpm.

Because an obstruction in the space between the well casing and well column prevented the insertion of a transducer below the water table, a decision was made to remove the existing turbine pump and install a smaller capacity submersible pump that could more closely match the proposed 100-200 gpm rates for a future pumping test.

6.2. FIELD TESTING

Field activities consisted of a well video log, groundwater pumping test and water quality testing for Well No. 8N/15W-24B3. Results of the field testing are described in the following sections.

6.2.1. Health and Safety

Prior to initiating the field activities, URS prepared a Site-specific Safe Work Plan to do the following:

- Identify and describe potentially hazards that may be encountered during field operations;
- Specify protective equipment and clothing for onsite activities; and
- Outline measures to be implemented in the event of an emergency.

URS field personnel and URS subcontractors reviewed the Safe Work Plan prior to commencing the field procedures. Field monitoring activities were recorded in the Safe Work Plan.

6.2.2. Video Logging

On August 20, 2009, the existing turbine pump and 450 feet of pump column were removed from the well and a video recording of the inside of the well casing from ground surface to the well bottom was run by Wellenco. The inside diameter of the casing was measured at 13.5 inches. Geographical Position System values for the well location were 34 degrees 46 minutes 19.2 seconds latitude and 118 degrees 25 minutes 13.6 seconds longitude. From evaluating the video log, the static water level of the well (with a layer of oil on the surface most likely from the pump) was first observed at a depth of 143 feet from the top of casing. The solid casing extends from ground surface to about 265 feet bgs, at which point vertical slotted casing was first observed. The vertical slots are only partly open (less than 50 percent open space because of precipitate deposits partially plugging the slots) from 265 feet bgs to the bottom of the well at 600 feet. The bottom 100 feet of the well, beginning at the 600-foot depth, is in-filled with sediment. The original depth in 1956 was reported to be 700 feet total depth (DWR 1965). Overall, the casing appeared to be in good condition with no breaks or dissolution holes in the casing wall. The water column thickness for the well is equal to the depth at which water was first observed (143 feet) to the bottom of the well (600 feet), and is approximately 457 feet. Although the bottom of the well is in-filled with sediment and the slots in the casing are partially plugged, this well initially produced 1,100 gpm when first tested with the existing turbine pump on July 27, 2009

6.2.3. Groundwater Pumping Test

Presented below is a summary of a groundwater pumping step test for Well No. 8N/15W-24B3. The purpose of this test was to assess the well transmissivity and to project optimum pumping rates for long-term production. While the intake bowls on the existing turbine pump were at about 450 feet bgs, the submersible pump was lowered 350 foot into the well in an effort to simulate the effects of a proposed 350 foot deep well in the area surrounding the site. Results of the testing data and analytical plots are included in Appendix A.

6.2.3.1. Field Monitoring

For this investigation, the stepped-rate test consisted of four steps, with each individual step lasting six hours. An initial stress test was performed on Saturday August 22, 2009 to assess initial drawdown effects in the well and establish pumping rates for the step test. Pumping for the fist step began on Monday August 24, 2009 at 9:17 am and recovery monitoring began on Tuesday August 25, 2009 at 9:18

am. Electronic pressure transducers and data-loggers were used during the test. The initial depth to groundwater prior to starting the test was measured with a hand-operated water-level probe at 144 feet bgs. Field monitoring activities conformed to general guidelines in American Society for Testing Materials standard D4050-91 (ASTM 1994).

Based on results of the stress test, the target pumping rates for each step were 100 gpm, 140 gpm, 180 gpm, and 220 gpm. Based on the field measurements, the overall average pumping rates for each step were 110 gpm, 145 gpm, 180 gpm, and 215 gpm. A summary of the pumping and drawdown measurements are shown on Figure A-1 (Appendix A). During the 24-hour pumping test, approximately 3,850 gallons of water was pumped from the well with a measured drawdown of about 44 feet at the end of the 24-hour test. During the recovery phase, the water level rose 10 feet in the first minute, 28 feet in the first hour, and within 4 feet of the initial level by the end of the 24-hour measurement phase.

6.2.3.2. Data Analysis

Drawdown data from the test were initially plotted on a semi-logarithmic plot of drawdown-versus-time at the various incremental discharges and adjusted for time in accordance with Sheahan□s (1971) method as shown on Figure A-2 (Appendix A). A drawdown component s_w was then calculated from the following Jacob (1947) equation:

$$s_w = BQ + CQ^P \quad (1)$$

Where:

Where:	s_w	□	Drawdown expected in the well, in feet.
	B	□	Aquifer head loss coefficient resulting from laminar flow, usually assumed to be caused by the aquifer, in ft/gpm.
	C	□	Well head loss coefficient from turbulent flow, usually caused by flow into the boreholes and screen in ft/gpm^P.
	P	□	Exponent of pumping rate (dimensionless).
	Q	□	Predicted well pumping rate, in gpm.

Typical values of P are nearly equal to 2 (Jacob 1947). Assuming P equals 2, equation (1) converts to the following linear equation:

$$s_w / Q = CQ + B \quad (2)$$

To obtain s_w for Well No. 8N/15W-24B3, s_w /Q was plotted against Q, the resultant head loss coefficient graph (Figure A-3) being a straight line with slope C and intercept B.

Results of this analysis were then used to assess the initial drawdown component for various pumping rates, based on assumptions of the Jacob (1947) equation (1).

Using the step-drawdown pumping and recovery data, estimates of transmissivity (T) were made with the Cooper Jacob (1946) Drawdown and Theis (1935) Recovery Test methods applied by the AQTESOLV® program (Windows Version 3.01, Duffield—2000). Output plots of the analyses are included in Appendix A as Figures A-4 and A-5. Results of the analyses indicate a T of 5,100 gallons per day per foot (gpd/ft). It should be noted, however, that the Theis Recovery data plots indicate a slight divergence of the drawdown recovery data due to possible boundary effects that may be caused by local changes in aquifer permeability or from pumping by nearby irrigation wells. Therefore, any long-term pumping drawdown predictions should account for a possible divergence of projected levels, and the maximum recommended well pumping rate should not result in long-term drawdown that exceeds 20 percent of the water column thickness (i.e. the maximum recommended continuous well pumping rate should retain at least 80 percent of the wells water column thickness).

From equation (1), drawdowns for the target pumping rates were estimated for the time ending with the first pumping step. The theoretical pumping curves were then developed to predict total drawdown after 6 and 60 hours of pumping at these rates using the following modified Cooper-Jacob (1946) equation:

$$\Delta s_w = \frac{264\,Q}{T} \qquad (3)$$

Where: Q Discharge in gpm

T Transmissivity in gpd/ft

Δs_w Drawdown over one log cycle for pumping rate Q (ft/log cycle)

The resultant drawdown after one log cycle of pumping for each target rate were estimated from the following modified Cooper and Jacob (1946) equation:

$$s_w' = \frac{264\,Q}{T} + s_w \qquad (4)$$

Where: s_w' Predicted drawdown, in feet, after one log cycle of pumping at Q

Theoretical pumping curves were then derived by fitting a straight line with a slope Δs_w through the predicted points of drawdown, s_w and s_w', for the target values of Q as shown on Figure A-6 (Appendix A).

Theoretical pumping drawdown curves for rates of Q at 110 gpm, 145 gpm, 180 gpm, 215 gpm, and 250 gpm are shown on Figure A-6. The projected rates are overlain by the pumping test drawdown data to show how the actual step-test data at 110 gpm, 145 gpm, 180 gpm, and 215 gpm correspond with the long-term projections.

An additional pumping drawdown curve is shown for 250 gpm, which is the estimated maximum recommended continuous pumping rate for the well (i.e., the rate at which the well would retain a minimum water column thickness of 80 percent and a maximum long-term drawdown of 20 percent).

The construction and operations pumping rates for the proposed Project (150 and 12 afy, respectively) are provided in the table below, and are compared with the above pumping test results. As shown in the table, the maximum recommended pumping rate of 250 gpm is almost 3 times the estimated Project construction rate, and approximately 33 times the operations rate. As may be seen on Figure A-6, the Project construction pumping drawdown curve for 150 afy (93 gpm) would be slightly above the 110 gpm pumping drawdown curve, and pumping the well at this rate would retain a water column thickness of approximately 94 percent with a drawdown of approximately 28 feet. Note that the pumping curves on Figure A-6 are based on continuous pumping (24 hours per day, 365 days per year). Based on the pumping and recovery test results, if the well were pumped for 8 or 12 hours per day, the water level would approach the drawdown level for the continuous pumping rate during the pumping period but would then rebound during the non-pumping period to an elevation approaching that of the initial water level.

Pumping Rates	Project Water Usage		Pumping Test Analysis (see Figures A-2 and A-6				
	Construction	Operations					
Continuous (afy)*	150	12	177	234	290	347	403
Continuous (gpm)*	93	7.5	110	145	180	215	250
12 hours/day	186	15	220	290	360	430	500
8 hours/day	279	22.5	330	435	540	645	750

*Continuous pumping rate of 24 hours per day, 365 days per year.

On the basis of the results of the pumping test, , the corresponding long-term specific capacity of the well can be calculated from the following equation:

$$Sp = \frac{Q}{(h_o - h)}$$

Where:

Sp	□	specific capacity (gpm/ft)
Q	□	pumping rate (gpm)
(h_o-h)	□	projected drawdown after 4 months of pumping (ft)

The corresponding specific capacity ranges from 3.1 to 3.2 gpm/ft within the projected 4 month continuous pumping range of 110 to 250 gpm.

6.2.3.3. Summary of Pumping Test Results

Results of the groundwater pumping test for Well No. 8N/15W-24B3 are as follows:

Non-Pumping Depth to Water	Water Column Thickness	Average Well Transmissivity	Projected Specific Capacity	Maximum Recommended Pumping Rate
144 feet	~457 feet	5,100 gpm/foot	3.1 – 3.2 gpm/foot	250 gpm

On the basis of these results, the desired long-term Project pumping rates of 150 afy for construction and 12 afy for operations appear feasible for Well No. 8N/15W-24B3. However, possible boundary conditions or extended drought periods could reduce the potential pumping yield. If necessary, such conditions could be mitigated and the yield of the well increased by rehabilitating the well screen and/or removing the bottom 100 feet of silt material to access more of the aquifer. The results also indicate that a new well drilled in the vicinity of the tested irrigation well could expect similar or better yield since the sediment in-fill and well slot restrictions would not be present.

6.2.4. Water Quality Sampling

A groundwater sample was collected from an in-line sample port prior to the completion of the 24-hour pumping test. The groundwater sample was collected for Modified California Code of Regulations Title 22 analysis.

Sample containers and handling procedures conformed to the established protocols for each specific parameter as described in EPA Method SW-846. The sample bottles, once filled and preserved as required, were properly labeled. Each label included well identification number, sample number, date and time sampled, and site/client name and location. The sealed and labeled samples were logged on a chain-of-custody (COC) document, placed in an ice chest packed with ice and transported to Calscience Environmental Laboratories Inc. (Calscience), a State of California accredited laboratory. Copies of the COCs are included with the laboratory report provided in Appendix B.

The results of water quality analyses are presented in a 73 page report containing the numerous quality control, blank tests, and the methods used to analyze for each of the analytes. Results of the inorganic and physical analyses are listed in Table 1 and the results of the radionuclide analyses are listed in Table 2. Of all the organic analytes tested, only chloromethane was detected at 1.7 micrograms per liter (µg/L). Although the U.S. Environmental Protection Agency (USEPA) has not set any Maximum Contaminant Level (MCL) for chloromethane (USEPA 2006), Drinking Water Advisories list a Lifetime Health Advisory (Lifetime HA) of 30 µg/L and a Drinking Water Equivalent Level (DWEL) advisory of 100 µg/L. The detected value of 1.7 µg/L is well below these levels.

From the analyses presented in Appendix B, it can be concluded that the water is high quality, as evidenced by its low TDS of only 226 mg/L, only one detection of organic chemicals (chloromethane), and the Radiological analytes all below any Maximum Contaminant Levels (MCL) or Action Levels (AL).

7.0 SUMMARY AND CONCLUSIONS

The groundwater resources for the proposed Project were evaluated for: (1) regional and historical groundwater flow and water level conditions; (2) pumping effects based on proposed pumping needs of the Project, as assessed by performing a thorough pumping test of the existing well at the site; and (3) historic and current water quality conditions for the site.

Historically, groundwater flow from 1915 to 2006 at the proposed Project site has not changed significantly. Recharge to the area was reported to be about 3,000 afy. Groundwater flow for the Antelope Buttes Recharge Triangle, where the site is located, has changed little over time (1915, 1961, and 2006). The general direction of groundwater flow has consistently been in the northeasterly direction from recharge along the north side of the San Gabriel Mountains toward the deeper Lancaster Groundwater Subbasin in the Antelope Valley. The water level in one well within the Antelope Butte Recharge Triangle and bordering the site (Well No. 8N/14W-18N1, see Figure 2) rose as much as 50 feet from 1960-1988 and has stayed as that level for the past 20 years. The water level in the irrigation well at the proposed site (Well No. 8N/15W-24B3, see Figure 2), declined only 2 feet between 1969 and 2009

A pumping test performed on August 24, 2009 showed that pumping at the desired yield of 150 and 12 afy (for construction and operations, respectively) at Well No. 8N/15W-24B3 would retain a water column thickness of about 94 percent or greater than the non-pumping water column thickness (assuming continuous pumping and no interference from boundary conditions). These rates are well below the maximum recommended continuous well pumping rate of 250 gpm, which would retain at least 80 percent of the non-pumping water column thickness. On the basis of these results, the desired yield of 150 afy for the estimated 3-year construction phase and 12 afy for the long-term operations phase appear very feasible for Well No. 8N/15W-24B3 or a new well within the Project site. It is expected that both construction and long-term operational needs of the facility could be met without adverse impacts on the groundwater aquifer, including wells on adjacent properties.

Water quality in the Basin is reportedly excellent near the boundaries of the Basin, and deteriorates with proximity to the dry lakes. Groundwater is typically calcium bicarbonate in character near the surrounding mountains and is sodium bicarbonate or sodium sulfate character in the central part of the Basin. Data from 213 public supply wells across the basin show an average TDS content of 374 mg/L, and range from 123 to 1,790 mg/L (DWR 1965).

The inorganic water quality test results presented in Appendix C show that the natural water quality in the Antelope Buttes Recharge Triangle is excellent and does not appear to have changed significantly over time. The historic water quality analyses for the wells within the Antelope Buttes Recharge Triangle indicate TDS concentrations from 174-476 mg/L averaging about 249 mg/L for 9 wells sampled between 1949 and 2008 (DWR 1965).

From the analyses of water obtained from Well No. 8N/15W-24B3 at completion of the 24 hour pumping test on August 25, 2009, it can be concluded that the water is high quality, as evidenced by its low TDS of only 226 mg/L, only one detection of organic chemicals (chloromethane), and the Radiological analytes all below any Maximum Contaminant Levels (MCL) or Action Levels (AL).

The on-site irrigation well which was investigated does not contain a sanitary seal, and is therefore not considered acceptable for and will not be used for Project domestic/potable water use. However, as evidenced by the data from wells in the Project area as summarized in Appendix C, the water quality of the tested irrigation well is indicative of the aquifer groundwater quality at the site. Thus, any new well drilled in the vicinity of the irrigation well or within the Project site (for domestic or other purposes) would likely have similar water quality.

Additionally, available data show that the average yield (or pumping rate) for wells within approximately a 5-mile radius of the on-site irrigation well is approximately 1,100 gpm. Consistently high yields and specific capacities for wells in the surrounding area as well as the tested irrigation well indicate that any new wells that may be drilled within the Project site would likely have similar yields and pumping characteristics.

8.0 REFERENCES

Department of Water Resources (DWR). 1965. *Water Wells in the Western Part of the Antelope Valley Area—Los Angeles and Kern Counties, California*, Bulletin 91-11

Department of Water Resources (DWR). 2004. *California's Groundwater Bulletin 118; Antelope Valley Groundwater Basin.* February 27.

Durbin, T. J. 1978. *Calibration of a Mathematical Model of the Antelope Valley Ground-Water Basin, California.* Geological Survey Water-Supply Paper 2046.

Regional Water Management Group of the Antelope Valley Integrated Regional Water Management Plan (RWMG). 2007. *Antelope Valley Integrated Regional Water Management Plan.*

American Society for Testing Materials. 1994, Standard Test Method (field procedure) for Withdrawal and Injection Tests for Determining Hydraulic Properties of Aquifer Systems, ASTM Designation D4050-91, in ASTM Standards on Groundwater and Vadose Zone Investigations, ASTM Committee D-18 on Soil and Rock, Second Edition, p. 432.

Cooper, H. H., Jr. and Jacob, C.E. 1946. A Generalized Graphical Method for Evaluating Formation Constants and Summarizing Well Field History; Amer. Geophys. Union Trans., v. 27, p.526-534.

Driscoll, F. G. 1986. Groundwater and Wells: Johnson Division, St. Paul, Minnesota, 1,089 p.

Duffield, G.M. 2000. AQTESOLV7, Aquifer Test Solver, Version 1.17; Geraghty and Miller, Inc. Modeling Group, Reston Virginia.

Fetter, C.W., 2001, Applied Hydrogeology, Third Edition. Prentice Hall Inc., Englewood Cliffs, New Jersey, 691 p.

Jacob, C. E. 1947. Drawdown Test to Determine Effective Radius of Artesian Well: Transactions of the American Society of Civil Engineers, v. 112, p. 1,047-1,070.

Theis, C.V. 1935. Relation between Lowering of the Piezometric Surface and Rate and Duration of Discharge of a Well: Amer. Geophys. Union Trans., v. 16, p. 519-524.

U.S Environmental Protection Agency (USEPA). 2006. Drinking Water Health Advisories, 2006 Edition, EPA 822-R-06-013. Accessed online at: http://www.epa.gov/waterscience/criteria/drinking/dwstandards.html

TABLES

TABLE 1. Well No. 8N/15W-24B3 Results of Inorganic and Physical Analyses

Parameter	Result	Parameter	Result
Calcium	8.9	Antimony	ND
Magnesium	3.52	Arsenic	0.00924
Sodium	42.9	Barium	0.00275
Potassium	2.85	Beryllium	ND
Chloride	8.9	Cadmium	ND
Sulfate	11	Chromium	0.00266
Bicarbonate (as CaCo3)	133	Copper	ND
Nitrite (as N)	ND	Nickel	0.00105
Nitrate (as N0	5.1	Selenium	ND
Silica (SiO2)	34.2	Silver	ND
Reactive Silica (as SiO2)	29	Thallium	ND
Color	5	Zinc	0.0811
Turbidity	0.16	Total Phosphorus	0.73
Odor	ND	Sulfide	ND
Total Hardness	100	Cyanide	ND
Specific Conductance	360	Fluoride	0.25
Total Dissolved Solids	226	Ammonia (as N)	ND
Suspended Solids	ND	Perchlorate	ND
pH	7.56	Total Organic Carbon	0.63
Iron	0.147	Oil and Grease	ND
Boron	0.0606	MBAS	ND
Mercury	ND		
o-Phosphate	ND		
Total Phosphate	2.2		
Carbon Dioxide	60		
Total Alkalinity (as CaCO3)	133		
Carbonate (as CaCO3)	ND		
Hydroxide (as CaCO3)	ND		
Asbestos			
Fibers Asbestos	0		
Fibers Non-Asbestos	0		

Note: All Results in mg/L except:

1. Color in Color Units
2. Turbidity in National Turbidity Units (NTU)
3. pH in pH Units

TABLE 2. Well No. 8N/15W-24B3 Results of Radiological Analyses

Constituent	Result ± Error	MDA	Units	MCL/AL
Gross Alpha	1.62 ± 1.43	1.63	pCi/L	15/5
Gross Beta	1.57 ± 1.37	1.69	pCi/L	50
Strontium 90	0.000 ± 0.282	0.766	pCi/L	8
Total Alpha Radium (226)	0.060 ± 0.117	0.353	pCi/L	3
Tritium	0.000 ± 223	381	pCi/L	20000
Uranium	2.16 ± 0.978	0.267	pCi/L	20
Ra 228	0.000 ± 0.728	0.268	pCi/L	2

Notes:

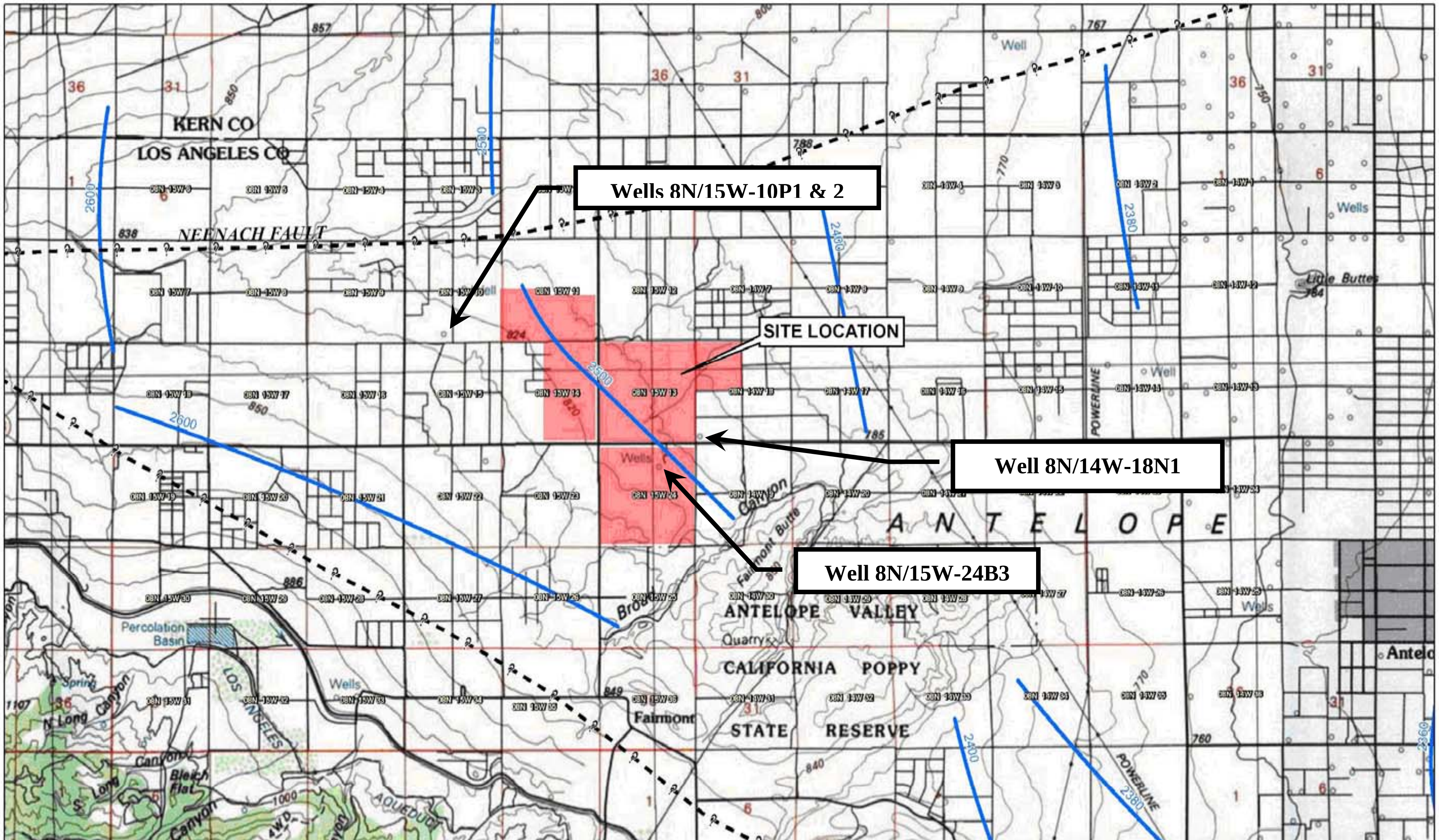
1. pCi/L = pico Curies per Liter
2. MDA = Minimum Detectable Activity (Calculated at the 95 percent confidence level) Data utilized by Department of Health Services to determine matrix interference.
3. MCL/AL = Maximum Contaminant Level/Action Level

FIGURES

AV Solar Ranch One

Figure 1. Regional Vicinity Map

T:\NextLight_Solar\deliverables\LarsenRanch\Project Description Figures\Figure1_Regional_Vicinity_Map.mxd



Legend

Project Site — Ground Water Level (1915)

Faults

Notes:

Topographic contours are in meters.

Groundwater contours are elevation above mean sea level (feet).

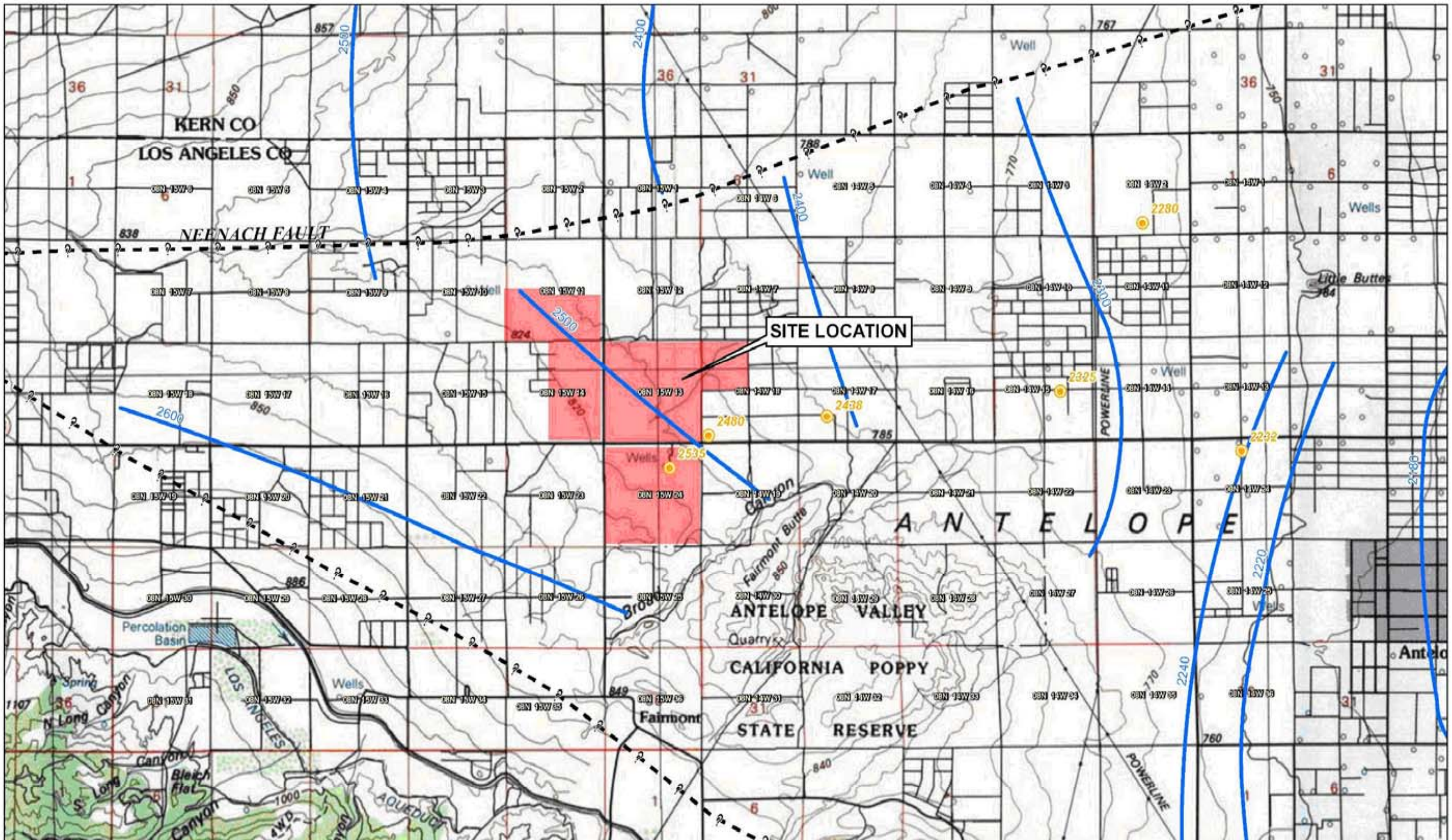
Well 8N/15/W-24B3 was investigated by URS in 2009 for this report.

0 1 2 Miles

N

AV Solar Ranch One
Ground Water Level (1915)

Figure 2 | August 2009



Legend

Project Site
Wells
Faults
Ground Water Level (1961)

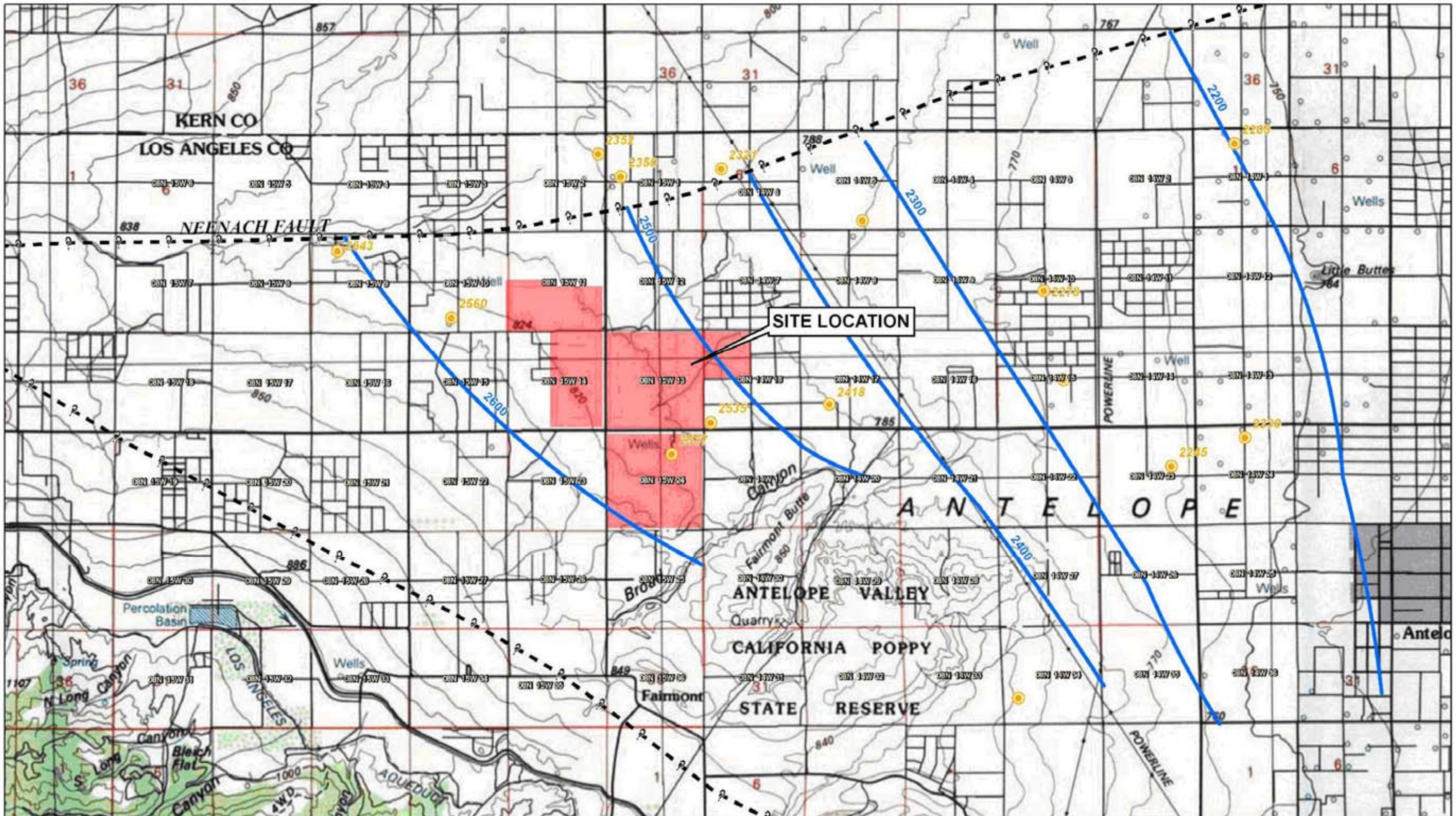
Notes:
Topographic contours are in meters.
Groundwater contours are elevation above mean sea level (feet).

0 1 2 Miles

N

AV Solar Ranch One
Ground Water Level (1961)

Figure 3	August 2009



Legend

- Project Site
- Wells
- Faults
- Ground Water Level (2006)

Notes:
Topographic contours are in meters.
Groundwater contours are elevation above mean sea level (feet).

0 1 2 Miles

N

AV Solar Ranch One
Ground Water Level (2006)

Figure 4

August 2009

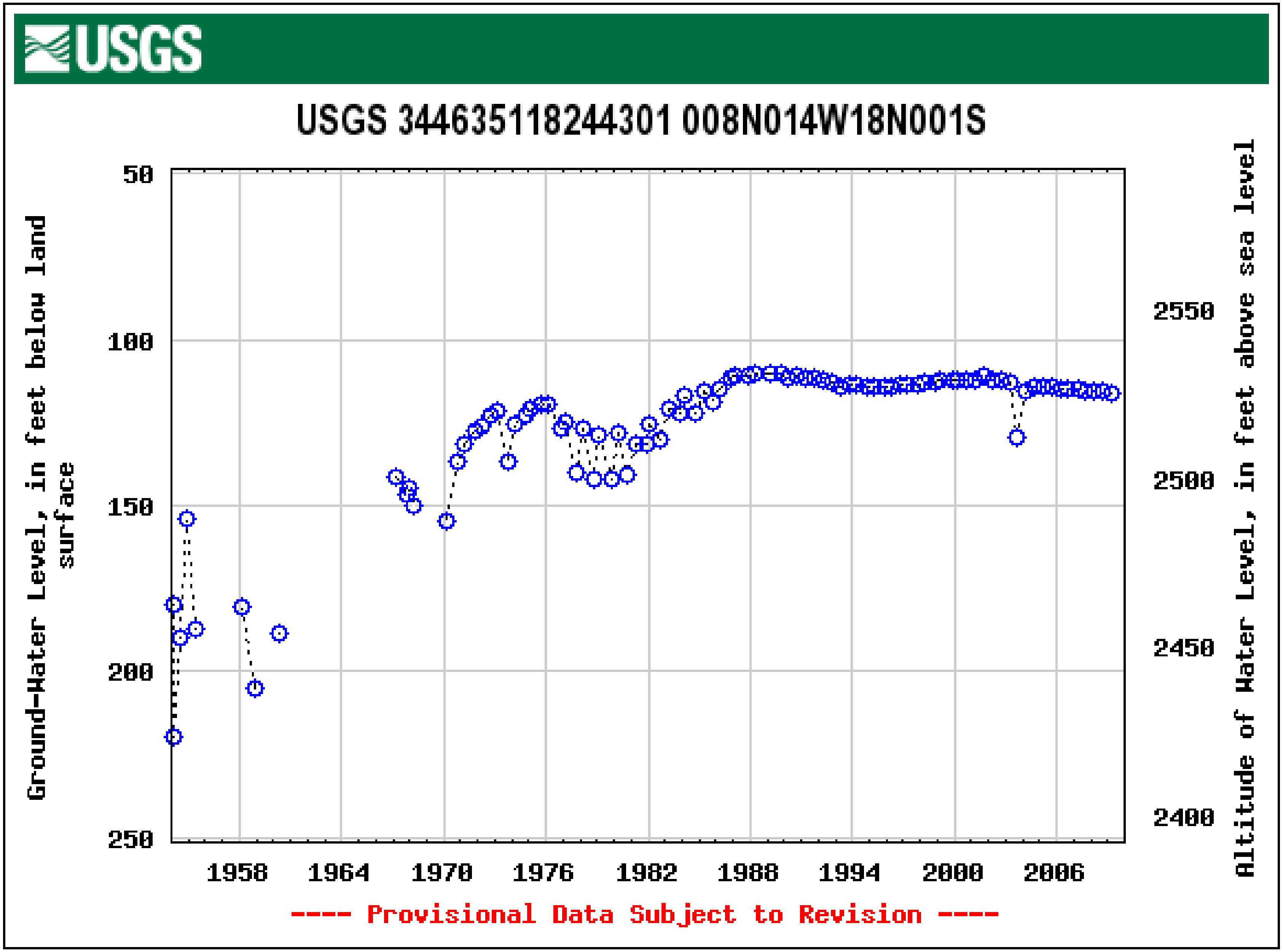


Figure 5. Historic Water Levels—Well 8N/14W-18N1-- Project Site Eastern Boundary

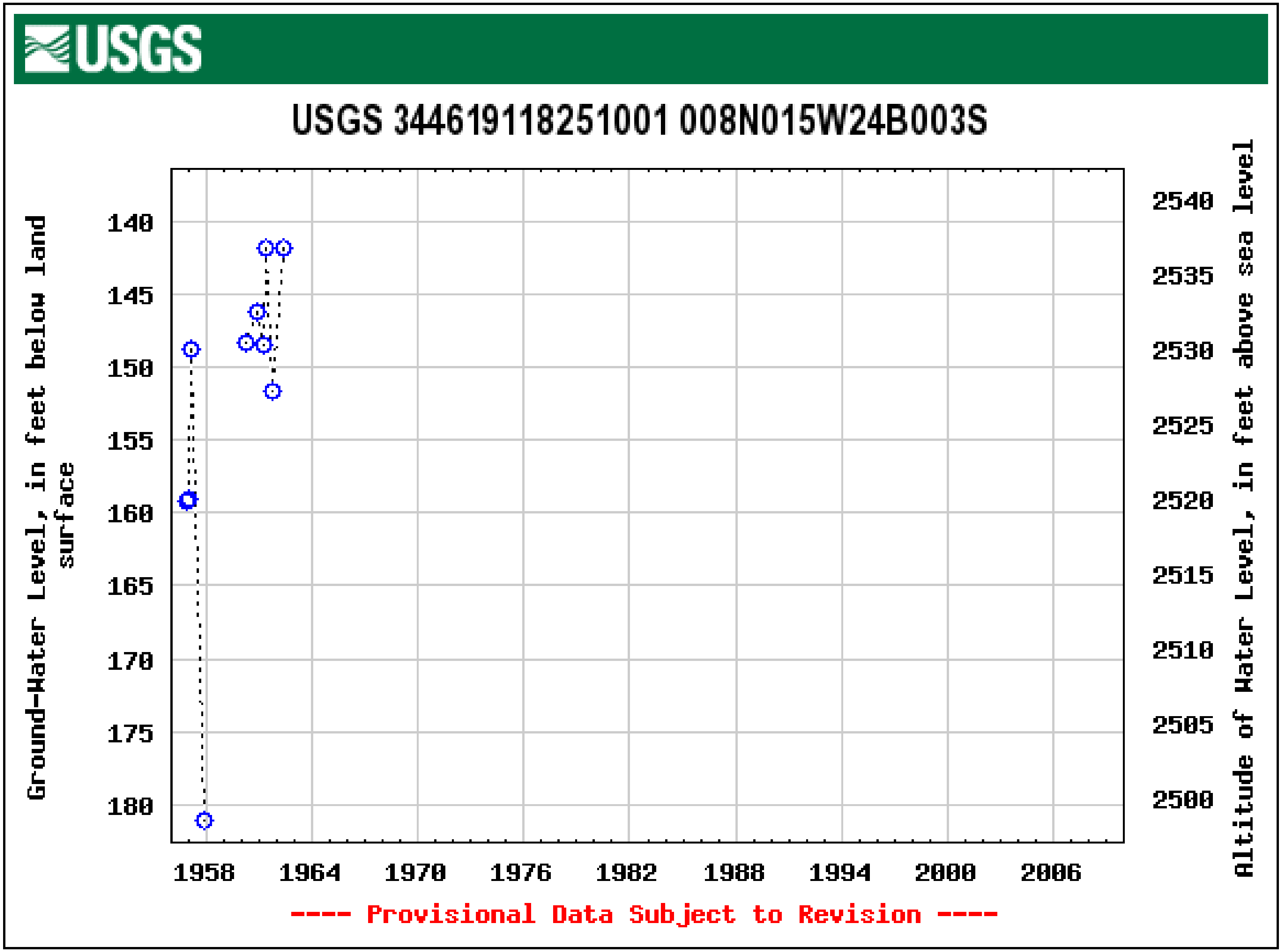


Figure 6. Historic Water Levels—Well 8N/15W-24B3—Project Site

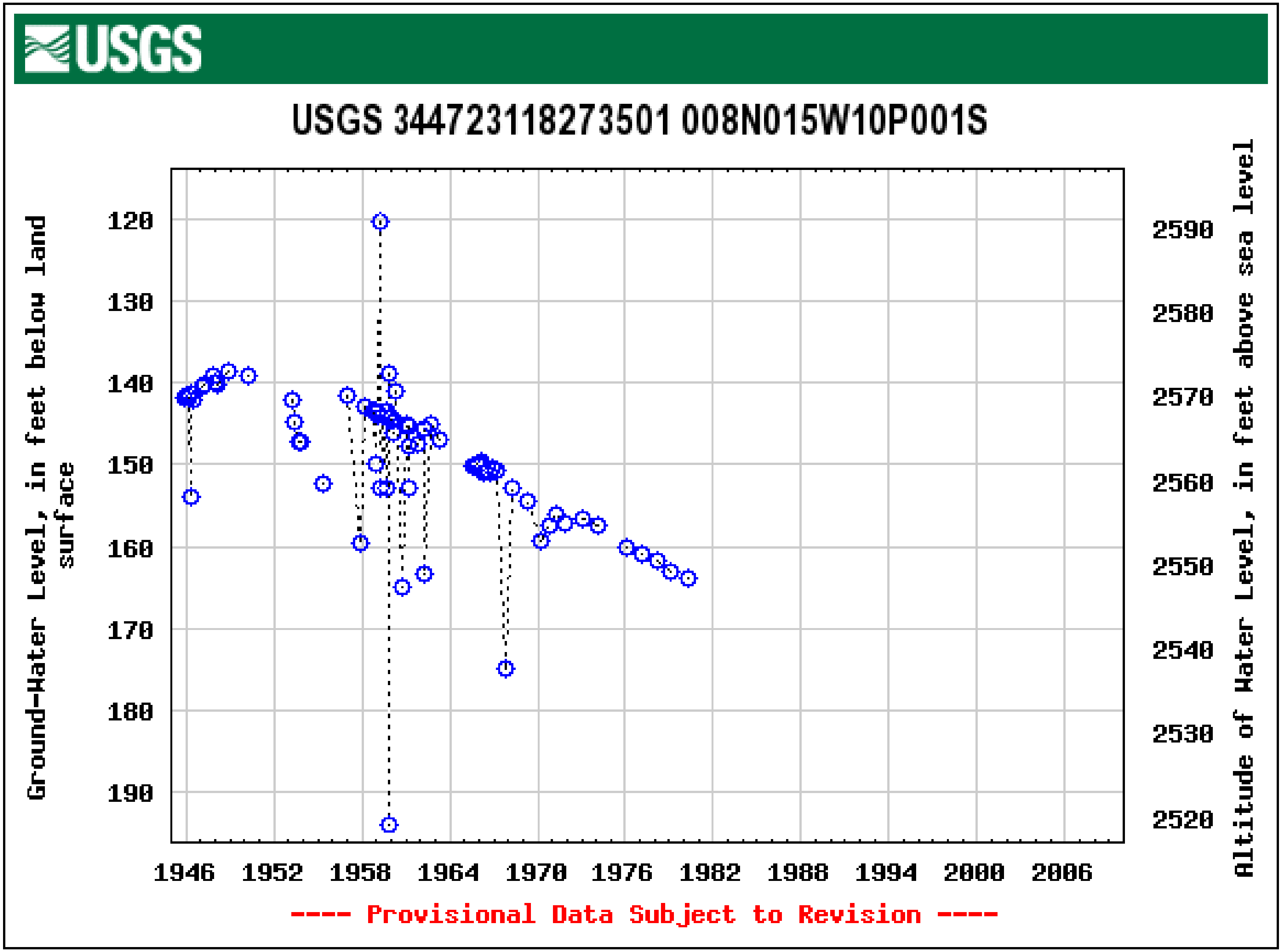


Figure 7. Historic Water Levels—Well 8N/15W-10P1—Northwest of Project Site (early data)

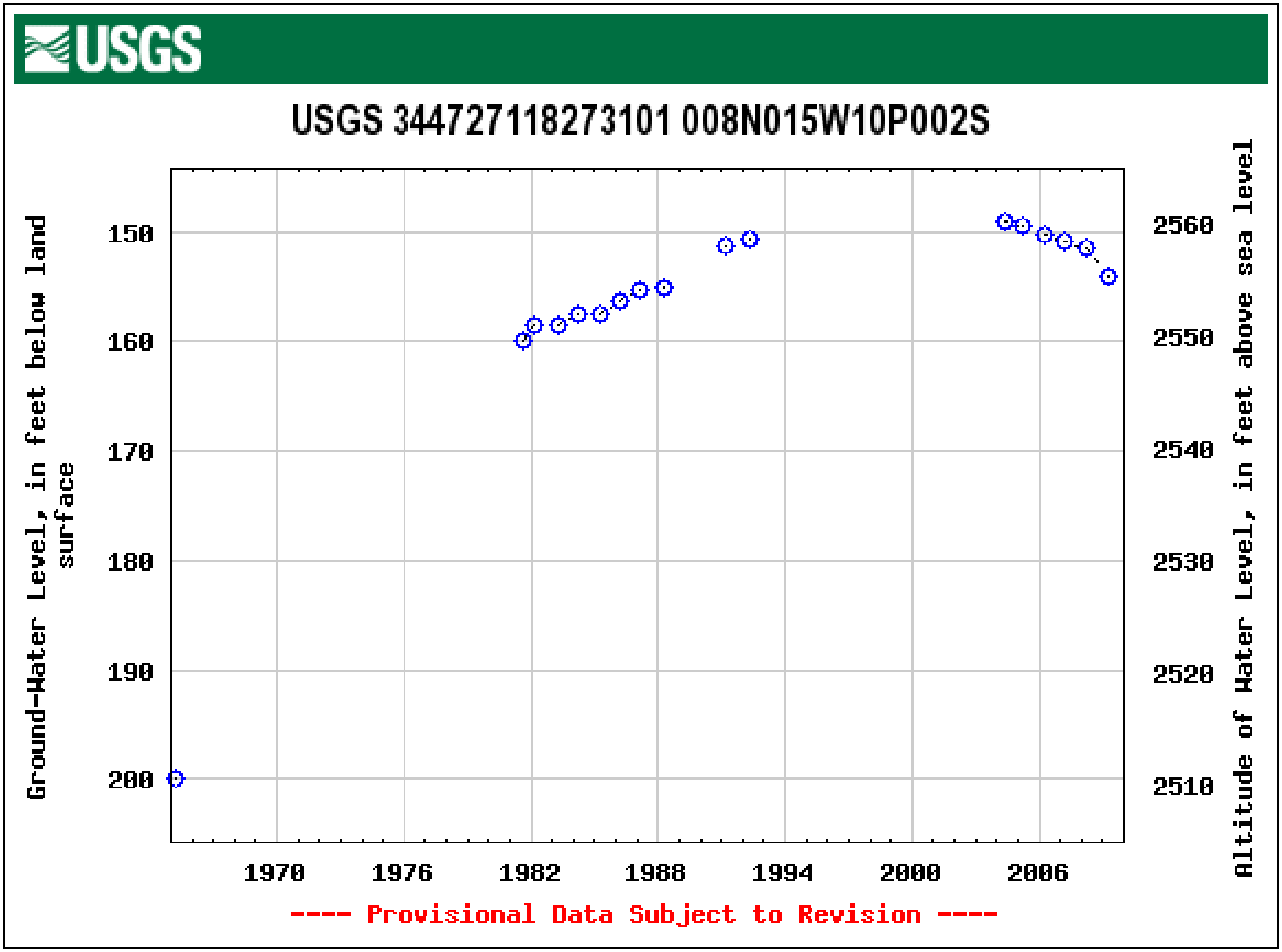
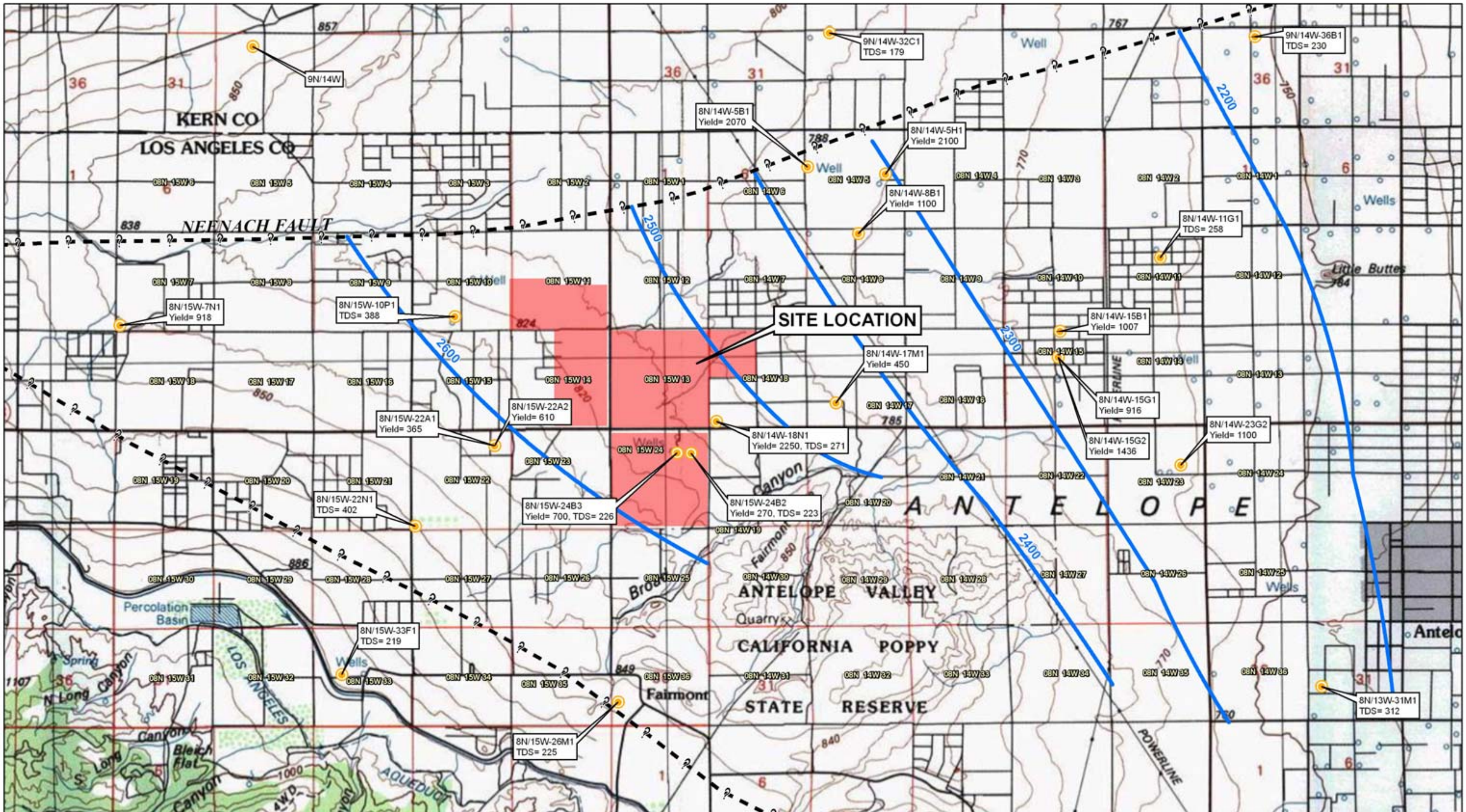


Figure 8. Historic Water Levels—Well 8N/15W-10P2—Northwest of Project Site (late data)



Legend

Project Site — Ground Water Level (2006)

Faults — Wells (Yeild value in gallons per minute; TDS= Total Dissolved Solids in mg/L)

* Topographic contours are in meters.

0 — 1 — 2 Miles

N

Location Map for Wells with Yield or Water Quality Data

Figure 9	November 2009

I:\av_solar_ranch_one\mxd

Appendix A. Pumping Test Drawdown Data and Analytical Plots

Data Set: T:\2009\Solar One\SolarOnePumpTest Report\Pump Test Analysis\Cooper-Jacob.tbk.aqt
Date: 10\06\09
Time: 15:20:37

PROJECT INFORMATION

Company: URS

AQUIFER DATA

Saturated Thickness: 455.7 ft
Anisotropy Ratio (Kz\Kr): 1.

PUMPING WELL DATA

Number of pumping wells: 1

Pumping Well No. 1: 8N\15W\24B3

X Location: 0. ft
Y Location: 0. ft

Fully Penetrating Well

No. of pumping periods: 5

Pumping Period Data

Time (min)	Rate (gal\min)	Time (min)	Rate (gal\min)	Time (min)	Rate (gal\min)
0.	100.	720.5	180.	1440.1	0.
360.	140.	1080.9	220.		

OBSERVATION WELL DATA

Number of observation wells: 1

Observation Well No. 1: 8N\15W\24B3

X Location: 0.1 ft
Y Location: 0.1 ft

Fully Penetrating Well

No. of observations: 884

Observation Data

Time (min)	Displacement (ft)	Time (min)	Displacement (ft)	Time (min)	Displacement (ft)
0.006	2.12	538.	25.79	1085.5	40.25
0.013	2.08	548.	25.81	1085.7	40.43
0.02	2.24	559.	25.98	1086.	40.49
0.027	2.39	571.	26.15	1086.3	40.61
0.035	2.56	584.	26.27	1086.6	40.73
0.044	2.91	597.	26.44	1087.	40.51
0.052	3.23	611.	26.58	1087.3	40.83
0.062	3.42	626.	26.66	1087.7	40.84
0.072	3.64	642.	26.74	1088.1	40.84
0.082	3.81	658.	26.93	1088.5	41.07
0.093	4.14	676.	27.1	1088.9	40.92
0.105	4.39	695.	27.19	1089.4	41.2
0.118	4.72	715.	27.34	1089.9	41.19
0.131	5.	720.5	27.26	1090.4	41.31
0.145	5.31	720.5	27.35	1091.	40.91
0.16	5.66	720.5	27.44	1091.6	41.37
0.176	5.91	720.5	27.44	1092.2	41.35
0.192	6.34	720.5	27.35	1092.9	41.54
0.21	6.57	720.5	27.49	1093.6	41.4
0.229	6.89	720.5	27.42	1094.3	41.64

Time (min)	Displacement (ft)	Time (min)	Displacement (ft)	Time (min)	Displacement (ft)
0.249	7.3	720.5	27.34	1095.1	41.61
0.27	7.62	720.5	27.35	1096.	41.39
0.292	7.98	720.5	27.36	1096.8	40.73
0.316	8.32	720.5	27.33	1097.8	40.71
0.341	8.68	720.5	27.43	1098.8	40.67
0.367	9.02	720.5	27.25	1099.8	40.39
0.395	9.42	720.5	27.32	1100.9	40.69
0.425	9.77	720.5	27.45	1102.1	40.79
0.456	10.18	720.5	27.4	1103.4	40.36
0.49	10.56	720.5	27.3	1104.7	40.46
0.525	10.9	720.5	27.34	1106.1	40.52
0.562	11.29	720.5	27.36	1107.6	40.78
0.602	11.68	720.5	27.27	1109.2	40.66
0.644	12.	720.5	27.36	1110.8	40.5
0.688	12.38	720.5	27.34	1112.6	40.56
0.735	12.73	720.5	27.35	1114.5	40.63
0.785	13.21	720.5	27.4	1116.5	40.96
0.838	13.31	720.6	27.37	1118.6	40.86
0.894	13.72	720.6	27.38	1120.8	40.94
0.954	13.86	720.6	27.33	1123.2	40.91
1.014	13.9	720.6	27.31	1125.7	40.91
1.084	14.24	720.6	27.31	1128.3	41.1
1.154	14.14	720.6	27.3	1131.1	41.25
1.224	13.87	720.6	27.33	1134.1	41.21
1.304	13.48	720.6	27.41	1137.2	41.33
1.394	13.06	720.6	27.37	1140.6	41.47
1.474	12.68	720.6	27.4	1144.1	41.39
1.574	12.2	720.6	27.44	1147.8	41.2
1.674	11.73	720.6	27.37	1151.8	41.44
1.777	11.43	720.7	27.34	1156.	41.64
1.884	11.09	720.7	27.39	1160.4	41.46
2.004	10.88	720.7	27.28	1165.1	41.6
2.134	10.75	720.7	27.37	1170.1	41.57
2.264	10.62	720.7	27.54	1175.4	41.85
2.404	10.57	720.7	27.43	1181.	41.82
2.554	10.27	720.7	27.48	1187.	41.93
2.715	10.33	720.8	27.5	1193.	42.03
2.877	10.11	720.8	27.71	1200.	42.12
3.054	10.23	720.8	27.65	1207.	42.08
3.244	10.17	720.8	27.57	1214.	42.27
3.444	10.24	720.8	27.67	1222.	42.33
3.654	10.25	720.9	27.73	1231.	42.49
3.874	10.28	720.9	27.93	1239.	42.45
4.114	10.29	720.9	27.92	1249.	42.7
4.364	10.48	720.9	27.88	1259.	42.85
4.624	10.44	721.	28.02	1269.	42.9
4.904	10.45	721.	28.03	1280.	43.25
5.204	10.26	721.	28.12	1292.	43.06
5.514	10.65	721.	28.24	1305.	43.3
5.854	10.76	721.1	28.1	1318.	43.45
6.204	10.83	721.1	28.4	1332.	43.6
6.574	10.94	721.2	28.52	1347.	43.83
6.974	11.03	721.2	28.31	1363.	43.87
7.394	11.04	721.2	28.34	1379.	43.88
7.834	11.22	721.3	28.65	1397.	44.08
8.304	11.28	721.3	28.53	1416.	44.32
8.804	11.35	721.4	28.59	1436.	44.49
9.334	11.6	721.5	28.64	1440.1	44.46
9.894	11.51	721.5	28.79	1440.1	44.44
10.49	11.47	721.6	28.83	1440.1	44.38
11.1	11.65	721.6	28.72	1440.1	44.33
11.79	11.77	721.7	28.91	1440.1	44.62
12.49	11.92	721.8	29.	1440.1	44.51
13.19	11.88	721.9	29.17	1440.1	44.41
13.99	11.99	722.	28.98	1440.1	44.53

Time (min)	Displacement (ft)	Time (min)	Displacement (ft)	Time (min)	Displacement (ft)
14.89	12.09	722.	29.1	1440.1	44.48
15.69	12.14	722.1	29.27	1440.1	44.32
16.69	12.29	722.2	29.13	1440.1	44.38
17.69	12.33	722.3	29.16	1440.2	44.34
18.69	12.45	722.4	29.42	1440.2	44.38
19.79	12.55	722.6	29.41	1440.2	44.49
20.99	12.63	722.7	29.31	1440.2	44.47
22.29	12.71	722.8	29.4	1440.2	44.39
23.59	12.98	723.	29.46	1440.2	44.29
24.99	12.92	723.1	29.49	1440.2	44.58
26.49	13.18	723.3	29.49	1440.2	44.67
28.09	13.15	723.4	29.6	1440.2	44.52
29.69	13.27	723.6	29.59	1440.2	44.41
31.5	13.38	723.8	29.6	1440.2	44.2
33.39	13.47	724.	29.76	1440.2	40.95
35.39	13.49	724.2	29.86	1440.2	43.26
37.5	13.72	724.4	29.87	1440.2	41.78
39.69	13.84	724.7	29.86	1440.2	44.1
42.09	13.93	724.9	30.01	1440.2	44.72
44.59	14.09	725.2	29.91	1440.2	42.96
47.19	14.17	725.5	29.96	1440.2	44.46
50.	14.34	725.8	29.87	1440.2	43.39
53.	14.42	726.1	30.2	1440.2	43.21
56.09	14.56	726.4	30.07	1440.3	43.02
59.49	14.65	726.8	30.26	1440.3	42.74
62.99	14.8	727.1	30.22	1440.3	42.68
66.7	14.9	727.5	30.15	1440.3	42.41
70.7	15.2	728.	30.16	1440.3	42.23
74.89	15.17	728.4	30.3	1440.3	42.02
79.29	15.32	728.9	30.3	1440.3	41.73
83.99	15.45	729.4	30.43	1440.3	41.5
88.99	15.58	729.9	30.43	1440.3	41.23
94.29	15.68	730.5	30.4	1440.3	40.95
99.89	15.89	731.1	30.44	1440.4	40.68
105.9	15.95	731.7	30.96	1440.4	40.39
111.9	16.14	732.4	31.31	1440.4	40.12
118.9	16.28	733.1	31.45	1440.4	39.83
125.9	16.38	733.8	31.59	1440.4	39.54
132.9	16.54	734.6	31.64	1440.5	39.28
140.9	16.71	735.5	31.89	1440.5	39.01
149.9	16.86	736.3	31.79	1440.5	38.72
157.9	17.	737.3	31.99	1440.5	38.41
167.9	17.13	738.3	31.9	1440.6	38.12
177.9	17.32	739.3	32.13	1440.6	37.82
187.9	17.46	740.4	32.28	1440.6	37.51
198.9	17.56	741.6	32.35	1440.6	37.21
210.9	17.74	742.9	32.53	1440.7	36.89
223.9	17.93	744.2	32.42	1440.7	36.57
236.9	18.06	745.6	32.5	1440.7	36.27
250.9	18.22	747.1	32.42	1440.8	35.92
265.9	18.39	748.7	32.32	1440.8	35.63
281.9	18.51	750.3	32.48	1440.8	35.28
297.9	18.69	752.1	32.47	1440.9	35.06
315.9	18.82	754.	32.41	1440.9	34.62
334.9	18.99	756.	32.57	1441.	34.54
354.9	19.15	758.1	32.3	1441.	34.18
360.	19.2	760.3	32.56	1441.1	33.85
360.	19.22	762.7	32.74	1441.2	33.74
360.	19.2	765.2	32.86	1441.2	33.26
360.	19.19	767.8	32.77	1441.3	33.01
360.	19.16	770.6	32.89	1441.4	32.73
360.	19.2	773.6	32.98	1441.4	32.44
360.	19.22	776.7	32.95	1441.5	32.14
360.	19.21	780.1	32.92	1441.6	31.85
360.	19.21	783.6	33.03	1441.7	31.78

Time (min)	Displacement (ft)	Time (min)	Displacement (ft)	Time (min)	Displacement (ft)
360.	19.16	787.3	33.05	1441.8	31.2
360.	19.19	791.3	33.22	1441.9	31.01
360.	19.19	795.5	33.25	1442.	30.73
360.	19.17	799.9	33.35	1442.1	30.45
360.	19.2	804.6	33.38	1442.2	30.12
360.	19.19	809.6	33.42	1442.3	29.82
360.	19.17	814.9	33.45	1442.5	29.53
360.	19.19	820.5	33.53	1442.6	29.32
360.	19.18	826.5	33.54	1442.8	28.95
360.	19.19	832.5	33.65	1442.9	28.64
360.	19.19	839.5	33.68	1443.1	28.38
360.	19.2	846.5	33.86	1443.3	28.1
360.	19.2	853.5	34.02	1443.5	27.82
360.1	19.21	861.5	34.08	1443.7	27.51
360.1	19.22	870.5	34.1	1443.9	27.28
360.1	19.2	878.5	34.3	1444.1	26.98
360.1	19.21	888.5	34.3	1444.3	26.74
360.1	19.17	898.5	34.54	1444.6	26.52
360.1	19.21	908.5	34.52	1444.8	26.27
360.1	19.23	919.5	34.61	1445.1	26.07
360.1	19.2	931.5	34.67	1445.4	25.77
360.1	19.21	944.5	34.77	1445.7	25.51
360.1	19.18	957.5	35.07	1446.1	25.29
360.1	19.16	971.5	35.06	1446.4	25.03
360.1	19.19	986.5	35.26	1446.8	24.8
360.1	19.16	1002.5	35.38	1447.2	24.57
360.1	19.21	1018.5	35.43	1447.6	24.31
360.2	19.19	1036.5	35.7	1448.	24.13
360.2	19.21	1055.5	35.81	1448.5	23.88
360.2	19.28	1075.5	35.99	1449.	23.67
360.2	19.32	1080.9	35.9	1449.5	23.5
360.2	19.2	1080.9	36.01	1450.1	23.22
360.2	19.38	1080.9	35.88	1450.7	23.02
360.2	19.4	1080.9	36.15	1451.3	22.84
360.3	19.4	1080.9	35.95	1452.	22.62
360.3	19.43	1080.9	35.84	1452.7	22.41
360.3	19.46	1080.9	36.16	1453.4	22.23
360.3	19.57	1080.9	35.77	1454.2	22.02
360.3	19.62	1080.9	36.12	1455.1	21.8
360.4	19.68	1080.9	35.93	1455.9	21.61
360.4	19.8	1080.9	36.07	1456.9	21.38
360.4	19.82	1080.9	35.91	1457.9	21.2
360.4	19.94	1080.9	35.84	1458.9	21.01
360.5	19.97	1080.9	35.85	1460.	20.81
360.5	20.04	1081.	36.2	1461.2	20.61
360.5	20.11	1081.	35.9	1462.5	20.42
360.6	20.22	1081.	36.14	1463.8	20.16
360.6	20.26	1081.	35.91	1465.2	20.
360.6	20.34	1081.	36.11	1466.7	19.8
360.7	20.4	1081.	35.9	1468.3	19.59
360.7	20.56	1081.	35.98	1469.9	19.4
360.8	20.57	1081.	35.88	1471.7	19.17
360.8	20.67	1081.	36.07	1473.6	18.95
360.9	20.74	1081.	36.	1475.6	18.74
360.9	20.78	1081.	36.03	1477.7	18.52
361.	20.87	1081.	36.12	1479.9	18.3
361.	20.87	1081.	35.9	1482.3	18.07
361.1	20.96	1081.	35.94	1484.8	17.87
361.1	21.06	1081.	35.86	1487.4	17.68
361.2	21.17	1081.	35.96	1490.2	17.45
361.3	21.19	1081.	35.95	1493.2	17.16
361.4	21.31	1081.	35.95	1496.3	16.95
361.5	21.33	1081.	35.94	1499.7	16.7
361.5	21.33	1081.	35.98	1503.2	16.45
361.6	21.42	1081.	36.03	1506.9	16.25

Time (min)	Displacement (ft)	Time (min)	Displacement (ft)	Time (min)	Displacement (ft)
361.7	21.52	1081.	36.15	1510.9	16.
361.8	21.57	1081.	36.17	1515.1	15.74
361.9	21.64	1081.	36.35	1519.5	15.49
362.1	21.63	1081.1	36.32	1524.2	15.23
362.2	21.76	1081.1	36.22	1529.2	15.02
362.3	21.83	1081.1	36.11	1534.5	14.76
362.5	22.02	1081.1	36.33	1540.1	14.49
362.6	21.9	1081.1	36.13	1546.1	14.24
362.8	22.03	1081.1	36.23	1552.1	14.
362.9	22.07	1081.1	36.04	1559.1	13.72
363.1	22.21	1081.1	36.24	1566.1	13.46
363.3	22.13	1081.1	36.15	1573.1	13.21
363.5	22.23	1081.1	36.25	1581.1	12.94
363.7	22.31	1081.1	36.33	1590.1	12.66
363.9	22.36	1081.1	36.19	1598.1	12.43
364.2	22.44	1081.1	36.3	1608.1	12.15
364.4	22.77	1081.1	36.27	1618.1	11.91
364.7	22.26	1081.1	36.37	1628.1	11.66
365.	22.75	1081.1	36.33	1639.1	11.41
365.3	22.57	1081.1	36.32	1651.1	11.14
365.6	22.64	1081.1	36.14	1664.1	10.86
365.9	22.7	1081.1	36.51	1677.1	10.62
366.3	22.96	1081.2	36.4	1691.1	10.36
366.6	22.54	1081.2	36.42	1706.1	10.08
367.	22.8	1081.2	36.76	1722.1	9.83
367.5	22.83	1081.2	36.53	1738.1	9.55
367.9	22.84	1081.2	36.52	1756.1	9.3
368.4	22.92	1081.2	36.7	1775.1	9.04
368.9	22.97	1081.2	36.93	1795.1	8.76
369.4	23.06	1081.2	36.8	1815.1	8.52
370.	23.03	1081.2	36.97	1835.1	8.29
370.6	23.19	1081.3	37.2	1855.1	8.07
371.2	23.1	1081.3	36.88	1875.1	7.83
371.9	23.23	1081.3	37.12	1895.1	7.67
372.6	23.24	1081.3	37.21	1915.1	7.5
373.3	23.29	1081.3	37.24	1935.1	7.31
374.1	23.3	1081.3	37.32	1955.1	7.17
375.	23.33	1081.4	37.33	1975.1	7.01
375.8	23.41	1081.4	37.52	1995.1	6.86
376.8	23.41	1081.4	37.49	2015.1	6.71
377.8	23.5	1081.4	37.42	2035.1	6.58
378.8	23.56	1081.5	37.69	2055.1	6.48
379.9	23.5	1081.5	37.58	2075.1	6.35
381.1	23.39	1081.5	37.61	2095.1	6.25
382.4	23.5	1081.6	37.88	2115.1	6.14
383.7	23.43	1081.6	37.84	2135.1	6.05
385.1	23.55	1081.6	37.87	2155.1	5.95
386.6	23.45	1081.7	38.31	2175.1	5.85
388.2	23.66	1081.7	38.03	2195.1	5.77
389.8	23.58	1081.7	38.32	2215.1	5.68
391.6	23.62	1081.8	38.28	2235.1	5.6
393.5	23.65	1081.8	38.3	2255.1	5.53
395.5	23.67	1081.9	38.32	2275.1	5.45
397.6	23.75	1081.9	38.74	2295.1	5.38
399.8	23.86	1082.	38.88	2315.1	5.31
402.2	23.91	1082.1	38.55	2335.1	5.24
404.7	23.91	1082.1	38.61	2355.1	5.19
407.3	23.98	1082.2	38.96	2375.1	5.12
410.1	24.07	1082.3	38.85	2395.1	5.05
413.1	24.1	1082.3	39.09	2415.1	5.
416.2	24.15	1082.4	39.07	2435.1	4.94
419.6	24.22	1082.5	39.33	2455.1	4.88
423.1	24.27	1082.6	39.28	2475.1	4.83
426.8	24.31	1082.7	39.34	2495.1	4.78
430.8	24.27	1082.8	39.38	2515.1	4.74

Time (min)	Displacement (ft)	Time (min)	Displacement (ft)	Time (min)	Displacement (ft)
435.	24.4	1082.9	39.36	2535.1	4.68
439.4	24.6	1083.	39.6	2555.1	4.63
444.1	24.63	1083.1	39.73	2575.1	4.59
449.1	24.71	1083.2	39.54	2595.1	4.54
454.4	24.77	1083.4	39.8	2615.1	4.5
460.	24.86	1083.5	39.79	2635.1	4.46
466.	24.91	1083.7	39.83	2655.1	4.42
472.	24.99	1083.8	39.98	2675.1	4.38
479.	25.05	1084.	39.89	2695.1	4.36
486.	25.15	1084.2	40.29	2715.1	4.31
493.	25.24	1084.3	40.26	2735.1	4.28
501.	25.33	1084.5	40.42	2755.1	4.25
510.	25.48	1084.8	40.09	2775.1	4.22
518.	25.63	1085.	40.44	2795.1	4.18
528.	25.82	1085.2	40.29		

SOLUTION

Aquifer Model: Unconfined
Solution Method: Cooper-Jacob

VISUAL ESTIMATION RESULTS

Estimated Parameters

Parameter	Estimate	
T	5100.	gal/day/ft
S	6.562	

Figure A-1
Pumping and Drawdown Effects
AV Solar Ranch One
Long Term Stepped-Rate Test

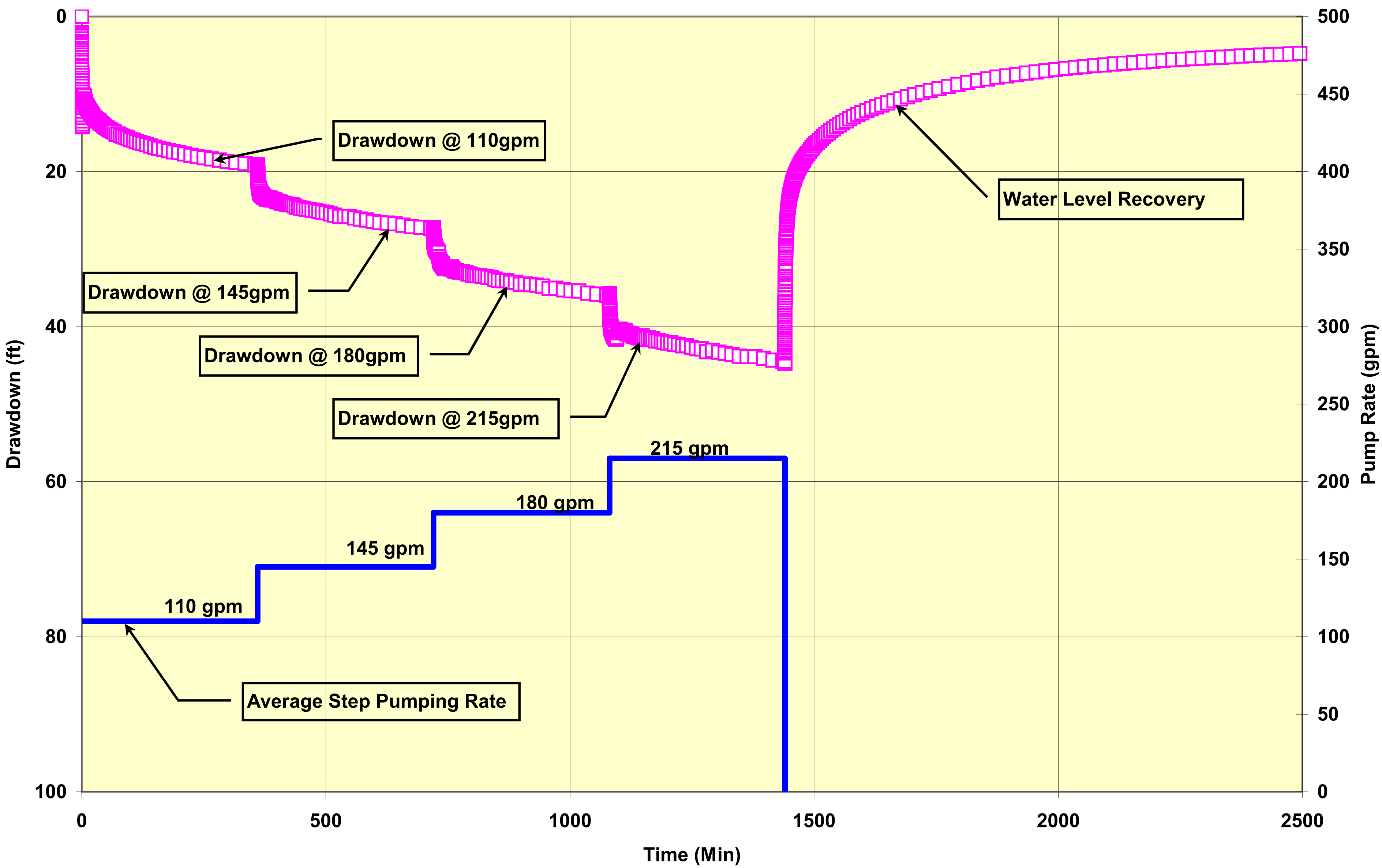


Figure A-2
8N/15W-24B3 Stepped-Rate Test
Step Drawdowns Adjusted for Time
AV Solar Ranch One

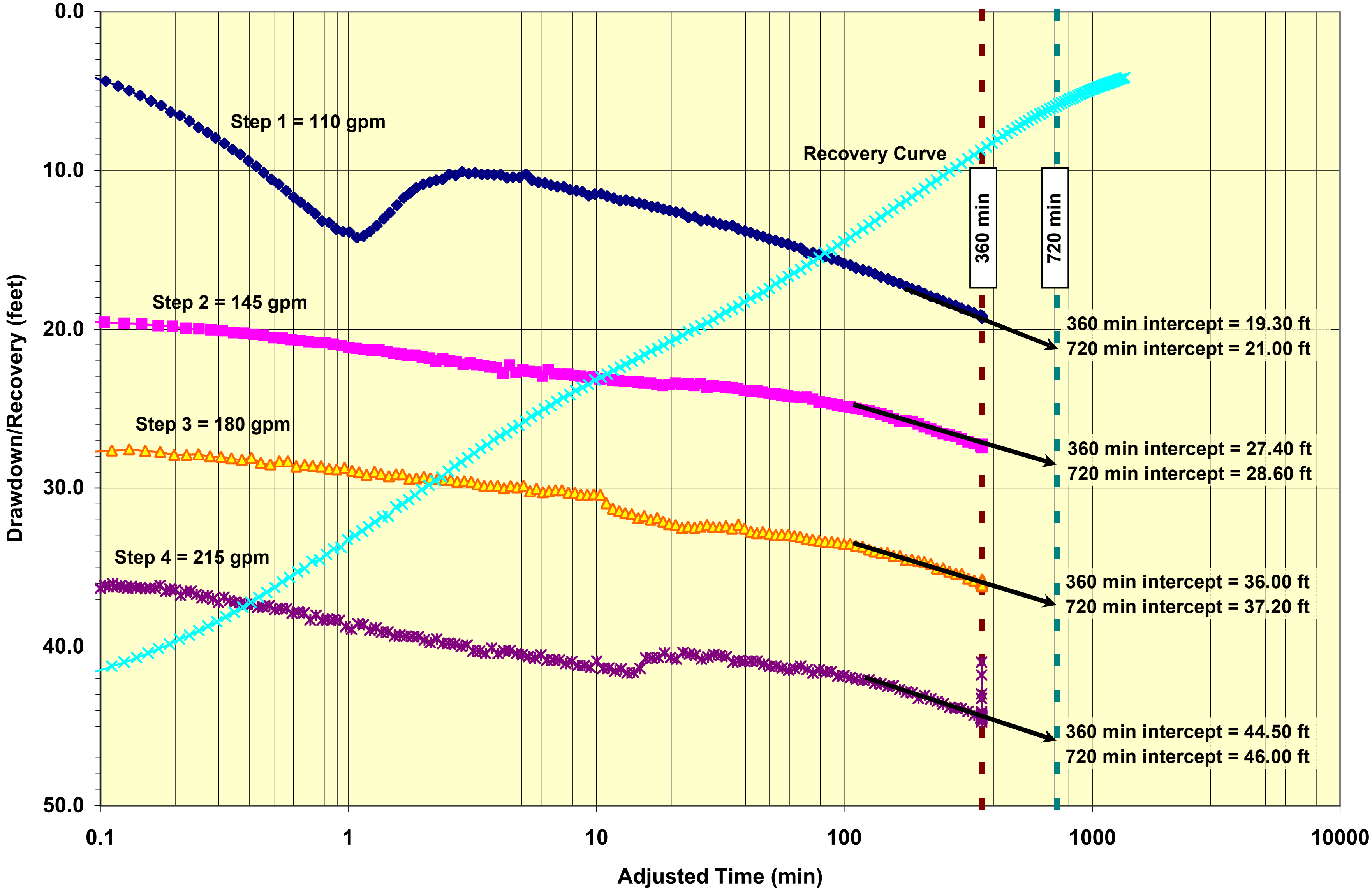
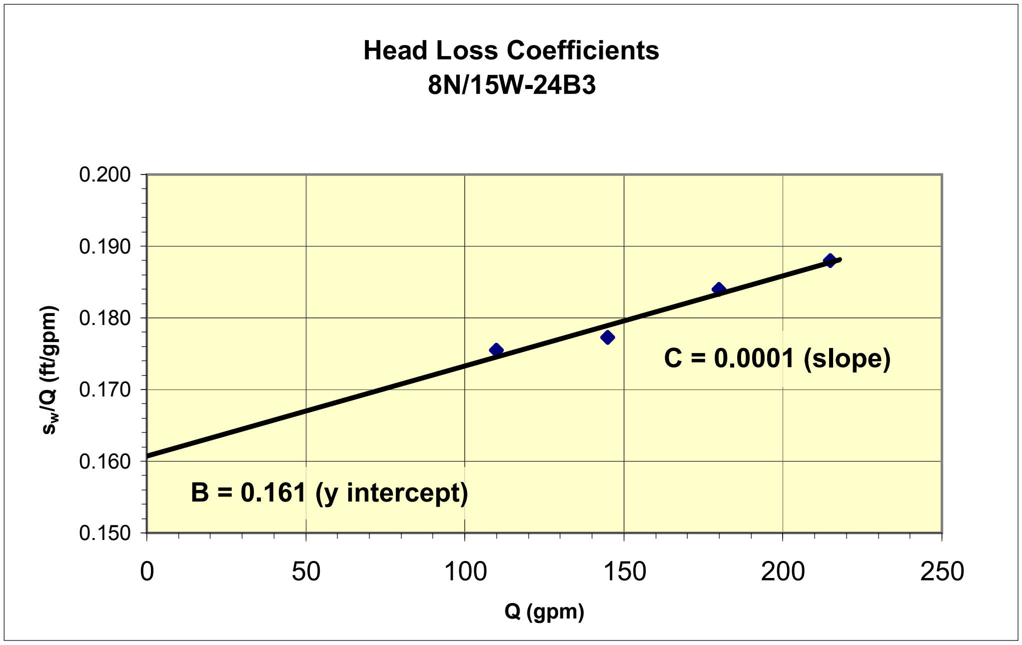


Figure A-3
Analysis of Head Loss Coefficients -- 8N/15W-24B3

Step	Qi	Sw (360 min)	Sw (720 min)	Δ Sw	Swi = Σ Δ Sw	Swi / Qi
0	0	0	0	0	--	--
1	110	19.30	21.00	19.3	19.3	0.1755
2	145	27.40	28.60	6.4	25.7	0.1772
3	180	36.00	37.20	7.4	33.1	0.1839
4	215	44.50	46.00	7.3	40.4	0.1879



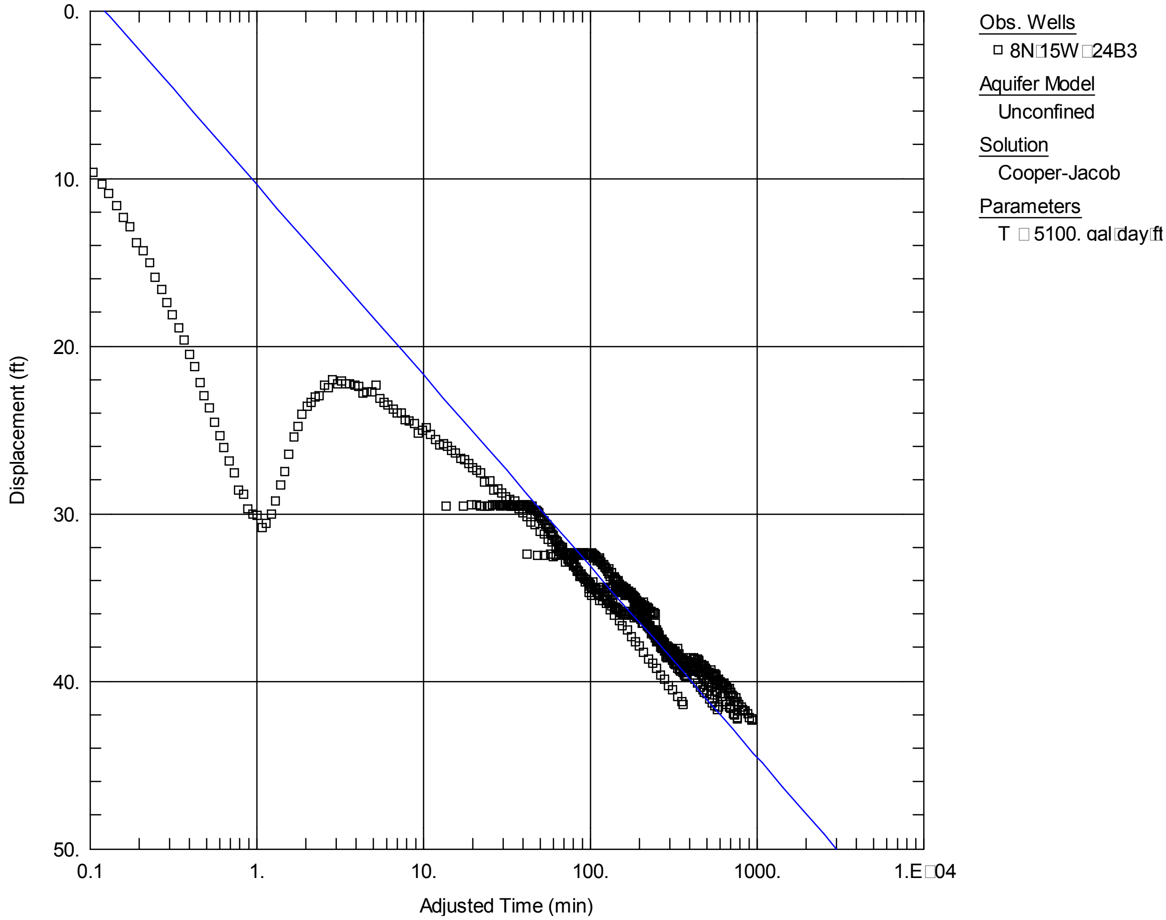


Figure A-4 Cooper-Jacob Analysis

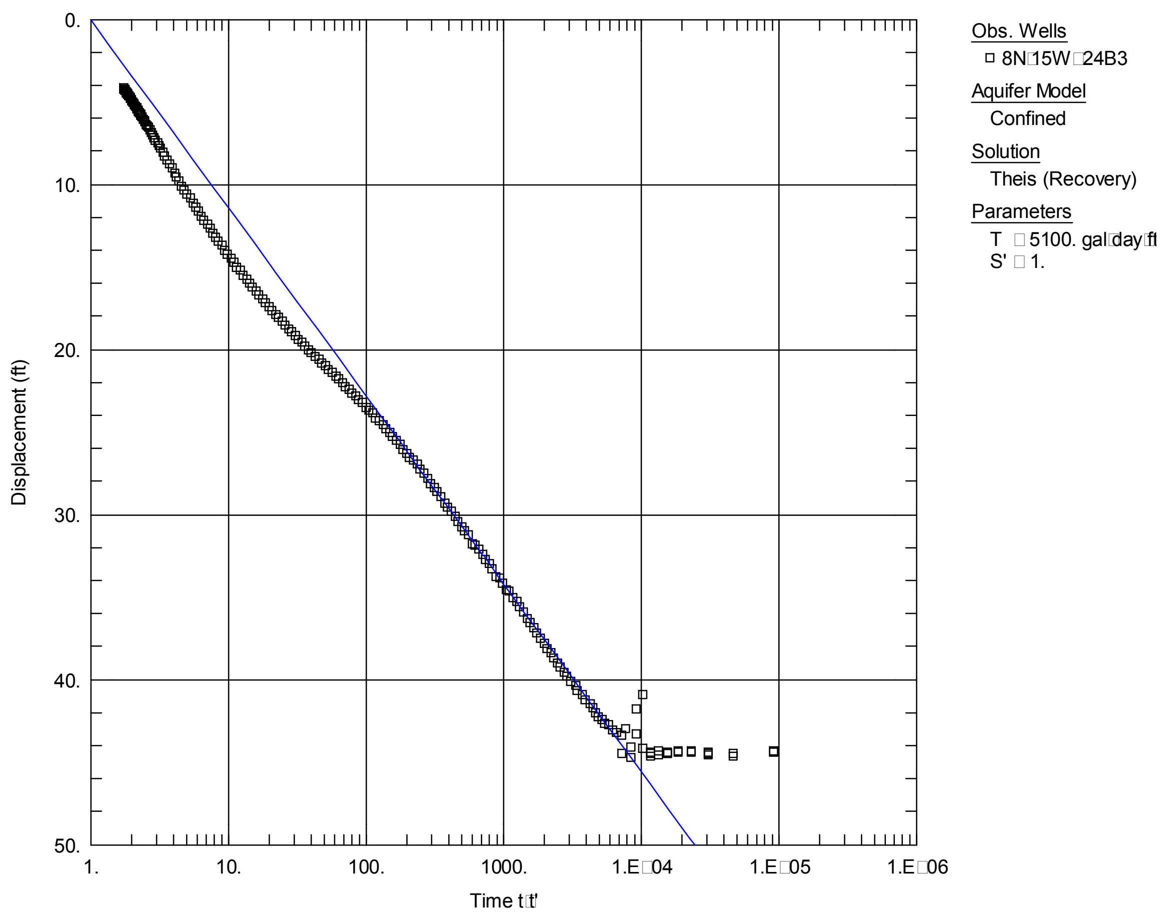
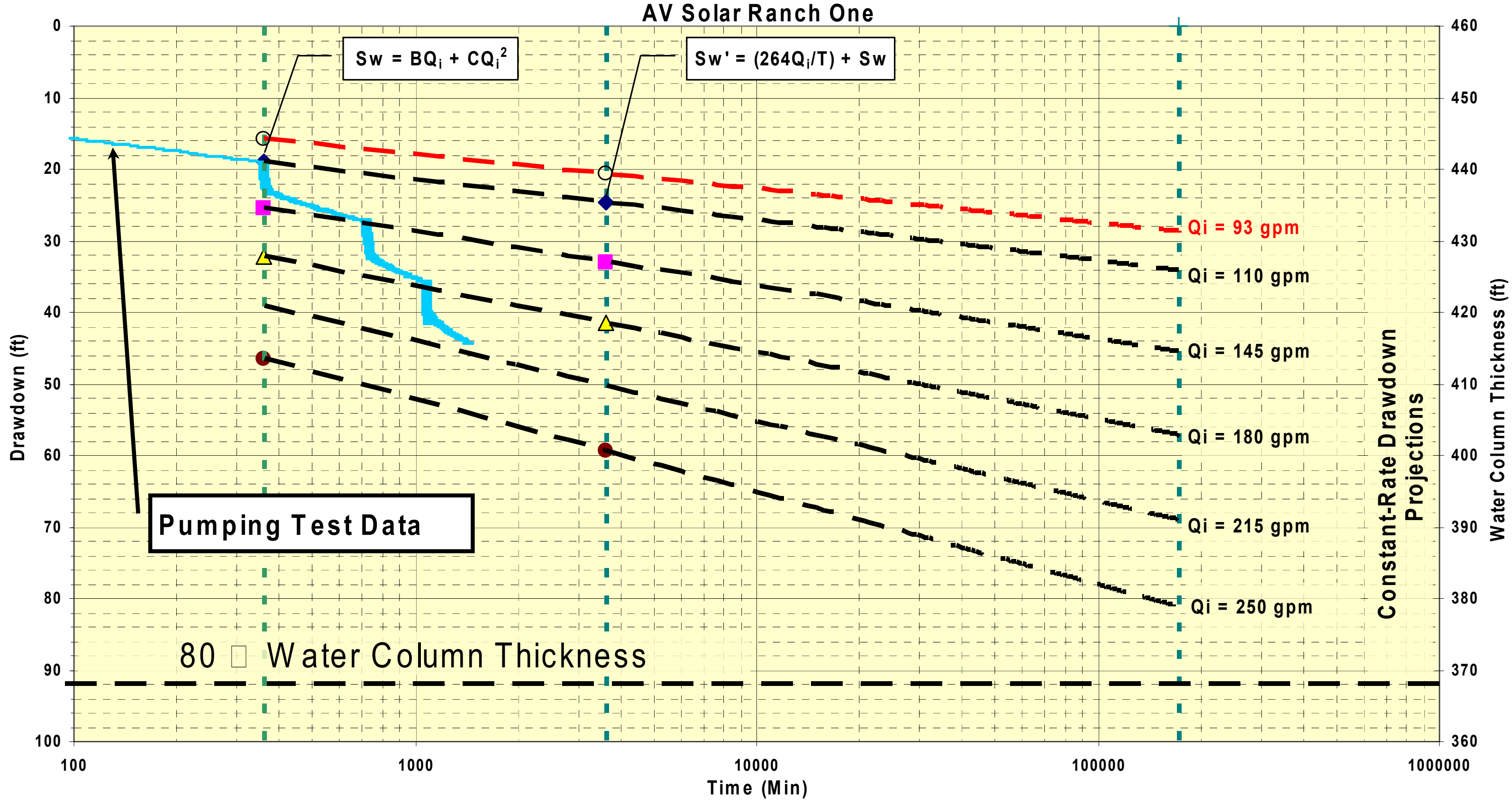


Figure A-5 Theis Recovery Analysis

Figure A-6
8N/15W-24B3
Drawdown Projections For Constant Rate Pumping
AV Solar Ranch One



Appendix B.   Groundwater Quality Laboratory Reports

Calscience Environmental Laboratories, Inc.

September 21, 2009

Joe Liles
URS Corporation
2020 East 1st Street, Suite 400
Santa Ana, CA 92705-4032

Subject: **Calscience Work Order No.: 09-08-2053**
Client Reference: Solar Ranch One - Lancaster, CA

Dear Client:

Enclosed is an analytical report for the above-referenced project. The samples included in this report were received 8/25/2009 and analyzed in accordance with the attached chain-of-custody.

Unless otherwise noted, all analytical testing was accomplished in accordance with the guidelines established in our Quality Systems Manual, applicable standard operating procedures, and other related documentation. The original report of subcontracted analysis, if any, is provided herein, and follows the standard Calscience data package. The results in this analytical report are limited to the samples tested and any reproduction thereof must be made in its entirety.

If you have any questions regarding this report, please do not hesitate to contact the undersigned.

Sincerely,

Vikas Patel

Calscience Environmental
Laboratories, Inc.
Vikas Patel
Project Manager

Calscience Environmental Laboratories, Inc.

Analytical Report

URS Corporation	Date Received: 08/25/09
2020 East 1st Street, Suite 400	Work Order No: 09-08-2053
Santa Ana, CA 92705-4032	Preparation: N/A / EPA 245.1 Total
	Method: EPA 200.8 / EPA 245.1
	Units: mg/L

Project: Solar Ranch One - Lancaster, CA

Page 1 of 1

Client Sample Number	Lab Sample Number	Date /Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
GWS-1	**09-08-2053-1-N**	**08/25/09 08:15**	**Aqueous**	**ICP/MS 03**	**08/27/09**	**08/27/09 17:39**	**090827L01**

Comment(s): -Mercury was analyzed on 8/27/2009 11:40:46 AM with batch 090827L01

Parameter	Result	RL	DF	Qual	Parameter	Result	RL	DF	Qual
Antimony	ND	0.00100	1		Thallium	ND	0.00100	1	
Arsenic	0.00924	0.00100	1		Zinc	0.0811	0.00500	1	
Barium	0.00275	0.00100	1		Aluminum	ND	0.0500	1	
Beryllium	ND	0.00100	1		Calcium	39.6	2.00	20	
Cadmium	ND	0.00100	1		Iron	0.147	0.0500	1	
Chromium	0.00266	0.00100	1		Magnesium	3.52	0.100	1	
Copper	ND	0.00100	1		Potassium	2.85	1.00	20	
Nickel	0.00105	0.00100	1		Sodium	42.9	2.00	20	
Selenium	ND	0.00100	1		Boron	0.0606	0.0500	1	
Silver	ND	0.00100	1		Mercury	ND	0.000500	1	

Client Sample Number	Lab Sample Number	Date /Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
Method Blank	**099-10-008-1,278**	**N/A**	**Aqueous**	**ICP/MS 03**	**08/27/09**	**08/27/09 16:39**	**090827L01**

Parameter	Result	RL	DF	Qual	Parameter	Result	RL	DF	Qual
Antimony	ND	0.00100	1		Thallium	ND	0.00100	1	
Arsenic	ND	0.00100	1		Zinc	ND	0.00500	1	
Barium	ND	0.00100	1		Aluminum	ND	0.0500	1	
Beryllium	ND	0.00100	1		Calcium	ND	0.100	1	
Cadmium	ND	0.00100	1		Iron	ND	0.0500	1	
Chromium	ND	0.00100	1		Magnesium	ND	0.100	1	
Copper	ND	0.00100	1		Potassium	ND	0.0500	1	
Nickel	ND	0.00100	1		Sodium	ND	0.100	1	
Selenium	ND	0.00100	1		Boron	ND	0.0500	1	
Silver	ND	0.00100	1						

Client Sample Number	Lab Sample Number	Date /Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
Method Blank	**099-04-008-4,289**	**N/A**	**Aqueous**	**Mercury**	**08/27/09**	**08/27/09 11:34**	**090827L01**

Parameter	Result	RL	DF	Qual
Mercury	ND	0.000500	1	

RL - Reporting Limit , DF - Dilution Factor , Qual - Qualifiers

Calscience Environmental Laboratories, Inc.

ACCREDITED IN ACCORDANCE WITH nelac

ANALYTICAL REPORT

URS Corporation		Date Sampled:	08/25/09
2020 East 1st Street, Suite 400		Date Received:	08/25/09
Santa Ana, CA 92705-4032		Date Extracted:	08/26/09
		Date Analyzed:	08/27/09
		Work Order No.:	09-08-2053
Attn:	Joe Liles	Method:	EPA 200.7 Total
RE:	Solar Ranch One - Lancaster, CA	Page 1 of 1	

All concentrations are reported in mg/L (ppm).

Sample Number	SiO_2 Concentration	Reporting Limit
GWS-1	34.2	0.11
Method Blank	ND	0.11

Calscience Environmental Laboratories, Inc.

Analytical Report

ACCREDITED IN ACCORDANCE WITH nelac

URS Corporation
2020 East 1st Street, Suite 400
Santa Ana, CA 92705-4032

Date Received:	08/25/09
Work Order No:	09-08-2053
Preparation:	EPA 504.1 Ext.
Method:	EPA 504.1
Units:	ug/L

Project: Solar Ranch One - Lancaster, CA

Page 1 of 1

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
GWS-1	**09-08-2053-1-E**	**08/25/09 08:15**	**Aqueous**	**GC 40**	**08/28/09**	**08/28/09 19:02**	**090828L05**

Parameter	Result	RL	DF	Qual	Parameter	Result	RL	DF	Qual
1,2-Dibromoethane	ND	0.010	1		1,2-Dibromo-3-Chloropropane	ND	0.010	1	

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
Method Blank	**099-12-520-183**	**N/A**	**Aqueous**	**GC 40**	**08/28/09**	**08/28/09 18:02**	**090828L05**

Parameter	Result	RL	DF	Qual	Parameter	Result	RL	DF	Qual
1,2-Dibromoethane	ND	0.010	1		1,2-Dibromo-3-Chloropropane	ND	0.010	1	

RL - Reporting Limit , DF - Dilution Factor , Qual - Qualifiers

Calscience Environmental Laboratories, Inc.

Analytical Report

URS Corporation		Date Received:	08/25/09
2020 East 1st Street, Suite 400		Work Order No:	09-08-2053
Santa Ana, CA 92705-4032		Preparation:	N/A
		Method:	EPA 524.2
		Units:	ug/L

Project: Solar Ranch One - Lancaster, CA

Page 1 of 2

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
GWS-1	**09-08-2053-1-A**	**08/25/09 08:15**	**Aqueous**	**GC/MS O**	**08/28/09**	**08/28/09 14:16**	**090828L01**

Parameter	Result	RL	DF	Qual	Parameter	Result	RL	DF	Qual
Dichlorodifluoromethane	ND	0.50	1		1,1,2-Trichloroethane	ND	0.50	1	
Chloromethane	1.7	0.50	1		1,3-Dichloropropane	ND	0.50	1	
1,1,2-Trichloro-1,2,2-Trifluoroethane	ND	0.50	1		Tetrachloroethene	ND	0.50	1	
Vinyl Chloride	ND	0.50	1		2-Hexanone	ND	5.0	1	
Bromomethane	ND	0.50	1		Dibromochloromethane	ND	0.50	1	
Chloroethane	ND	0.50	1		1,2-Dibromoethane	ND	0.50	1	
Trichlorofluoromethane	ND	0.50	1		Chlorobenzene	ND	0.50	1	
Diethyl Ether	ND	0.50	1		1,1,1,2-Tetrachloroethane	ND	0.50	1	
1,1-Dichloroethene	ND	0.50	1		Acrolein	ND	2.0	1	
Iodomethane	ND	2.0	1		Ethanol	ND	50	1	
Acetone	ND	10	1		Ethylbenzene	ND	0.50	1	
Carbon Disulfide	ND	0.50	1		p/m-Xylene	ND	0.50	1	
Allyl Chloride	ND	0.50	1		o-Xylene	ND	0.50	1	
Methylene Chloride	ND	2.0	1		Styrene	ND	0.50	1	
Acrylonitrile	ND	2.0	1		Bromoform	ND	0.50	1	
t-1,2-Dichloroethene	ND	0.50	1		Isopropylbenzene	ND	0.50	1	
1,1-Dichloroethane	ND	0.50	1		1,1,2,2-Tetrachloroethane	ND	0.50	1	
2-Butanone	ND	2.0	1		t-1,4-Dichloro-2-Butene	ND	5.0	1	
c-1,2-Dichloroethene	ND	0.50	1		1,2,3-Trichloropropane	ND	0.50	1	
2,2-Dichloropropane	ND	0.50	1		Bromobenzene	ND	0.50	1	
Bromochloromethane	ND	0.50	1		n-Propylbenzene	ND	0.50	1	
Tetrahydrofuran	ND	5.0	1		2-Chlorotoluene	ND	0.50	1	
Chloroform	ND	0.50	1		4-Chlorotoluene	ND	0.50	1	
1,1,1-Trichloroethane	ND	0.50	1		1,3,5-Trimethylbenzene	ND	0.50	1	
1,1-Dichloropropene	ND	0.50	1		tert-Butylbenzene	ND	0.50	1	
Carbon Tetrachloride	ND	0.50	1		1,2,4-Trimethylbenzene	ND	0.50	1	
1,2-Dichloroethane	ND	0.50	1		sec-Butylbenzene	ND	0.50	1	
Benzene	ND	0.50	1		p-Isopropyltoluene	ND	0.50	1	
Trichloroethene	ND	0.50	1		1,3-Dichlorobenzene	ND	0.50	1	
1,2-Dichloropropane	ND	0.50	1		1,4-Dichlorobenzene	ND	0.50	1	
Methyl Methacrylate	ND	5.0	1		n-Butylbenzene	ND	0.50	1	
Dibromomethane	ND	0.50	1		Methyl-t-Butyl Ether (MTBE)	ND	0.50	1	
Bromodichloromethane	ND	0.50	1		1,2-Dichlorobenzene	ND	0.50	1	
c-1,3-Dichloropropene	ND	0.50	1		1,2-Dibromo-3-Chloropropane	ND	2.0	1	
4-Methyl-2-Pentanone	ND	5.0	1		1,2,4-Trichlorobenzene	ND	0.50	1	
Toluene	ND	0.50	1		Hexachloro-1,3-Butadiene	ND	0.50	1	
t-1,3-Dichloropropene	ND	0.50	1		Naphthalene	ND	0.50	1	
Ethyl Methacrylate	ND	2.0	1		1,2,3-Trichlorobenzene	ND	0.50	1	

Surrogates:	REC (%)	Control Limits	Qual	Surrogates:	REC (%)	Control Limits	Qual
1,4-Bromofluorobenzene	84	66-114		1,2-Dichlorobenzene-d4	91	62-122	

RL - Reporting Limit , DF - Dilution Factor , Qual - Qualifiers

Calscience Environmental Laboratories, Inc.

Analytical Report

URS Corporation		Date Received:	08/25/09
2020 East 1st Street, Suite 400		Work Order No:	09-08-2053
Santa Ana, CA 92705-4032		Preparation:	N/A
		Method:	EPA 524.2
		Units:	ug/L

Project: Solar Ranch One - Lancaster, CA

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
Method Blank	**095-01-053-312**	**N/A**	**Aqueous**	**GC/MS O**	**08/28/09**	**08/28/09 13:18**	**090828L01**

Parameter	Result	RL	DF	Qual	Parameter	Result	RL	DF	Qual
Dichlorodifluoromethane	ND	0.50	1		1,1,2-Trichloroethane	ND	0.50	1	
Chloromethane	ND	0.50	1		1,3-Dichloropropane	ND	0.50	1	
1,1,2-Trichloro-1,2,2-Trifluoroethane	ND	0.50	1		Tetrachloroethene	ND	0.50	1	
Vinyl Chloride	ND	0.50	1		2-Hexanone	ND	5.0	1	
Bromomethane	ND	0.50	1		Dibromochloromethane	ND	0.50	1	
Chloroethane	ND	0.50	1		1,2-Dibromoethane	ND	0.50	1	
Trichlorofluoromethane	ND	0.50	1		Chlorobenzene	ND	0.50	1	
Diethyl Ether	ND	0.50	1		1,1,1,2-Tetrachloroethane	ND	0.50	1	
1,1-Dichloroethene	ND	0.50	1		Acrolein	ND	2.0	1	
Iodomethane	ND	2.0	1		Ethanol	ND	50	1	
Acetone	ND	10	1		Ethylbenzene	ND	0.50	1	
Carbon Disulfide	ND	0.50	1		p/m-Xylene	ND	0.50	1	
Allyl Chloride	ND	0.50	1		o-Xylene	ND	0.50	1	
Methylene Chloride	ND	2.0	1		Styrene	ND	0.50	1	
Acrylonitrile	ND	2.0	1		Bromoform	ND	0.50	1	
t-1,2-Dichloroethene	ND	0.50	1		Isopropylbenzene	ND	0.50	1	
1,1-Dichloroethane	ND	0.50	1		1,1,2,2-Tetrachloroethane	ND	0.50	1	
2-Butanone	ND	2.0	1		t-1,4-Dichloro-2-Butene	ND	5.0	1	
c-1,2-Dichloroethene	ND	0.50	1		1,2,3-Trichloropropane	ND	0.50	1	
2,2-Dichloropropane	ND	0.50	1		Bromobenzene	ND	0.50	1	
Bromochloromethane	ND	0.50	1		n-Propylbenzene	ND	0.50	1	
Tetrahydrofuran	ND	5.0	1		2-Chlorotoluene	ND	0.50	1	
Chloroform	ND	0.50	1		4-Chlorotoluene	ND	0.50	1	
1,1,1-Trichloroethane	ND	0.50	1		1,3,5-Trimethylbenzene	ND	0.50	1	
1,1-Dichloropropene	ND	0.50	1		tert-Butylbenzene	ND	0.50	1	
Carbon Tetrachloride	ND	0.50	1		1,2,4-Trimethylbenzene	ND	0.50	1	
1,2-Dichloroethane	ND	0.50	1		sec-Butylbenzene	ND	0.50	1	
Benzene	ND	0.50	1		p-Isopropyltoluene	ND	0.50	1	
Trichloroethene	ND	0.50	1		1,3-Dichlorobenzene	ND	0.50	1	
1,2-Dichloropropane	ND	0.50	1		1,4-Dichlorobenzene	ND	0.50	1	
Methyl Methacrylate	ND	5.0	1		n-Butylbenzene	ND	0.50	1	
Dibromomethane	ND	0.50	1		Methyl-t-Butyl Ether (MTBE)	ND	0.50	1	
Bromodichloromethane	ND	0.50	1		1,2-Dichlorobenzene	ND	0.50	1	
c-1,3-Dichloropropene	ND	0.50	1		1,2-Dibromo-3-Chloropropane	ND	2.0	1	
4-Methyl-2-Pentanone	ND	5.0	1		1,2,4-Trichlorobenzene	ND	0.50	1	
Toluene	ND	0.50	1		Hexachloro-1,3-Butadiene	ND	0.50	1	
t-1,3-Dichloropropene	ND	0.50	1		Naphthalene	ND	0.50	1	
Ethyl Methacrylate	ND	2.0	1		1,2,3-Trichlorobenzene	ND	0.50	1	

Surrogates:	REC (%)	Control Limits	Qual	Surrogates:	REC (%)	Control Limits	Qual
1,4-Bromofluorobenzene	89	66-114		1,2-Dichlorobenzene-d4	89	62-122	

RL - Reporting Limit , DF - Dilution Factor , Qual - Qualifiers

Calscience Environmental Laboratories, Inc.

Analytical Report

URS Corporation
2020 East 1st Street, Suite 400
Santa Ana, CA 92705-4032

Date Received: 08/25/09
Work Order No: 09-08-2053

Project: Solar Ranch One - Lancaster, CA

Page 1 of 2

Client Sample Number	Lab Sample Number	Date Collected	Matrix
GWS-1	**09-08-2053-1**	**08/25/09**	**Aqueous**

Parameter	Result	RL	DF	Qual	Units	Date Prepared	Date Analyzed	Method
Chloride	8.9	1.0	1		mg/L	N/A	08/25/09	EPA 300.0
Nitrite (as N)	ND	0.10	1		mg/L	N/A	08/25/09	EPA 300.0
Nitrate (as N)	5.1	0.10	1		mg/L	N/A	08/25/09	EPA 300.0
o-Phosphate (as P)	ND	0.10	1		mg/L	N/A	08/25/09	EPA 300.0
Sulfate	11	1.0	1		mg/L	N/A	08/25/09	EPA 300.0
Perchlorate	ND	2.0	1		ug/L	N/A	08/26/09	EPA 314.0
Color	5.0	5.0	1		Color unit	08/25/09	08/25/09	SM 2120 B
Turbidity	0.16	0.050	1		NTU	N/A	08/26/09	SM 2130 B
Odor	ND	2.0	1		TON	08/25/09	08/25/09	SM 2150 B
Alkalinity, Total (as CaCO3)	133	5.0	1		mg/L	N/A	08/25/09	SM 2320B
Bicarbonate (as CaCO3)	133	5.0	1		mg/L	N/A	08/25/09	SM 2320B
Carbonate (as CaCO3)	ND	1.0	1		mg/L	N/A	08/25/09	SM 2320B
Hydroxide (as CaCO3)	ND	1.0	1		mg/L	N/A	08/25/09	SM 2320B
Hardness, Total	100	2.0	1		mg/L	N/A	08/31/09	SM 2340 C
Specific Conductance	360	1.0	1		umhos/cm	N/A	08/25/09	SM 2510 B
Solids, Total Dissolved	226	1.0	1		mg/L	08/27/09	08/27/09	SM 2540 C
Solids, Total Suspended	ND	1.0	1		mg/L	08/28/09	08/28/09	SM 2540 D
pH	7.56	0.01	1		pH units	N/A	08/25/09	SM 4500 H+ B
Phosphorus, Total	0.73	0.10	1		mg/L	08/27/09	08/27/09	SM 4500 P B/E
Sulfide, Total	ND	0.050	1		mg/L	08/26/09	08/26/09	SM 4500 S2 - D
Cyanide, Total	ND	0.050	1		mg/L	08/27/09	08/27/09	SM 4500-CN E
Fluoride	0.25	0.10	1		mg/L	N/A	08/25/09	SM 4500-F C
Ammonia (as N)	ND	0.10	1		mg/L	08/31/09	08/31/09	SM 4500-NH3 B/C
Carbon, Total Organic	0.63	0.50	1		mg/L	N/A	08/25/09	SM 5310 D
Oil and Grease	ND	1.0	1		mg/L	08/28/09	08/28/09	SM 5520 B
MBAS	ND	0.10	1		mg/L	08/26/09	08/26/09	SM 5540C
Carbon Dioxide	60	1.0	1		mg/L	N/A	08/25/09	SM4500-CO2D

RL - Reporting Limit , DF - Dilution Factor , Qual - Qualifiers

Calscience Environmental Laboratories, Inc.

Analytical Report

URS Corporation
2020 East 1st Street, Suite 400
Santa Ana, CA 92705-4032

Date Received: 08/25/09
Work Order No: 09-08-2053

Project: Solar Ranch One - Lancaster, CA

Client Sample Number	Lab Sample Number	Date Collected	Matrix
Method Blank		**N/A**	**Aqueous**

Parameter	Result	RL	DF	Qual	Units	Date Prepared	Date Analyzed	Method
Chloride	ND	1.0	1		mg/L	N/A	08/25/09	EPA 300.0
Nitrite (as N)	ND	0.10	1		mg/L	N/A	08/25/09	EPA 300.0
Nitrate (as N)	ND	0.10	1		mg/L	N/A	08/25/09	EPA 300.0
o-Phosphate (as P)	ND	0.10	1		mg/L	N/A	08/25/09	EPA 300.0
Sulfate	ND	1.0	1		mg/L	N/A	08/25/09	EPA 300.0
Perchlorate	ND	2.0	1		ug/L	N/A	08/26/09	EPA 314.0
Alkalinity, Total (as CaCO3)	ND	1.0	1		mg/L	N/A	08/25/09	SM 2320B
Bicarbonate (as CaCO3)	ND	1.0	1		mg/L	N/A	08/25/09	SM 2320B
Carbonate (as CaCO3)	ND	1.0	1		mg/L	N/A	08/25/09	SM 2320B
Hydroxide (as CaCO3)	ND	1.0	1		mg/L	N/A	08/25/09	SM 2320B
Hardness, Total	ND	2.0	1		mg/L	N/A	08/31/09	SM 2340 C
Solids, Total Dissolved	ND	1.0	1		mg/L	08/27/09	08/27/09	SM 2540 C
Solids, Total Suspended	ND	1.0	1		mg/L	08/28/09	08/28/09	SM 2540 D
Phosphorus, Total	ND	0.10	1		mg/L	08/27/09	08/27/09	SM 4500 P B/E
Sulfide, Total	ND	0.050	1		mg/L	08/26/09	08/26/09	SM 4500 S2 - D
Cyanide, Total	ND	0.050	1		mg/L	08/27/09	08/27/09	SM 4500-CN E
Fluoride	ND	0.10	1		mg/L	N/A	08/25/09	SM 4500-F C
Ammonia (as N)	ND	0.10	1		mg/L	08/31/09	08/31/09	SM 4500-NH3 B/C
Carbon, Total Organic	ND	0.50	1		mg/L	N/A	08/25/09	SM 5310 D
Oil and Grease	ND	1.0	1		mg/L	08/28/09	08/28/09	SM 5520 B
MBAS	ND	0.10	1		mg/L	08/26/09	08/26/09	SM 5540C

RL - Reporting Limit , DF - Dilution Factor , Qual - Qualifiers

Calscience
Environmental
Laboratories, Inc.

ANALYTICAL REPORT

URS Corporation		Date Sampled:	08/25/09
2020 East 1st Street, Suite 400		Date Received:	08/25/09
Santa Ana, CA 92705-4032		Date Extracted:	08/27/09
		Date Analyzed:	08/27/09
		Work Order No.:	09-08-2053
Attn:	Joe Liles	Method:	SM 4500 P B/E
RE:	Solar Ranch One - Lancaster, CA	Page 1 of 1	

All concentrations are reported in mg/L (ppm).

Sample Number	Total Phosphate Concentration	Reporting Limit
GWS-1	2.2	0.3
Method Blank	ND	0.3

Calscience Environmental Laboratories, Inc.

Quality Control - Spike/Spike Duplicate

URS Corporation	Date Received: 08/25/09
2020 East 1st Street, Suite 400	Work Order No: 09-08-2053
Santa Ana, CA 92705-4032	Preparation: N/A
	Method: EPA 200.7

Project Solar Ranch One - Lancaster, CA

Quality Control Sample ID	Matrix	Instrument	Date Prepared	Date Analyzed	MS/MSD Batch Number
09-08-1968-1	**Aqueous**	**ICP 5300**	**08/26/09**	**08/27/09**	**090826SA4**

Parameter	MS %REC	MSD %REC	%REC CL	RPD	RPD CL	Qualifiers
Silicon	4X	4X	80-120	4X	0-20	Q

RPD - Relative Percent Difference , CL - Control Limit

Calscience Environmental Laboratories, Inc.

Quality Control - PDS / PDSD

ACCREDITED IN ACCORDANCE WITH nelac

URS Corporation		Date Received	08/25/09
2020 East 1st Street, Suite 400		Work Order No:	09-08-2053
Santa Ana, CA 92705-4032		Preparation:	N/A
		Method:	EPA 200.7

Project: Solar Ranch One - Lancaster, CA

Quality Control Sample ID	Matrix	Instrument	Date Prepared	Date Analyzed	PDS/PDSD Batch Number
09-08-1968-1	**Aqueous**	**ICP 5300**	**08/26/09**	**08/27/09**	**090826SA4**

Parameter	PDS %REC	PDSD %REC	%REC CL	RPD	RPD CL	Qualifiers
Silicon	4X	4X	75-125	4X	0-20	Q

RPD - Relative Percent Difference , CL - Control Limit

Calscience Environmental Laboratories, Inc.

Quality Control - Spike/Spike Duplicate

URS Corporation
2020 East 1st Street, Suite 400
Santa Ana, CA 92705-4032

Date Received: 08/25/09
Work Order No: 09-08-2053
Preparation: N/A
Method: EPA 200.8

Project Solar Ranch One - Lancaster, CA

Quality Control Sample ID	Matrix	Instrument	Date Prepared	Date Analyzed	MS/MSD Batch Number
09-08-1919-1	**Aqueous**	**ICP/MS 03**	**08/27/09**	**08/27/09**	**090827S01**

Parameter	MS %REC	MSD %REC	%REC CL	RPD	RPD CL	Qualifiers
Antimony	111	110	80-120	1	0-20	
Arsenic	102	102	80-120	0	0-20	
Barium	96	104	80-120	5	0-20	
Beryllium	100	99	80-120	0	0-20	
Cadmium	103	103	80-120	0	0-20	
Chromium	100	99	80-120	1	0-20	
Copper	106	106	80-120	1	0-20	
Nickel	99	99	80-120	1	0-20	
Selenium	90	90	80-120	0	0-20	
Silver	107	108	80-120	1	0-20	
Thallium	97	97	80-120	0	0-20	
Zinc	70	69	80-120	1	0-20	3
Aluminum	125	134	80-120	4	0-20	3
Calcium	4X	4X	80-120	4X	0-20	Q
Iron	4X	4X	80-120	4X	0-20	Q
Magnesium	97	101	80-120	2	0-20	
Potassium	103	66	80-120	19	0-20	3
Sodium	4X	4X	80-120	4X	0-20	Q
Boron	107	104	80-120	2	0-20	

RPD - Relative Percent Difference , CL - Control Limit

Calscience Environmental Laboratories, Inc.

Quality Control - PDS / PDSD

URS Corporation		Date Received	08/25/09
2020 East 1st Street, Suite 400		Work Order No:	09-08-2053
Santa Ana, CA 92705-4032		Preparation:	N/A
		Method:	EPA 200.8

Project: Solar Ranch One - Lancaster, CA

Quality Control Sample ID	Matrix	Instrument	Date Prepared	Date Analyzed	PDS/PDSD Batch Number
09-08-1919-1	**Aqueous**	**ICP/MS 03**	**08/27/09**	**08/27/09**	**090827S01**

Parameter	PDS %REC	PDSD %REC	%REC CL	RPD	RPD CL	Qualifiers
Antimony	106	104	75-125	1	0-20	
Arsenic	100	100	75-125	0	0-20	
Barium	98	102	75-125	3	0-20	
Beryllium	98	101	75-125	2	0-20	
Cadmium	98	99	75-125	1	0-20	
Chromium	97	98	75-125	2	0-20	
Copper	105	106	75-125	1	0-20	
Nickel	96	97	75-125	1	0-20	
Selenium	88	88	75-125	0	0-20	
Silver	105	106	75-125	0	0-20	
Thallium	92	93	75-125	2	0-20	
Zinc	109	106	75-125	3	0-20	
Aluminum	143	180	75-125	15	0-20	
Calcium	103	102	75-125	1	0-20	
Iron	4X	4X	75-125	4X	0-20	Q
Magnesium	101	102	75-125	1	0-20	
Potassium	104	106	75-125	1	0-20	
Sodium	100	103	75-125	2	0-20	
Boron	103	106	75-125	2	0-20	

RPD - Relative Percent Difference , CL - Control Limit

Calscience Environmental Laboratories, Inc.

Quality Control - Spike/Spike Duplicate

URS Corporation
2020 East 1st Street, Suite 400
Santa Ana, CA 92705-4032

Date Received: 08/25/09
Work Order No: 09-08-2053
Preparation: EPA 245.1 Total
Method: EPA 245.1

Project Solar Ranch One - Lancaster, CA

Quality Control Sample ID	Matrix	Instrument	Date Prepared	Date Analyzed	MS/MSD Batch Number
GWS-1	**Aqueous**	**Mercury**	**08/27/09**	**08/27/09**	**090827S01**

Parameter	MS %REC	MSD %REC	%REC CL	RPD	RPD CL	Qualifiers
Mercury	99	101	57-141	2	0-10	

RPD - Relative Percent Difference , CL - Control Limit

Calscience Environmental Laboratories, Inc.

Quality Control - Spike/Spike Duplicate

URS Corporation
2020 East 1st Street, Suite 400
Santa Ana, CA 92705-4032

Date Received: 08/25/09
Work Order No: 09-08-2053
Preparation: EPA 504.1 Ext.
Method: EPA 504.1

Project Solar Ranch One - Lancaster, CA

Quality Control Sample ID	Matrix	Instrument	Date Prepared	Date Analyzed	MS/MSD Batch Number
GWS-1	**Aqueous**	**GC 40**	**08/28/09**	**08/28/09**	**090828S05**

Parameter	MS %REC	MSD %REC	%REC CL	RPD	RPD CL	Qualifiers
1,2-Dibromoethane	78	84	60-140	6	0-25	
1,2-Dibromo-3-Chloropropane	94	102	60-140	8	0-25	

RPD - Relative Percent Difference , CL - Control Limit

Calscience Environmental Laboratories, Inc.

Quality Control - Spike/Spike Duplicate

URS Corporation
2020 East 1st Street, Suite 400
Santa Ana, CA 92705-4032

Date Received: 08/25/09
Work Order No: 09-08-2053
Preparation: N/A
Method: EPA 524.2

Project Solar Ranch One - Lancaster, CA

Quality Control Sample ID	Matrix	Instrument	Date Prepared	Date Analyzed	MS/MSD Batch Number
GWS-1	**Aqueous**	**GC/MS O**	**08/28/09**	**08/28/09**	**090828S01**

Parameter	MS %REC	MSD %REC	%REC CL	RPD	RPD CL	Qualifiers
Vinyl Chloride	93	87	66-132	7	0-23	
1,1-Dichloroethene	106	99	63-135	6	0-28	
c-1,2-Dichloroethene	105	108	77-131	3	0-18	
Chloroform	100	104	67-139	4	0-15	
Carbon Tetrachloride	75	74	54-132	1	0-34	
Trichloroethene	103	105	71-131	1	0-21	
1,2-Dichloropropane	101	104	79-133	3	0-18	
Chlorobenzene	105	110	69-135	4	0-20	
Ethanol	127	145	15-285	14	0-60	
Ethylbenzene	108	105	64-136	3	0-20	
1,4-Dichlorobenzene	105	113	69-135	8	0-24	
Methyl-t-Butyl Ether (MTBE)	84	96	75-129	13	0-30	
Tert-Butyl Alcohol (TBA)	88	97	43-169	10	0-58	
Diisopropyl Ether (DIPE)	93	95	75-129	2	0-21	
Ethyl-t-Butyl Ether (ETBE)	89	100	72-126	12	0-27	
Tert-Amyl-Methyl Ether (TAME)	93	107	69-129	15	0-33	

RPD - Relative Percent Difference , CL - Control Limit

Calscience Environmental Laboratories, Inc.

Quality Control - Spike/Spike Duplicate

URS Corporation
2020 East 1st Street, Suite 400
Santa Ana, CA 92705-4032

Date Received: N/A
Work Order No: 09-08-2053

Project: Solar Ranch One - Lancaster, CA

Matrix: Aqueous or Solid

Parameter	Method	Quality Control Sample ID	Date Analyzed	Date Extracted	MS% REC	MSD % REC	%REC CL	RPD	RPD CL	Qualifiers
Phosphorus, Total	SM 4500 P B/E	09-08-2017-1	08/27/09	8/27/09	102	101	70-130	1	0-25	
Perchlorate	EPA 314.0	GWS-1	08/27/09	N/A	64	68	80-120	6	0-15	3
Fluoride	SM 4500-F C	09-08-1695-2	08/25/09	N/A	100	102	70-130	2	0-25	
Chloride	EPA 300.0	09-08-1954-7	08/25/09	N/A	100	100	80-120	0	0-20	
Nitrite (as N)	EPA 300.0	09-08-1954-7	08/25/09	N/A	94	94	80-120	0	0-20	
Nitrate (as N)	EPA 300.0	09-08-1954-7	08/25/09	N/A	97	97	80-120	0	0-20	
o-Phosphate (as P)	EPA 300.0	09-08-1954-7	08/25/09	N/A	86	88	80-120	3	0-20	
Sulfate	EPA 300.0	09-08-1954-7	08/25/09	N/A	97	96	80-120	1	0-20	
Cyanide, Total	SM 4500-CN E	09-08-2100-1	08/27/09	8/27/09	84	84	70-130	1	0-25	
Carbon, Total Organic	SM 5310 D	GWS-1	08/25/09	N/A	95	96	70-130	0	0-25	

RPD - Relative Percent Difference , CL - Control Limit

Calscience Environmental Laboratories, Inc.

Quality Control - Duplicate

URS Corporation		Date Received:	N/A
2020 East 1st Street, Suite 400		Work Order No:	09-08-2053
Santa Ana, CA 92705-4032			

Project: Solar Ranch One - Lancaster, CA

Matrix: Aqueous or Solid

Parameter	Method	QC Sample ID	Date Analyzed	Sample Conc	DUP Conc	RPD	RPD CL	Qualifiers
pH	SM 4500 H+ B	09-08-2040-1	08/25/09	8.22	8.19	0	0-25	
Hardness, Total	SM 2340 C	GWS-1	08/31/09	100	100	1	0-25	
Specific Conductance	SM 2510 B	GWS-1	08/25/09	360	360	0	0-25	
Turbidity	SM 2130 B	GWS-1	08/26/09	0.16	0.15	6	0-25	
Carbon Dioxide	SM4500-CO2D	GWS-1	08/25/09	60	61	3	0-25	
Alkalinity, Total (as CaCO3)	SM 2320B	GWS-1	08/25/09	133	137	3	0-25	
Bicarbonate (as CaCO3)	SM 2320B	GWS-1	08/25/09	133	137	3	0-25	
Carbonate (as CaCO3)	SM 2320B	GWS-1	08/25/09	ND	ND	NA	0-25	
Hydroxide (as CaCO3)	SM 2320B	GWS-1	08/25/09	ND	ND	NA	0-25	
Color	SM 2120 B	GWS-1	08/25/09	5.0	5.0	0	0-25	
Odor	SM 2150 B	GWS-1	08/25/09	ND	ND	NA	0-25	
Sulfide, Total	SM 4500 S2 - D	09-08-2024-1	08/26/09	0.50	0.50	0	0-25	
Ammonia (as N)	SM 4500-NH3 B/C	GWS-1	08/31/09	ND	ND	NA	0-25	
Solids, Total Suspended	SM 2540 D	09-08-2218-2	08/28/09	8.2	8.5	4	0-20	
Solids, Total Dissolved	SM 2540 C	09-08-1810-1	08/27/09	705	732	4	0-20	

RPD - Relative Percent Difference , CL - Control Limit

Calscience Environmental Laboratories, Inc.

Quality Control - Laboratory Control Sample

URS Corporation		Date Received:	N/A
2020 East 1st Street, Suite 400		Work Order No:	09-08-2053
Santa Ana, CA 92705-4032		Preparation:	EPA 3010A Total
		Method:	EPA 6010B

Project: Solar Ranch One - Lancaster, CA

Quality Control Sample ID	Matrix	Instrument	Date Analyzed	Lab File ID	LCS Batch Number
097-01-003-9,682	**Aqueous**	**ICP 5300**	**08/27/09**	**090826-la-4**	**090826LA4A**

Parameter	Conc Added	Conc Recovered	LCS %Rec	%Rec CL	Qualifiers
Silicon	0.500	0.490	98	80-120	

RPD - Relative Percent Difference , CL - Control Limit

Calscience Environmental Laboratories, Inc.

Quality Control - LCS/LCS Duplicate

URS Corporation	Date Received: N/A
2020 East 1st Street, Suite 400	Work Order No: 09-08-2053
Santa Ana, CA 92705-4032	Preparation: N/A
	Method: EPA 200.8

Project: Solar Ranch One - Lancaster, CA

Quality Control Sample ID	Matrix	Instrument	Date Prepared	Date Analyzed	LCS/LCSD Batch Number
099-10-008-1,278	**Aqueous**	**ICP/MS 03**	**08/27/09**	**08/31/09**	**090827L01**

Parameter	LCS %REC	LCSD %REC	%REC CL	ME_CL	RPD	RPD CL	Qualifiers
Antimony	98	96	85-115	80-120	2	0-20	
Arsenic	104	106	85-115	80-120	2	0-20	
Barium	103	102	85-115	80-120	0	0-20	
Beryllium	108	107	85-115	80-120	1	0-20	
Cadmium	105	105	85-115	80-120	0	0-20	
Chromium	96	96	85-115	80-120	0	0-20	
Copper	105	105	85-115	80-120	0	0-20	
Nickel	96	96	85-115	80-120	1	0-20	
Selenium	100	105	85-115	80-120	5	0-20	
Silver	105	104	85-115	80-120	0	0-20	
Thallium	97	96	85-115	80-120	0	0-20	
Zinc	111	114	85-115	80-120	2	0-20	
Aluminum	109	107	85-115	80-120	2	0-20	
Calcium	111	108	85-115	80-120	2	0-20	
Iron	97	98	85-115	80-120	1	0-20	
Magnesium	107	108	85-115	80-120	0	0-20	
Potassium	109	106	85-115	80-120	2	0-20	
Sodium	111	109	85-115	80-120	1	0-20	
Boron	105	109	85-115	80-120	4	0-20	

Total number of LCS compounds : 19
Total number of ME compounds : 0
Total number of ME compounds allowed : 1
LCS ME CL validation result : Pass

RPD - Relative Percent Difference , CL - Control Limit

Calscience Environmental Laboratories, Inc.

Quality Control - LCS/LCS Duplicate

URS Corporation		Date Received:	N/A
2020 East 1st Street, Suite 400		Work Order No:	09-08-2053
Santa Ana, CA 92705-4032		Preparation:	EPA 245.1 Total
		Method:	EPA 245.1

Project: Solar Ranch One - Lancaster, CA

Quality Control Sample ID	Matrix	Instrument	Date Prepared	Date Analyzed	LCS/LCSD Batch Number
099-04-008-4,289	**Aqueous**	**Mercury**	**08/27/09**	**08/27/09**	**090827L01**

Parameter	LCS %REC	LCSD %REC	%REC CL	RPD	RPD CL	Qualifiers
Mercury	100	100	85-121	0	0-10	

RPD - Relative Percent Difference , CL - Control Limit

Calscience Environmental Laboratories, Inc.

Quality Control - LCS/LCS Duplicate

URS Corporation		Date Received:	N/A
2020 East 1st Street, Suite 400		Work Order No:	09-08-2053
Santa Ana, CA 92705-4032		Preparation:	EPA 504.1 Ext.
		Method:	EPA 504.1

Project: Solar Ranch One - Lancaster, CA

Quality Control Sample ID	Matrix	Instrument	Date Prepared	Date Analyzed	LCS/LCSD Batch Number
099-12-520-183	**Aqueous**	**GC 40**	**08/28/09**	**08/28/09**	**090828L05**

Parameter	LCS %REC	LCSD %REC	%REC CL	RPD	RPD CL	Qualifiers
1,2-Dibromoethane	88	92	60-140	4	0-25	
1,2-Dibromo-3-Chloropropane	93	90	60-140	4	0-25	

RPD - Relative Percent Difference , CL - Control Limit

Calscience Environmental Laboratories, Inc.

Quality Control - LCS/LCS Duplicate

URS Corporation		Date Received:	N/A
2020 East 1st Street, Suite 400		Work Order No:	09-08-2053
Santa Ana, CA 92705-4032		Preparation:	N/A
		Method:	EPA 524.2

Project: Solar Ranch One - Lancaster, CA

Quality Control Sample ID	Matrix	Instrument	Date Prepared	Date Analyzed	LCS/LCSD Batch Number
095-01-053-312	**Aqueous**	**GC/MS O**	**08/28/09**	**08/28/09**	**090828L01**

Parameter	LCS %REC	LCSD %REC	%REC CL	ME_CL	RPD	RPD CL	Qualifiers
Vinyl Chloride	88	86	65-131	54-142	2	0-11	
1,1-Dichloroethene	105	100	73-127	64-136	4	0-11	
c-1,2-Dichloroethene	107	105	82-124	75-131	2	0-11	
Chloroform	105	102	85-121	79-127	3	0-10	
Carbon Tetrachloride	81	77	83-119	77-125	5	0-12	ME
Trichloroethene	106	104	80-122	73-129	2	0-11	
1,2-Dichloropropane	102	103	79-127	71-135	1	0-12	
Chlorobenzene	104	106	82-124	75-131	3	0-10	
Ethanol	121	119	43-169	22-190	1	0-69	
Ethylbenzene	109	107	79-127	71-135	2	0-8	
1,4-Dichlorobenzene	108	110	82-124	75-131	2	0-14	
Methyl-t-Butyl Ether (MTBE)	99	105	80-122	73-129	6	0-16	
Tert-Butyl Alcohol (TBA)	99	98	62-134	50-146	1	0-25	
Diisopropyl Ether (DIPE)	98	101	74-128	65-137	4	0-9	
Ethyl-t-Butyl Ether (ETBE)	97	102	76-124	68-132	5	0-13	
Tert-Amyl-Methyl Ether (TAME)	101	106	76-124	68-132	4	0-15	

Total number of LCS compounds : 16

Total number of ME compounds : 1

Total number of ME compounds allowed : 1

LCS ME CL validation result : Pass

RPD - Relative Percent Difference , CL - Control Limit

Calscience Environmental Laboratories, Inc.

Quality Control - LCS/LCS Duplicate

URS Corporation	Date Received:	N/A
2020 East 1st Street, Suite 400	Work Order No:	09-08-2053
Santa Ana, CA 92705-4032		

Project: Solar Ranch One - Lancaster, CA

Matrix: Aqueous or Solid

Parameter	Method	Quality Control Sample ID	Date Extracted	Date Analyzed	LCS % REC	LCSD % REC	%REC CL	RPD	RPD CL	Qual
Perchlorate	EPA 314.0	099-05-203-975	N/A	08/26/09	99	98	85-115	1	0-15	
Chloride	EPA 300.0	099-12-906-430	N/A	08/25/09	101	103	90-110	2	0-15	
Nitrite (as N)	EPA 300.0	099-12-906-430	N/A	08/25/09	97	97	90-110	0	0-15	
Nitrate (as N)	EPA 300.0	099-12-906-430	N/A	08/25/09	97	99	90-110	2	0-15	
o-Phosphate (as P)	EPA 300.0	099-12-906-430	N/A	08/25/09	96	98	90-110	2	0-15	
Sulfate	EPA 300.0	099-12-906-430	N/A	08/25/09	98	100	90-110	1	0-15	
MBAS	SM 5540C	099-05-093-2,043	08/26/09	08/26/09	99	99	80-120	0	0-20	

RPD - Relative Percent Difference , CL - Control Limit

Calscience Environmental Laboratories, Inc.

Quality Control - Laboratory Control Sample

URS Corporation	Date Received:	N/A
2020 East 1st Street, Suite 400	Work Order No:	09-08-2053
Santa Ana, CA 92705-4032		

Project: Solar Ranch One - Lancaster, CA

Matrix: Aqueous or Solid

Parameter	Method	Quality Control Sample ID	Date Analyzed	Date Extracted	Conc Added	Conc Recovered	LCS %Rec	%Rec CL	Qualifiers
Phosphorus, Total	SM 4500 P B/E	099-05-098-2,054	08/27/09	08/27/09	0.400	0.394	98	80-120	
Fluoride	SM 4500-F C	097-01-022-511	08/25/09	N/A	0.500	0.508	102	80-120	
Cyanide, Total	SM 4500-CN E	099-05-061-2,650	08/27/09	08/27/09	0.200	0.167	84	80-120	
Carbon, Total Organic	SM 5310 D	099-05-097-3,542	08/25/09	N/A	5.00	4.95	99	80-120	

RPD - Relative Percent Difference , CL - Control Limit

Calscience Environmental Laboratories, Inc.

Glossary of Terms and Qualifiers

Work Order Number: 09-08-2053

Qualifier	Definition
*	See applicable analysis comment.
1	Surrogate compound recovery was out of control due to a required sample dilution, therefore, the sample data was reported without further clarification.
2	Surrogate compound recovery was out of control due to matrix interference. The associated method blank surrogate spike compound was in control and, therefore, the sample data was reported without further clarification.
3	Recovery of the Matrix Spike (MS) or Matrix Spike Duplicate (MSD) compound was out of control due to matrix interference. The associated LCS and/or LCSD was in control and, therefore, the sample data was reported without further clarification.
4	The MS/MSD RPD was out of control due to matrix interference. The LCS/LCSD RPD was in control and, therefore, the sample data was reported without further clarification.
5	The PDS/PDSD associated with this batch of samples was out of control due to a matrix interference effect. The associated batch LCS/LCSD was in control and, hence, the associated sample data was reported with no further corrective action required.
A	Result is the average of all dilutions, as defined by the method.
B	Analyte was present in the associated method blank.
C	Analyte presence was not confirmed on primary column.
E	Concentration exceeds the calibration range.
H	Sample received and/or analyzed past the recommended holding time.
J	Analyte was detected at a concentration below the reporting limit and above the laboratory method detection limit. Reported value is estimated.
ME	LCS Recovery Percentage is within LCS ME Control Limit range.
N	Nontarget Analyte.
ND	Parameter not detected at the indicated reporting limit.
Q	Spike recovery and RPD control limits do not apply resulting from the parameter concentration in the sample exceeding the spike concentration by a factor of four or greater.
U	Undetected at the laboratory method detection limit.
X	% Recovery and/or RPD out-of-range.
Z	Analyte presence was not confirmed by second column or GC/MS analysis.
	Solid - Unless otherwise indicated, solid sample data is reported on a wet weight basis, not corrected for % moisture.

URS CORPORATION
2020 East First Street, Suite 400
Santa Ana, CA 92705
(714) 835-6886
FAX (714) 667-7147

CHAIN OF CUSTODY RECORD

2053

Date: 8/25/09
Page 1 of 4

☐ Data Requested in GISKey Format

Lab Name: CALSCIENCE
URS Project/PO Number: Solar One
Client Name/Project Name/Location: SOLAR RANCH ONE - LANCASTER, CA
Geo Tracker Information:
URS Project Manager: JOE VILES
EDF Reporting: Y N Global ID:
Sampler Name and Signature: Moz Ahvari
COELT Log Number:

Requested Analyses: VOCs (EPA 524.2); EDB/DBCP; METALS (200.7); ICP/MS METALS (200.8); REACTIVE SILICA BY MWH; ANIONS, TURBIDITY, ALK., PH, SC; PERCHLORATE, COLOR, FLUORIDE; CARBON DIOXIDE; CYANIDE; TOTAL HARDNESS; HOLD

#	Sample Name	Sample Date	Sample Time	Preserved	Matrix	Container type	# of Cont.	VOCs (EPA 524.2)	EDB/DBCP	METALS (200.7)	ICP/MS METALS (200.8)	REACTIVE SILICA BY MWH	ANIONS, TURBIDITY, ALK., PH, SC	PERCHLORATE, COLOR, FLUORIDE	CARBON DIOXIDE	CYANIDE	TOTAL HARDNESS					HOLD	Special Instructions
1	GWS-1	8/25/09	0815	Y HCl	L	40 ml Glass VOA	3	X															
2	GWS-1	8/25/09	0815	Y $Na_2S_2O_3$	L	40 ml Glass VOA	3		X														
3	GWS-1	8/25/09	0815	Y HNO_3	L	250 ml Plas.	1			X													
4	GWS-1	8/25/09	0815	Y ULTRA HNO_3	L	250 ml Plas.	1				X												
5	GWS-1	8/25/09	0815	N	L	500 ml Plas.	1					X											
6	GWS-1	8/25/09	0815	N	L	1000 ml Plas.	1						X										
7	GWS-1	8/25/09	0815	N	L	1000 ml Plas.	1							X									
8	GWS-1	8/25/09	0815	N	L	250 ml Amb. Glass	1								X								
9	GWS-1	8/25/09	0815	Y NaOH	L	500 ml Plas.	1									X							
10	GWS-1	8/25/09	0815	Y HNO_3	L	250 ml Plas.	1										X						

Relinquished By	Date	Received By	Date/Time
[signature]	8-25-09	[signature] CEL	8/25/09 1134
[signature]	8/25/09	[signature]	8/25/09 1350

Turnaround Time: (Check)
Same Day:____ 72 Hour:____
24 Hour:____ 5 Day:____
48 Hour:____ Standard:____

Lab Use Only
Cooler Temperature*:________
*Record upon arrival

URS

S=Solid L=Liquid G=Gas

White Copy in Final Report, Yellow to File, Pink to URS at Dropoff

URS CORPORATION

2020 East First Street, Suite 400
Santa Ana, CA 92705
(714) 835-6886
FAX (714) 667-7147

CHAIN OF CUSTODY RECORD

2053

Date: 8/25/09
Page 2 of 4

☐ Data Requested in GISKey Format

Lab Name: CALSCIENCE
URS Project/PO Number: Solar Ranch/one
Client Name/Project Name/Location: SOLAR RANCH ONE-LANCASTER, CA
Geo Tracker Information:
URS Project Manager: JOE LILES
EDF Reporting: Y N Global ID:
Sampler Name and Signature: Maz Ahvari
COELT Log Number:

Requested Analyses:

	Sample Name	Sample Date:	Sample Time:	Preserved:	Matrix:	Container type:	# of Cont.:	AMMONIA-NITROGEN	OIL & GREASE	TOTAL PHOSPHORUS	TDS	TSS	TOTAL SULFIDE	SURFACTANTS (MBAS)	TOC	RADIUM 226	RADIUM 228				HOLD	Special Instructions:
1	GWS-1	8/25/09	0815	Y H_2SO_4	L	1000 ml Amb. Glass	1	X														
2	GWS-1	8/25/09	0815	Y H_2SO_4	L	1000 ml Amb. Glass	1		X													
3	GWS-1	8/25/09	0815	Y H_2SO_4	L	250 ml Glass	1			X												
4	GWS-1	8/25/09	0815	N	L	1000 ml Plas.	1				X											
5	GWS-1	8/25/09	0815	N	L	1000 ml Plas.	1					X										
6	GWS-1	8/25/09	0815	Y ZnAc$_2$ + NaOH	L	125 ml Plas.	1						X									
7	GWS-1	8/25/09	0815	N	L	500 ml Plas.	1							X								
8	GWS-1	8/25/09	0815	Y H_2SO_4	L	250 ml Glass	1								X							
9	GWS-1	8/25/09	0815	Y HNO_3	L	1000 ml Plas.	1									X						
10	GWS-1	8/25/09	0815	Y HNO_3	L	1000 ml Plas.	2										X					

Container type options: Acetate SS. Brass Jar Encore ml Amb. Plas. Glass VOA. Matrix options: S L G. Preserved: Y N.

Relinquished By:	Date:	Received By:	Date/Time:
[signature]	8-25-09	Rudy W CEC	8/25/09 1134
Rudy W	8/25/09	[signature]	8/25/09 1350

Turnaround Time: (Check)
Same Day:____ 72 Hour:____
24 Hour:____ 5 Day:____
48 Hour:____ Standard:____

Lab Use Only
Cooler Temperature*:________
*Record upon arrival

URS

S=Solid L=Liquid G=Gas White Copy in Final Report, Yellow to File, Pink to URS at Dropoff

URS CORPORATION

2020 East First Street, Suite 400
Santa Ana, CA 92705
(714) 835-6886
FAX (714) 667-7147

CHAIN OF CUSTODY RECORD

2053

Date: 8 / 25 / 09

Page 3 of 4

☐ Data Requested in GISKey Format

Lab Name: CALSCIENCE	URS Project/PO Number: Solar Ranch
Client Name/Project Name/Location: SOLAR RANCH ONE-LANCASTER, CA	Geo Tracker Information:
URS Project Manager: JOE LILES	EDF Reporting: Y N Global ID:
Sampler Name and Signature: Maz Ahvari	COELT Log Number:

Requested Analyses:

	Sample Name	Sample Date:	Sample Time:	Preserved:	Matrix:	Container type:	# of Cont.:	STRONTIUM 90	URANIUM	GROSS ALPHA & BETA	TRITIUM	ASBESTOS	DIOXIN (2,3,7,8-TCDD)	ODOR	EPA 508	EPA 515.3	EPA 525.2				HOLD	Special Instructions:
1	GWS-1	8/25/09	0815	Y HNO3	L	1000 ml Plas.	1	X														
2	GWS-1	8/25/09	0815	Y HNO3	L	1000 ml Plas.	1		X													
3	GWS-1	8/25/09	0815	N	L	1000 ml Plas.	1			X												
4	GWS-1	8/25/09	0815	N	L	40 ml VOA	3				X											
5	GWS-1	8/25/09	0815	N	L	1000 ml Plas.	1					X										
6	GWS-1	8/25/09	0815	N	L	1000 ml Amb. Glass	2						X									
7	GWS-1	8/25/09	0815	N	L	500 ml Amb. Glass	1							X								
8	GWS-1	8/25/09	0815	N	L	1000 ml Amb. Glass	2								X							
9	GWS-1	8/25/09	0815	N	L	250 ml Amb. Glass	1									X						
10	GWS-1	8/25/09	0815	Y HCl	L	1000 ml Amb. Glass	2										X					

Container type options: Acetate SS. Brass Jar Encore ___ ml Amb. Plas. Glass VOA

Relinquished By:	Date:	Received By:	Date/Time:
[signature]	8-25-09	[signature] CEL	8/25/09 1134
[signature]	8/25/09	[signature]	8/25/09 1350

Turnaround Time: (Check)
Same Day:____ 72 Hour:____
24 Hour:____ 5 Day:____
48 Hour:____ Standard:____

Lab Use Only
Cooler Temperature*:__________
*Record upon arrival

URS

S=Solid L=Liquid G=Gas

White Copy in Final Report, Yellow to File, Pink to URS at Dropoff

URS CORPORATION
2020 East First Street, Suite 400
Santa Ana, CA 92705
(714) 835-6886
FAX (714) 667-7147

CHAIN OF CUSTODY RECORD

2053

Date: 8 / 25 / 09
Page 4 of 4

☐ Data Requested in GISKey Format

Lab Name: CALSCIENCE	URS Project/PO Number: Solar One
Client Name/Project Name/Location: SOLAR RANCH ONE - LANCASTER, CA	Geo Tracker Information:
URS Project Manager: JOE LILES	EDF Reporting: Y N Global ID:
Sampler Name and Signature: Moz Ahvari	COELT Log Number:

Requested Analyses:

	Sample Name	Sample Date:	Sample Time:	Preserved:	Matrix:	Container type:	# of Cont.:	EPA 531.1	EPA 547	EPA 548.1	EPA 549.2										HOLD	Special Instructions:
1	GWS-1	8/25/09	0815	Y N	S L G	Acetate SS. Brass Jar Encore 40 ml Amb. Plas. Glass VOA	1	X														
2	GWS-1	8/25/09	0815	Y N	S L G	Acetate SS. Brass Jar Encore 40 ml Amb. Plas. Glass VOA	1		X													
3	GWS-1	8/25/09	0815	Y N	S L G	Acetate SS. Brass Jar Encore 250 ml Amb. Plas. Glass VOA	1			X												
4	GWS-1	8/25/09	0815	Y N	S L G	Acetate SS. Brass Jar Encore 1000 ml Amb. Plas. Glass VOA	1				X											
5				Y N	S L G	Acetate SS. Brass Jar Encore ___ml Amb. Plas. Glass VOA																
6				Y N	S L G	Acetate SS. Brass Jar Encore ___ml Amb. Plas. Glass VOA																
7				Y N	S L G	Acetate SS. Brass Jar Encore ___ml Amb. Plas. Glass VOA																
8				Y N	S L G	Acetate SS. Brass Jar Encore ___ml Amb. Plas. Glass VOA																
9				Y N	S L G	Acetate SS. Brass Jar Encore ___ml Amb. Plas. Glass VOA																
10				Y N	S L G	Acetate SS. Brass Jar Encore ___ml Amb. Plas. Glass VOA																

Relinquished By:	Date:	Received By:	Date/Time:
[signature]	8-25-09	[signature] CEC	8/25/09 1134
[signature]	8/25/09	[signature]	8/25/09 1350

Turnaround Time: (Check)
Same Day:____ 72 Hour:____
24 Hour:____ 5 Day:____
48 Hour:____ Standard:____

Lab Use Only
Cooler Temperature*:________
*Record upon arrival

URS

S=Solid L=Liquid G=Gas

White Copy in Final Report, Yellow to File, Pink to URS at Dropoff

Calscience Environmental Laboratories, Inc.

WORK ORDER #: 09-08- 2 0 5 3

SAMPLE RECEIPT FORM

Cooler 1 of 3

CLIENT: URS

DATE: 8/25/09

TEMPERATURE: (Criteria: 0.0 °C – 6.0 °C, not frozen)

Temperature 2 . 9 °C - 0.2 °C (CF) = 2 . 7 °C ☑ Blank ☐ Sample

☐ Sample(s) outside temperature criteria (PM/APM contacted by: ________).

☐ Sample(s) outside temperature criteria but received on ice/chilled on same day of sampling.

☐ **Received at ambient temperature, placed on ice for transport by Courier.**

Ambient Temperature: ☐ Air ☐ Filter ☐ Metals Only ☐ PCBs Only **Initial:** AM

CUSTODY SEALS INTACT:

☐ Cooler	☐ ________	☐ No (Not Intact)	☑ Not Present	☐ N/A	Initial: AM
☐ Sample	☐ ________	☐ No (Not Intact)	☑ Not Present		Initial: PS

SAMPLE CONDITION:	Yes	No	N/A
Chain-Of-Custody (COC) document(s) received with samples	☑	☐	☐
COC document(s) received complete	☑	☐	☐
☐ Collection date/time, matrix, and/or # of containers logged in based on sample labels.			
☐ COC not relinquished. ☐ No date relinquished. ☐ No time relinquished.			
Sampler's name indicated on COC	☑	☐	☐
Sample container label(s) consistent with COC	☐	☑	☐
Sample container(s) intact and good condition	☑	☐	☐
Correct containers and volume for analyses requested	☑	☐	☐
Analyses received within holding time	☑	☐	☐
Proper preservation noted on COC or sample container	☑	☐	☐
☐ Unpreserved vials received for Volatiles analysis			
Volatile analysis container(s) free of headspace	☑	☐	☐
Tedlar bag(s) free of condensation	☐	☐	☑

CONTAINER TYPE:

Solid: ☐4ozCGJ ☐8ozCGJ ☐16ozCGJ ☐Sleeve ☐EnCores® ☐TerraCores® ☐________

Water: 6 ☑VOA 3 ☑VOAh 3 ☑VOAna$_2$ ☐125AGB ☐125AGBh ☐125AGBp 4 ☑1AGB ☐1~~AGBna$_2$~~ (CBROWN) PB 2 ☑1AGBs ☐500AGB ☑500AGJ ☐500AGJs 3 ☑250AGB ☐250CGB 2 ☑250CGBs 6 ☑1PB 2 ☑500PB ☑500PBna ☐250PB 3 ☑250PBn ☐125PB ☑125PBznna ☐100PJ ☐100PJna$_2$ 5 ☑ 1PBn 2 ☑ 1AGBh 2 ☑ VOA AMBER

Air: ☐Tedlar® ☐Summa® ☐______ **Other:** ☐______________ **Checked/Labeled by:** PS

Container: C: Clear A: Amber P: Plastic G: Glass J: Jar B: Bottle Z: Ziploc/Resealable Bag E: Envelop **Reviewed by:** WB

Preservative: h: HCL n: HNO3 na$_2$:$Na_2S_2O_3$ Na: NaOH p: H_3PO_4 s: H_2SO_4 znna: $ZnAc_2$+NaOH f: Field-filtered **Scanned by:** PS

Calscience Environmental Laboratories, Inc.

WORK ORDER #: 09-08-2 0 5 3

SAMPLE RECEIPT FORM

Cooler 3 of 3

CLIENT: VRS

DATE: 8 / 25 / 09

TEMPERATURE: (Criteria: 0.0 °C – 6.0 °C, not frozen)

Temperature 3.5 °C - 0.2 °C (CF) = 3.3 °C ☑ Blank ☐ Sample

☐ Sample(s) outside temperature criteria (PM/APM contacted by: ________).

☐ Sample(s) outside temperature criteria but received on ice/chilled on same day of sampling.

☐ **Received at ambient temperature, placed on ice for transport by Courier.**

Ambient Temperature: ☐ Air ☐ Filter ☐ Metals Only ☐ PCBs Only Initial: AY

CUSTODY SEALS INTACT:

☐ Cooler ☐ ________ ☐ No (Not Intact) ☑ Not Present ☐ N/A Initial: AY

☐ Sample ☐ ________ ☐ No (Not Intact) ☑ Not Present Initial: PS

SAMPLE CONDITION:	Yes	No	N/A
Chain-Of-Custody (COC) document(s) received with samples	☑	☐	☐
COC document(s) received complete	☑	☐	☐
☐ Collection date/time, matrix, and/or # of containers logged in based on sample labels.			
☐ COC not relinquished. ☐ No date relinquished. ☐ No time relinquished.			
Sampler's name indicated on COC	☑	☐	☐
Sample container label(s) consistent with COC	☑	☐	☐
Sample container(s) intact and good condition	☑	☐	☐
Correct containers and volume for analyses requested	☑	☐	☐
Analyses received within holding time	☑	☐	☐
Proper preservation noted on COC or sample container	☑	☐	☐
☐ Unpreserved vials received for Volatiles analysis			
Volatile analysis container(s) free of headspace	☑	☐	☐
Tedlar bag(s) free of condensation	☐	☐	☑

CONTAINER TYPE:

Solid: ☐4ozCGJ ☐8ozCGJ ☐16ozCGJ ☐Sleeve ☐EnCores® ☐TerraCores® ☐________

Water: ☑VOA 6 ☑VOAh 3 ☑VOAna₂ 3 ☐125AGB ☐125AGBh ☐125AGBp ☑1AGB 4 ☑1A~~GBna₂~~ PB (BROWN) 2 ☑1AGBs ☐500AGB ☑500AGJ 3 ☐500AGJs ☑250AGB 3 ☐250CGB ☑250CGBs 2 ☑1PB 6 ☑500PB 5 ☑500PBna 2 ☐250PB ☑250PBn 3 ☐125PB ☑125PBznna ☐100PJ ☐100PJna₂ ☑ 1PBn 5 ☑ 1AGBh 2 ☑ VOA AMBER 2

Air: ☐Tedlar® ☐Summa® ☐________ **Other:** ☐________________ **Checked/Labeled by:** PS

Container: C: Clear A: Amber P: Plastic G: Glass J: Jar B: Bottle Z: Ziploc/Resealable Bag E: Envelop **Reviewed by:** WB

Preservative: h: HCL n: HNO3 na₂: $Na_2S_2O_3$ Na: NaOH p: H_3PO_4 s: H_2SO_4 znna: $ZnAc_2$+NaOH f: Field-filtered **Scanned by:** PS

Calscience Environmental Laboratories, Inc.

WORK ORDER #: 09-08- 2 0 5 3

SAMPLE RECEIPT FORM

Cooler 2 **of** 3

CLIENT: VRS

DATE: 8 / 25 / 09

TEMPERATURE: (Criteria: 0.0 °C – 6.0 °C, not frozen)

Temperature 3 . 3 °C - 0.2 °C (CF) = 3 . 1 °C ☑ Blank ☐ Sample

☐ Sample(s) outside temperature criteria (PM/APM contacted by: _______).

☐ Sample(s) outside temperature criteria but received on ice/chilled on same day of sampling.

☐ **Received at ambient temperature, placed on ice for transport by Courier.**

Ambient Temperature: ☐ Air ☐ Filter ☐ Metals Only ☐ PCBs Only **Initial:** AM

CUSTODY SEALS INTACT:

☐ Cooler ☐__________ ☐ No (Not Intact) ☑ Not Present ☐ N/A **Initial:** AM

☐ Sample ☐__________ ☐ No (Not Intact) ☑ Not Present **Initial:** PS

SAMPLE CONDITION:	Yes	No	N/A
Chain-Of-Custody (COC) document(s) received with samples	☑	☐	☐
COC document(s) received complete	☑	☐	☐
☐ Collection date/time, matrix, and/or # of containers logged in based on sample labels.			
☐ COC not relinquished. ☐ No date relinquished. ☐ No time relinquished.			
Sampler's name indicated on COC	☑	☐	☐
Sample container label(s) consistent with COC	☐	☑	☐
Sample container(s) intact and good condition	☑	☐	☐
Correct containers and volume for analyses requested	☑	☐	☐
Analyses received within holding time	☑	☐	☐
Proper preservation noted on COC or sample container	☑	☐	☐
☐ Unpreserved vials received for Volatiles analysis			
Volatile analysis container(s) free of headspace	☑	☐	☐
Tedlar bag(s) free of condensation	☐	☐	☑

CONTAINER TYPE:

Solid: ☐4ozCGJ ☐8ozCGJ ☐16ozCGJ ☐Sleeve ☐EnCores® ☐TerraCores® ☐________

Water: ☑VOA 6 ☑VOAh 3 ☑VOAna₂ 3 ☐125AGB ☐125AGBh ☐125AGBp ☑1AGB 4 ☑1AGB~~na₂~~ 2 (BROWN) ☑1AGBs PS ☐500AGB ☑500AGJ ☐500AGJs ☑250AGB 3 ☐250CGB ☑250CGBs 2 ☑1PB 8/25/09 6 ☑500PB 2 ☑500PBna 5 ☐250PB ☑250PBn 3 ☐125PB ☑125PBznna ☐100PJ ☐100PJna₂ ☑ 1PBh 5 ☑ 1AGBh 2 ☑ VOA AMBER 2

Air: ☐Tedlar® ☐Summa® ☐_______ **Other:** ☐______________ **Checked/Labeled by:** PS

Container: C: Clear **A:** Amber **P:** Plastic **G:** Glass **J:** Jar **B:** Bottle **Z:** Ziploc/Resealable Bag **E:** Envelop **Reviewed by:** [illegible]

Preservative: h: HCL **n:** HNO3 **na₂:** $Na_2S_2O_3$ **Na:** NaOH **p:** H_3PO_4 **s:** H_2SO_4 **znna:** $ZnAc_2$+NaOH **f:** Field-filtered **Scanned by:** PS

Calscience Environmental Laboratories, Inc.

WORK ORDER #: 09-08- 2 0 5 3

SAMPLE ANOMALY FORM

SAMPLES - CONTAINERS & LABELS:

- ☐ **Samples NOT RECEIVED but listed on COC**
- ☐ **Samples received but NOT LISTED on COC**
- ☐ **Holding time expired** – list sample ID(s) and test
- ☐ **Insufficient quantities for analysis** – list test
- ☐ **Improper container(s)/preservative used** – list test
- ☐ **No preservative noted on COC or label** – list test & notify lab
- ☐ **Sample labels illegible** – note test/container type
- ☑ **Sample labels do not match COC** – Note in comments
  - ☐ **Sample ID**
  - ☐ **Date and/or Time Collected**
  - ☐ **Project Information**
  - ☑ **# of Containers**
  - ☐ **Analysis**
- ☐ **Sample containers compromised** – Note in comments
  - ☐ **Leaking**
  - ☐ **Broken**
  - ☐ **Without Labels**
- ☐ **Air sample containers compromised** – Note in comments
  - ☐ **Flat**
  - ☐ **Very low in volume**
  - ☐ **Leaking (transferred into Calscience Tedlar® Bag*)**
  - ☐ **Leaking (transferred into Client's Tedlar® Bag*)**
- ☐ **Other:** ____________

Comments:

(-1) GWS-1 RECEIVED 47 CONTAINERS INSTEAD OF 44 (EXTRA 3X VIALS FOR TRITIUM).

HEADSPACE – Containers with Bubble > 6mm or ¼ inch:

Sample #	Container ID(s)	# of Vials Received	Sample #	Container ID(s)	# of Vials Received	Sample #	Container ID(s)	# of RSK or CO_2 or DO Received

Comments: ____________

*Transferred at Client's request.

Initial / Date PS 8/25/09

LA Testing
159 Pasadena Avenue, South Pasadena, CA 91030
Phone: (323) 254-9960 Fax: (323) 254-9982 Email: pasadenalab@latesting.com

Attn: **Vik Patel**
Calscience Environmental Labs, Inc.
7440 Lincoln Way
Garden Grove, CA 92841

Fax: (714) 894-7501 Phone: (714) 895-5494
Project: **09-08-2053**

Customer ID: 32CALS51
Customer PO:
Received: 08/26/09 8:55 AM
LA Testing Order: 320909027

LA Testing Proj:
Analysis Date: 8/27/2009

Determination of Asbestos Structures in Water Performed by the 100.2 Method (EPA/600/R-94/134)

Sample ID	Sample Prep Date	# Fibers Asbestos	# Fibers Non-Asbestos	Type(s) Of Asbestos	Analytical Sensitivity (MFL)	Confidence Limits	Concentration Of Asbestos Fibers (MFL)	Comments
GWS-1 *320909027-0001*	08/26/09 8:25AM	0	0		0.19	0.00-0.70	<0.19	Total area of filtered examined=0.068mm2

Effective filtration area=1288mm2

Analyst(s)
Kieu-Ahn Pham Duong (1)

Derrick Tanner, Laboratory Manager
or other approved signatory

Sample collection and containers provided by the client, acceptable bottle blank level is defined as <=0.01MFL>10um. ND=None Detected. This report relates only to those items tested.
This report may not be reproduced, except in full, without written permission by EMSL Analytical, Inc. Samples received in good condition unless otherwise noted.
Samples analyzed by LA Testing South Pasadena 159 Pasadena Avenue, South Pasadena CA CA ELAP 2283

Calscience Environmental Laboratories, Inc.
7440 LINCOLN WAY
GARDEN GROVE, CA 92841-1432
TEL: (714) 895-5494 . FAX: (714) 894-7501

TO: LA TESTING

320909027

CHAIN OF CUSTODY RECORD

DATE: 08/25/09

PAGE: 1 OF 1

LABORATORY CLIENT: Calscience Environmental Laboratories, Inc.	CLIENT PROJECT NAME / NUMBER: 09-08-2053
ADDRESS: 7440 Lincoln Way	P.O. NO.:
CITY: Garden Grove, CA 92841-1427	PROJECT CONTACT: Vik Patel
TEL: 714/895-5494 FAX: 714/894-7501 E-MAIL: vipatel@calscience.com	QUOTE NO.:
	SAMPLER(S): (SIGNATURE)
	LAB USE ONLY: ☐☐-☐☐☐☐

TURNAROUND TIME
☐ SAME DAY ☐ 24 HR ☐ 48HR ☐ 72 HR ☐ 4 DAYS ☐ 10 DAYS

SPECIAL REQUIREMENTS (ADDITIONAL COSTS MAY APPLY)
☐ RWQCB REPORTING ☐ ARCHIVE SAMPLES UNTIL ___/___/___

SPECIAL INSTRUCTIONS

Standard TAT

REQUESTED ANALYSIS

LAB USE ONLY	SAMPLE ID	LOCATION/ DESCRIPTION	SAMPLING DATE	SAMPLING TIME	Matrix	#Cont	Asbestos (100.2) or equivalent
	GWS-1		08/25/09	0815	S	1	X

Relinquished by: (Signature)	Received by: (Signature)	Date:	Time:
CEL	Jonyen - DO 8°C	8/25/09	4:20 pm
Relinquished by: (Signature)	Received by: (Signature) (RV)	Date: 8/26	Time: 8:55A
Relinquished by: (Signature)	Received by: (Signature)	Date:	Time:

MWH Laboratories
A Division of MWH Americas, Inc.

750 Royal Oak Dr., Suite 100
Monrovia, California, 91016-3629
Tel: 626 386 1100
Fax: 626 386 1101
1 800 566 LABS (1 800 566 5227)

Laboratory Report

for

Calscience Environmental Labs, Inc.
7440 Lincoln Way
Garden Grove, CA 92641-1432
Attention: Steve Lane
Fax: 714-894-7501

Date of Issue
09/04/2009
MWH LABORATORIES

ACCREDITED IN ACCORDANCE WITH nelac 01114CA

Report#: 313098
Project: SUBCONTRACT
Group: SILICA

YOM: Yolanda.O.Martin

Project Manager

Laboratory certifies that the test results meet all **NELAC** requirements unless noted in the Comments section or the Case Narrative. Following the cover page are Hits Reports, Comments, QC Summary, QC Report and Regulatory Forms. This report shall not be reproduced except in full, without the written approval of the laboratory.

MWH Laboratories
750 Royal Oaks Drive Suite 100, Monrovia, Ca 91016
Phone 626-386-1100/Fax: 626-386-1101

Acknowledgement of Samples Received

Calscience Environmental Labs, Inc.
7440 Lincoln Way
Garden Grove, CA 92641-1432
Attn: Steve Lane
Phone: 714-895-5494

Customer Code: CALSCIENCE
Group #: 313098
Project #: SUBCONTRACT
Sample Group: SILICA
Project Manager: Yolanda.O.Martin
Phone: 626-386-1104
PO #: 09-08-2053

The following samples were received from you on **August 26, 2009**. They have been scheduled for the tests listed below each sample. If this information is incorrect, please contact your service representative. Thank you for using MWH Laboratories.

Sample #	Sample Id	Sample Date
200908260412	GWS-1	25-Aug-2009 0815
	Reactive Silica as SiO2	

Test Description

2/8

Reported: 09/04/09

Calscience Environmental Laboratories, Inc.

7440 LINCOLN WAY
GARDEN GROVE, CA 92841-1432
TEL: (714) 895-5494 . FAX: (714) 894-7501

TO: MWH

313098

CHAIN OF CUSTODY RECORD

DATE: 08/25/09

PAGE: 1 OF 1

LABORATORY CLIENT: Calscience Environmental Laboratories, Inc.		CLIENT PROJECT NAME / NUMBER: 09-08-2053	P.O. NO.:
ADDRESS: 7440 Lincoln Way		PROJECT CONTACT: Vik Patel	QUOTE NO.:
CITY: Garden Grove, CA 92841-1427		SAMPLER(S): (SIGNATURE)	LAB USE ONLY
TEL: 714/895-5494	FAX: 714/894-7501	E-MAIL: vipatel@calscience.com	

TURNAROUND TIME: ☐ SAME DAY ☐ 24 HR ☐ 48HR ☐ 72 HR ☐ 5 DAYS ☒ Standard

SPECIAL REQUIREMENTS (ADDITIONAL COSTS MAY APPLY): ☐ RWQCB REPORTING ☐ ARCHIVE SAMPLES UNTIL ____ / ____ / ____

SPECIAL INSTRUCTIONS:

REQUESTED ANALYSIS

LAB USE ONLY	SAMPLE ID	LOCATION/ DESCRIPTION	SAMPLING DATE	SAMPLING TIME	Matrix	#Cont	Reactive Silica
3/8	GWS-1		08/25/09	0815	W	1	X

Relinquished by: (Signature)	Received by: (Signature)	Date:	Time:
[signature]	[signature] Oscar Cabrera	8/26	13:17
Relinquished by: (Signature)	Received by: (Signature)	Date:	Time:
Relinquished by: (Signature)	Received by: (Signature)	Date:	Time:

2°c on ice

MWH Laboratories
A Division of MWH Americas, Inc.

750 Royal Oak Dr., Suite 100
Monrovia, California, 91016-3629
Tel: 626 386 1100
Fax: 626 386 1101
1 800 566 LABS (1 800 566 5227)

Laboratory Comments
Report: #313098

Calscience Environmental Labs, Inc.
Steve Lane
7440 Lincoln Way
Garden Grove, CA 92641-1432

The Comments Report may be blank if there are no comments for this report.

MWH Laboratories
A Division of MWH Americas, Inc.

750 Royal Oak Dr., Suite 100
Monrovia, California, 91016-3629
Tel: 626 386 1100
Fax: 626 386 1101
1 800 566 LABS (1 800 566 5227)

Laboratory
Hits Report: 313098

Calscience Environmental Labs, Inc.
Steve Lane
7440 Lincoln Way
Garden Grove, CA 92641-1432

Samples Received on:
08/26/2009

Analyzed	Analyte	Sample ID	Result	Federal MCL	Units	MRL
	200908260412	**GWS-1**				
09/03/2009 16:30	Reactive Silica as SiO2		29		mg/L	1

SUMMARY OF POSITIVE DATA ONLY

MWH Laboratories
A Division of MWH Americas, Inc.

750 Royal Oak Dr., Suite 100
Monrovia, California, 91016-3629
Tel: 626 386 1100
Fax: 626 386 1101
1 800 566 LABS (1 800 566 5227)

Laboratory Data
Report: 313098

Calscience Environmental Labs, Inc.
Steve Lane
7440 Lincoln Way
Garden Grove, CA 92641-1432

Samples Received on:
08/26/2009

Prepared	Analyzed	QC Ref #	Method	Analyte	Result	Units	MRL	Dilution
GWS-1 (200908260412)						**Sampled on 08/25/2009 0815**		
		SM4500-SIO2 C - Reactive Silica as SiO2						
	09/03/2009 16:30	521982	(SM4500-SIO2 C)	Reactive Silica as SiO2	29	mg/L	1	1

Rounding on totals after summation.
(c) - indicates calculated results

MWH Laboratories
A Division of MWH Americas, Inc.

750 Royal Oak Dr., Suite 100
Monrovia, California, 91016-3629
Tel: 626 386 1100
Fax: 626 386 1101
1 800 566 LABS (1 800 566 5227)

Laboratory
QC Summary: 313098

Calscience Environmental Labs, Inc.

QC Ref # 521982 - Reactive Silica as SiO2 **Analysis Date: 09/03/2009**

200908260412 GWS-1 Analyzed by: KXS

MWH Laboratories
A Division of MWH Americas, Inc.

750 Royal Oak Dr., Suite 100
Monrovia, California, 91016-3629
Tel: 626 386 1100
Fax: 626 386 1101
1 800 566 LABS (1 800 566 5227)

Laboratory
QC Report: 313098

Calscience Environmental Labs, Inc.

QC Ref# 521982 - Reactive Silica as SiO2 by SM4500-SIO2 C — **Analysis Date: 09/03/2009**

QC Type	Analyte	Native	Spiked	Recovered	Units	Yield (%)	Limits (%)	RPDLimit (%)	RPD%
LCS1	Reactive Silica as SiO2		20	19.5	mg/L	98	(85-115)		
LCS2	Reactive Silica as SiO2		20	18.8	mg/L	94	(85-115)	10	3.7
MBLK	Reactive Silica as SiO2			<0.5	mg/L				
MRL_CHK	Reactive Silica as SiO2		1.0	1.3	mg/L	130	(50-150)		
MS_200908260412	Reactive Silica as SiO2	29	20	45.7	mg/L	86	(70-130)		
MSD_200908260412	Reactive Silica as SiO2	29	20	46.1	mg/L	88	(70-130)	20	2.3

Spike recovery is already corrected for native results.
Spikes which exceed Limits and Method Blanks with positive results are highlighted by Underlining.
Criteria for MS and Dup are advisory only, batch control is based on LCS. Criteria for duplicates are advisory only, unless otherwise specified in the method.
(S) Indicates surrogate compound.
(I) Indicates internal standard compound.
RPD not calculated for LCS2 when different a concentration than LCS1 is used
RPD not calculated for Duplicates when the result is not five times the MRL (Minimum Reporting Level)

Weck Laboratories, Inc.
Analytical Laboratory Service - Since 1964

Certificate of Analysis

Report Date: Thursday, September 17, 2009
Received Date: Wednesday, August 26, 2009
Received Time: 10:50 am
Turnaround Time: Normal

Client: Calscience Environmental Laboratories
7440 Lincoln Way
Garden Grove, CA 92841-1432

Phones: (714) 895-5494
Fax: (714) 894-7501

P.O. #:

Attn: Vikas Patel
Project: 09-08-2053

Lab Sample ID: 9H26017-01 **Sample ID: GWS-1** **Matrix:** Water
Sampled by: Client **Sampled: 08/25/09 08:15**

Analyte	Result	DL	RL	Units	Dil	Method	Prepared	Analyzed	Batch	Qualifier
4,4´-DDD	ND	0.0056	0.010	ug/l	1x1	EPA 508	8/28/09	8/31/09 20:03	W9H1090	
4,4´-DDE	ND	0.0048	0.010	ug/l	1x1	EPA 508	8/28/09	8/31/09 20:03	W9H1090	
4,4´-DDT	ND	0.0046	0.010	ug/l	1x1	EPA 508	8/28/09	8/31/09 20:03	W9H1090	
Aldrin	ND	0.0037	0.010	ug/l	1x1	EPA 508	8/28/09	8/31/09 20:03	W9H1090	
alpha-BHC	ND	0.0053	0.010	ug/l	1x1	EPA 508	8/28/09	8/31/09 20:03	W9H1090	
beta-BHC	ND	0.0053	0.010	ug/l	1x1	EPA 508	8/28/09	8/31/09 20:03	W9H1090	
Chlordane (tech)	ND	0.045	0.10	ug/l	1x1	EPA 508	8/28/09	8/31/09 20:03	W9H1090	
Chlorothalonil	ND	0.011	0.050	ug/l	1x1	EPA 508	8/28/09	8/31/09 20:03	W9H1090	
delta-BHC	ND	0.0046	0.010	ug/l	1x1	EPA 508	8/28/09	8/31/09 20:03	W9H1090	
Dieldrin	ND	0.0044	0.010	ug/l	1x1	EPA 508	8/28/09	8/31/09 20:03	W9H1090	
Endosulfan I	ND	0.0047	0.010	ug/l	1x1	EPA 508	8/28/09	8/31/09 20:03	W9H1090	
Endosulfan II	ND	0.0047	0.010	ug/l	1x1	EPA 508	8/28/09	8/31/09 20:03	W9H1090	
Endosulfan sulfate	ND	0.0046	0.010	ug/l	1x1	EPA 508	8/28/09	8/31/09 20:03	W9H1090	
Endrin	ND	0.0050	0.010	ug/l	1x1	EPA 508	8/28/09	8/31/09 20:03	W9H1090	
Endrin aldehyde	ND	0.0056	0.010	ug/l	1x1	EPA 508	8/28/09	8/31/09 20:03	W9H1090	
gamma-BHC (Lindane)	ND	0.0050	0.010	ug/l	1x1	EPA 508	8/28/09	8/31/09 20:03	W9H1090	
Heptachlor	ND	0.0052	0.010	ug/l	1x1	EPA 508	8/28/09	8/31/09 20:03	W9H1090	
Heptachlor epoxide	ND	0.0058	0.010	ug/l	1x1	EPA 508	8/28/09	8/31/09 20:03	W9H1090	
Hexachlorobenzene	ND	0.0020	0.010	ug/l	1x1	EPA 508	8/28/09	8/31/09 20:03	W9H1090	
Hexachlorocyclopentadiene	ND	0.016	0.050	ug/l	1x1	EPA 508	8/28/09	8/31/09 20:03	W9H1090	
Methoxychlor	ND	0.0064	0.010	ug/l	1x1	EPA 508	8/28/09	8/31/09 20:03	W9H1090	
PCB-1016	ND	0.097	0.10	ug/l	1x1	EPA 508	8/28/09	8/31/09 20:03	W9H1090	
PCB-1221	ND	0.084	0.10	ug/l	1x1	EPA 508	8/28/09	8/31/09 20:03	W9H1090	
PCB-1232	ND	0.064	0.10	ug/l	1x1	EPA 508	8/28/09	8/31/09 20:03	W9H1090	
PCB-1242	ND	0.070	0.10	ug/l	1x1	EPA 508	8/28/09	8/31/09 20:03	W9H1090	
PCB-1248	ND	0.049	0.10	ug/l	1x1	EPA 508	8/28/09	8/31/09 20:03	W9H1090	
PCB-1254	ND	0.068	0.10	ug/l	1x1	EPA 508	8/28/09	8/31/09 20:03	W9H1090	
PCB-1260	ND	0.069	0.10	ug/l	1x1	EPA 508	8/28/09	8/31/09 20:03	W9H1090	
PCBs, Total	ND	0.049	0.50	ug/l	1x1	EPA 508	8/28/09	8/31/09 20:03	W9H1090	
Propachlor	ND	0.014	0.050	ug/l	1x1	EPA 508	8/28/09	8/31/09 20:03	W9H1090	
Toxaphene	ND	0.031	1.0	ug/l	1x1	EPA 508	8/28/09	8/31/09 20:03	W9H1090	
Trifluralin	ND	0.0070	0.010	ug/l	1x1	EPA 508	8/28/09	8/31/09 20:03	W9H1090	

Weck Laboratories, Inc.
Analytical Laboratory Service - Since 1964

Certificate of Analysis

Lab Sample ID: 9H26017-01 **Sample ID:** **GWS-1** **Matrix:** Water
Sampled by: Client **Sampled: 08/25/09 08:15**

Analyte	Result	DL	RL	Units	Dil	Method	Prepared	Analyzed	Batch	Qualifier
Surrogate: Decachlorobiphenyl	*66 %*		*70-130*							S-GC
Surrogate: Tetrachloro-meta-xylene	*86 %*		*70-130*							
2,4,5-T	ND	0.050	0.20	ug/l	1x1	EPA 515.3	8/26/09	8/27/09 10:52	W9H0981	
2,4,5-TP (Silvex)	ND	0.020	0.20	ug/l	1x1	EPA 515.3	8/26/09	8/27/09 10:52	W9H0981	
2,4-D	ND	0.050	0.40	ug/l	1x1	EPA 515.3	8/26/09	8/27/09 10:52	W9H0981	
2,4-DB	ND	0.42	2.0	ug/l	1x1	EPA 515.3	8/26/09	8/27/09 10:52	W9H0981	
3,5-Dichlorobenzoic acid	ND	0.080	1.0	ug/l	1x1	EPA 515.3	8/26/09	8/27/09 10:52	W9H0981	
Acifluorfen	ND	0.050	0.40	ug/l	1x1	EPA 515.3	8/26/09	8/27/09 10:52	W9H0981	
Bentazon	ND	0.23	2.0	ug/l	1x1	EPA 515.3	8/26/09	8/27/09 10:52	W9H0981	
Chloramben	ND		1.0	ug/l	1x1	EPA 515.3	8/26/09	8/27/09 10:52	W9H0981	
Dalapon	ND	0.040	0.40	ug/l	1x1	EPA 515.3	8/26/09	8/27/09 10:52	W9H0981	
DCPA	ND	0.020	0.10	ug/l	1x1	EPA 515.3	8/26/09	8/27/09 10:52	W9H0981	
Dicamba	ND	0.080	0.60	ug/l	1x1	EPA 515.3	8/26/09	8/27/09 10:52	W9H0981	
Dichloroprop	ND	0.060	0.30	ug/l	1x1	EPA 515.3	8/26/09	8/27/09 10:52	W9H0981	
Dinoseb	ND	0.050	0.40	ug/l	1x1	EPA 515.3	8/26/09	8/27/09 10:52	W9H0981	
Pentachlorophenol	ND	0.020	0.20	ug/l	1x1	EPA 515.3	8/26/09	8/27/09 10:52	W9H0981	
Picloram	ND	0.34	0.60	ug/l	1x1	EPA 515.3	8/26/09	8/27/09 10:52	W9H0981	
Surrogate: 2,4-DCAA	*107 %*		*70-130*							
Alachlor	ND	0.070	0.10	ug/l	1x1	EPA 525.2	8/27/09	9/11/09 14:40	W9H1041	
Atrazine	ND	0.047	0.10	ug/l	1x1	EPA 525.2	8/27/09	9/11/09 14:40	W9H1041	
Benzo (a) pyrene	ND	0.073	0.10	ug/l	1x1	EPA 525.2	8/27/09	9/11/09 14:40	W9H1041	
Bis(2-ethylhexyl)adipate	ND	0.23	5.0	ug/l	1x1	EPA 525.2	8/27/09	9/11/09 14:40	W9H1041	
Bis(2-ethylhexyl)phthalate	ND	1.1	3.0	ug/l	1x1	EPA 525.2	8/27/09	9/11/09 14:40	W9H1041	
Bromacil	ND	0.90	1.0	ug/l	1x1	EPA 525.2	8/27/09	9/11/09 14:40	W9H1041	
Butachlor	ND	0.10	0.20	ug/l	1x1	EPA 525.2	8/27/09	9/11/09 14:40	W9H1041	
Captan	ND	0.86	1.0	ug/l	1x1	EPA 525.2	8/27/09	9/11/09 14:40	W9H1041	
Chloropropham	ND	0.010	0.10	ug/l	1x1	EPA 525.2	8/27/09	9/11/09 14:40	W9H1041	
Cyanazine	ND	0.020	0.10	ug/l	1x1	EPA 525.2	8/27/09	9/11/09 14:40	W9H1041	
Diazinon	ND	0.051	0.10	ug/l	1x1	EPA 525.2	8/27/09	9/11/09 14:40	W9H1041	
Dimethoate	ND	0.10	0.20	ug/l	1x1	EPA 525.2	8/27/09	9/11/09 14:40	W9H1041	
Diphenamid	ND	0.020	0.10	ug/l	1x1	EPA 525.2	8/27/09	9/11/09 14:40	W9H1041	
Disulfoton	ND	0.030	0.10	ug/l	1x1	EPA 525.2	8/27/09	9/11/09 14:40	W9H1041	
EPTC	ND	0.23	1.0	ug/l	1x1	EPA 525.2	8/27/09	9/11/09 14:40	W9H1041	
Metolachlor	ND	0.056	0.10	ug/l	1x1	EPA 525.2	8/27/09	9/11/09 14:40	W9H1041	
Metribuzin	ND	0.074	0.10	ug/l	1x1	EPA 525.2	8/27/09	9/11/09 14:40	W9H1041	
Molinate	ND	0.051	0.10	ug/l	1x1	EPA 525.2	8/27/09	9/11/09 14:40	W9H1041	
Prometon	ND	0.16	0.20	ug/l	1x1	EPA 525.2	8/27/09	9/11/09 14:40	W9H1041	
Prometryn	ND	0.074	0.10	ug/l	1x1	EPA 525.2	8/27/09	9/11/09 14:40	W9H1041	
Simazine	ND	0.083	0.10	ug/l	1x1	EPA 525.2	8/27/09	9/11/09 14:40	W9H1041	
Terbacil	ND	0.55	2.0	ug/l	1x1	EPA 525.2	8/27/09	9/11/09 14:40	W9H1041	
Thiobencarb	ND	0.11	0.20	ug/l	1x1	EPA 525.2	8/27/09	9/11/09 14:40	W9H1041	
Trithion	ND	0.010	0.10	ug/l	1x1	EPA 525.2	8/27/09	9/11/09 14:40	W9H1041	
Surrogate: 1,3-Dimethyl-2-NB	*112 %*		*73-136*							
Surrogate: Perylene-d12	*65 %*		*48-141*							

Certificate of Analysis

Lab Sample ID: 9H26017-01 **Sample ID: GWS-1** **Matrix:** Water
Sampled by: Client **Sampled: 08/25/09 08:15**

Analyte	Result	DL	RL	Units	Dil	Method	Prepared	Analyzed	Batch	Qualifier
Surrogate: Triphenyl phosphate	*89 %*		*71-150*							
3-Hydroxycarbofuran	ND	0.43	2.0	ug/l	1x1	EPA 531.1	9/16/09	9/16/09 16:54	W9I0686	
Aldicarb	ND	0.70	2.0	ug/l	1x1	EPA 531.1	9/16/09	9/16/09 16:54	W9I0686	
Aldicarb sulfone	ND	0.36	2.0	ug/l	1x1	EPA 531.1	9/16/09	9/16/09 16:54	W9I0686	
Aldicarb sulfoxide	ND	0.33	2.0	ug/l	1x1	EPA 531.1	9/16/09	9/16/09 16:54	W9I0686	
Carbaryl	ND	0.97	2.0	ug/l	1x1	EPA 531.1	9/16/09	9/16/09 16:54	W9I0686	
Carbofuran	ND	0.63	5.0	ug/l	1x1	EPA 531.1	9/16/09	9/16/09 16:54	W9I0686	
Methiocarb	ND	1.4	3.0	ug/l	1x1	EPA 531.1	9/16/09	9/16/09 16:54	W9I0686	
Methomyl	ND	0.34	2.0	ug/l	1x1	EPA 531.1	9/16/09	9/16/09 16:54	W9I0686	
Oxamyl	ND	0.57	2.0	ug/l	1x1	EPA 531.1	9/16/09	9/16/09 16:54	W9I0686	
Propoxur (Baygon)	ND	0.43	5.0	ug/l	1x1	EPA 531.1	9/16/09	9/16/09 16:54	W9I0686	
Glyphosate	ND	1.8	25	ug/l	1x1	EPA 547	9/14/09	9/14/09 22:16	W9I0634	O-04
Endothall	ND	3.5	45	ug/l	1x1	EPA 548.1	8/28/09	9/5/09 8:33	W9H1122	
Diquat	ND	0.90	4.0	ug/l	1x1	EPA 549.2	8/26/09	9/2/09 15:52	W9H1034	

Weck Laboratories, Inc.
Analytical Laboratory Service - Since 1964

Certificate of Analysis

Quality Control Section

Carbamates and Urea Pesticides - Quality Control

Batch W9I0686 - EPA 531.1

Blank (W9I0686-BLK1) — **Prepared: 09/16/09 Analyzed: 09/16/09 16:54**

Analyte	Sample Result	QC Result	Qualifier	Units	Spike Level	%REC	%REC Limits	RPD	RPD Limit
Aldicarb sulfoxide		ND		ug/l					
Aldicarb sulfone		ND		ug/l					
Oxamyl		ND		ug/l					
Methomyl		ND		ug/l					
3-Hydroxycarbofuran		ND		ug/l					
Aldicarb		ND		ug/l					
Propoxur (Baygon)		ND		ug/l					
Carbofuran		ND		ug/l					
Carbaryl		ND		ug/l					
Methiocarb		ND		ug/l					

LCS (W9I0686-BS1) — **Prepared: 09/16/09 Analyzed: 09/16/09 16:54**

Analyte	Sample Result	QC Result	Qualifier	Units	Spike Level	%REC	%REC Limits	RPD	RPD Limit
Aldicarb sulfoxide		10.9		ug/l	10.0	109	80-120		
Aldicarb sulfone		11.1		ug/l	10.0	111	80-120		
Oxamyl		10.5		ug/l	10.0	105	80-120		
Methomyl		11.3		ug/l	10.0	113	80-120		
3-Hydroxycarbofuran		9.67		ug/l	10.0	97	80-120		
Aldicarb		11.7		ug/l	10.0	117	80-120		
Propoxur (Baygon)		11.1		ug/l	10.0	111	80-120		
Carbofuran		9.32		ug/l	10.0	93	80-120		
Carbaryl		11.2		ug/l	10.0	112	80-120		
Methiocarb		9.18		ug/l	10.0	92	80-120		

Matrix Spike (W9I0686-MS1) — **Source: 9I09008-01** — **Prepared: 09/16/09 Analyzed: 09/16/09 16:54**

Analyte	Sample Result	QC Result	Qualifier	Units	Spike Level	%REC	%REC Limits	RPD	RPD Limit
Aldicarb sulfoxide	ND	12.2		ug/l	10.0	122	65-135		
Aldicarb sulfone	ND	13.0		ug/l	10.0	130	65-135		
Oxamyl	ND	12.1		ug/l	10.0	121	65-135		
Methomyl	ND	13.5		ug/l	10.0	135	65-135		
3-Hydroxycarbofuran	ND	11.2		ug/l	10.0	112	65-135		
Aldicarb	ND	13.1		ug/l	10.0	131	65-135		
Propoxur (Baygon)	ND	13.0		ug/l	10.0	130	65-135		
Carbofuran	ND	10.9		ug/l	10.0	109	65-135		
Carbaryl	ND	13.1		ug/l	10.0	131	65-135		
Methiocarb	ND	10.6		ug/l	10.0	106	65-135		

Matrix Spike Dup (W9I0686-MSD1) — **Source: 9I09008-01** — **Prepared: 09/16/09 Analyzed: 09/16/09 16:54**

Analyte	Sample Result	QC Result	Qualifier	Units	Spike Level	%REC	%REC Limits	RPD	RPD Limit
Aldicarb sulfoxide	ND	12.3		ug/l	10.0	123	65-135	0.8	30

Certificate of Analysis

Carbamates and Urea Pesticides - Quality Control

Batch W9I0686 - EPA 531.1

Matrix Spike Dup (W9I0686-MSD1) **Source: 9I09008-01** **Prepared: 09/16/09 Analyzed: 09/16/09 16:54**

Analyte	Sample Result	QC Result	Qualifier	Units	Spike Level	%REC	%REC Limits	RPD	RPD Limit
Aldicarb sulfone	ND	12.8		ug/l	10.0	128	65-135	2	30
Oxamyl	ND	12.3		ug/l	10.0	123	65-135	2	30
Methomyl	ND	13.9	Q-08	ug/l	10.0	139	65-135	3	30
3-Hydroxycarbofuran	ND	11.5		ug/l	10.0	115	65-135	3	30
Aldicarb	ND	12.9		ug/l	10.0	129	65-135	2	30
Propoxur (Baygon)	ND	13.2		ug/l	10.0	132	65-135	2	30
Carbofuran	ND	11.5		ug/l	10.0	115	65-135	5	30
Carbaryl	ND	12.5		ug/l	10.0	125	65-135	5	30
Methiocarb	ND	10.6		ug/l	10.0	106	65-135	0	30

Chlorinated Herbicides - Quality Control

Batch W9H0981 - EPA 515.3

Blank (W9H0981-BLK1) **Prepared: 08/26/09 Analyzed: 08/27/09 10:52**

Analyte	Sample Result	QC Result	Qualifier	Units	Spike Level	%REC	%REC Limits	RPD	RPD Limit
Surrogate: 2,4-DCAA		*11.7*		ug/l	*10.0*	*117*	*70-130*		
Dalapon		ND		ug/l					
3,5-Dichlorobenzoic acid		ND		ug/l					
Dicamba		ND		ug/l					
Dichloroprop		ND		ug/l					
2,4-D		ND		ug/l					
Pentachlorophenol		ND		ug/l					
2,4,5-TP (Silvex)		ND		ug/l					
2,4,5-T		ND		ug/l					
2,4-DB		ND		ug/l					
Dinoseb		ND		ug/l					
Bentazon		ND		ug/l					
DCPA		ND		ug/l					
Picloram		ND		ug/l					
Acifluorfen		ND		ug/l					
Chloramben		ND		ug/l					

LCS (W9H0981-BS1) **Prepared: 08/26/09 Analyzed: 08/27/09 10:52**

Analyte	Sample Result	QC Result	Qualifier	Units	Spike Level	%REC	%REC Limits	RPD	RPD Limit
Surrogate: 2,4-DCAA		*10.8*		ug/l	*10.0*	*108*	*70-130*		
Dalapon		1.83		ug/l	2.00	92	70-130		
3,5-Dichlorobenzoic acid		2.20		ug/l	2.00	110	70-130		
Dicamba		2.06		ug/l	2.00	103	70-130		
Dichloroprop		2.19		ug/l	2.00	110	70-130		
2,4-D		1.97		ug/l	2.00	99	70-130		
Pentachlorophenol		1.98		ug/l	2.00	99	70-130		
2,4,5-TP (Silvex)		1.98		ug/l	2.00	99	70-130		

Weck Laboratories, Inc.
Analytical Laboratory Service - Since 1964

Certificate of Analysis

Chlorinated Herbicides - Quality Control

Batch W9H0981 - EPA 515.3

LCS (W9H0981-BS1) **Prepared: 08/26/09 Analyzed: 08/27/09 10:52**

Analyte	Sample Result	QC Result	Qualifier	Units	Spike Level	%REC	%REC Limits	RPD	RPD Limit
2,4,5-T		2.03		ug/l	2.00	101	70-130		
2,4-DB		2.29		ug/l	2.00	114	70-130		
Dinoseb		1.88		ug/l	2.00	94	70-130		
Bentazon		1.57		ug/l	2.00	78	70-130		
DCPA		2.23		ug/l	2.00	112	70-130		
Picloram		1.88		ug/l	2.00	94	70-130		
Acifluorfen		1.85		ug/l	2.00	93	70-130		

Matrix Spike (W9H0981-MS1) **Source: 9H19067-02** **Prepared: 08/26/09 Analyzed: 08/27/09 10:52**

Analyte	Sample Result	QC Result	Qualifier	Units	Spike Level	%REC	%REC Limits	RPD	RPD Limit
Surrogate: 2,4-DCAA		*11.1*		ug/l	*10.0*	*111*	*70-130*		
Dalapon	ND	1.85		ug/l	2.00	92	70-130		
3,5-Dichlorobenzoic acid	ND	2.02		ug/l	2.00	101	70-130		
Dicamba	ND	2.10		ug/l	2.00	105	70-130		
Dichloroprop	ND	2.50		ug/l	2.00	125	70-130		
2,4-D	ND	2.35		ug/l	2.00	118	70-130		
Pentachlorophenol	ND	2.05		ug/l	2.00	102	70-130		
2,4,5-TP (Silvex)	ND	2.03		ug/l	2.00	101	70-130		
2,4,5-T	ND	2.20		ug/l	2.00	110	70-130		
2,4-DB	ND	2.08		ug/l	2.00	104	70-130		
Dinoseb	ND	2.07		ug/l	2.00	104	70-130		
Bentazon	ND	1.71		ug/l	2.00	85	70-130		
DCPA	ND	2.21		ug/l	2.00	110	70-130		
Picloram	ND	2.07		ug/l	2.00	104	70-130		
Acifluorfen	ND	2.13		ug/l	2.00	107	70-130		

Matrix Spike Dup (W9H0981-MSD1) **Source: 9H19067-02** **Prepared: 08/26/09 Analyzed: 08/27/09 10:52**

Analyte	Sample Result	QC Result	Qualifier	Units	Spike Level	%REC	%REC Limits	RPD	RPD Limit
Surrogate: 2,4-DCAA		*11.2*		ug/l	*10.0*	*112*	*70-130*		
Dalapon	ND	1.94		ug/l	2.00	97	70-130	5	30
3,5-Dichlorobenzoic acid	ND	2.63	MS-05	ug/l	2.00	132	70-130	26	30
Dicamba	ND	2.10		ug/l	2.00	105	70-130	0.1	30
Dichloroprop	ND	2.17		ug/l	2.00	108	70-130	14	30
2,4-D	ND	2.51		ug/l	2.00	126	70-130	7	30
Pentachlorophenol	ND	2.11		ug/l	2.00	105	70-130	3	30
2,4,5-TP (Silvex)	ND	2.07		ug/l	2.00	103	70-130	2	30
2,4,5-T	ND	2.32		ug/l	2.00	116	70-130	5	30
2,4-DB	ND	2.25		ug/l	2.00	112	70-130	8	30
Dinoseb	ND	2.16		ug/l	2.00	108	70-130	4	30
Bentazon	ND	1.76		ug/l	2.00	88	70-130	3	30
DCPA	ND	2.27		ug/l	2.00	114	70-130	3	30
Picloram	ND	2.10		ug/l	2.00	105	70-130	1	30
Acifluorfen	ND	2.21		ug/l	2.00	110	70-130	3	30

Certificate of Analysis

Chlorinated Pesticides and/or PCBs - Quality Control

Batch W9H1090 - EPA 508

Blank (W9H1090-BLK1) **Prepared: 08/28/09 Analyzed: 08/31/09 18:12**

Analyte	Sample Result	QC Result	Qualifier	Units	Spike Level	%REC	%REC Limits	RPD	RPD Limit
Surrogate: Tetrachloro-meta-xylene		*0.104*		ug/l	*0.100*	*104*	*70-130*		
Surrogate: Decachlorobiphenyl		*0.0676*	S-GC	ug/l	*0.100*	*68*	*70-130*		
Aldrin		ND		ug/l					
alpha-BHC		ND		ug/l					
beta-BHC		ND		ug/l					
delta-BHC		ND		ug/l					
gamma-BHC (Lindane)		ND		ug/l					
4,4´-DDD		ND		ug/l					
4,4´-DDE		ND		ug/l					
4,4´-DDT		ND		ug/l					
Dieldrin		ND		ug/l					
Endosulfan I		ND		ug/l					
Endosulfan II		ND		ug/l					
Endosulfan sulfate		ND		ug/l					
Endrin		ND		ug/l					
Endrin aldehyde		ND		ug/l					
Heptachlor		ND		ug/l					
Heptachlor epoxide		ND		ug/l					
Methoxychlor		ND		ug/l					
Chlorothalonil		ND		ug/l					
Hexachlorobenzene		ND		ug/l					
Hexachlorocyclopentadiene		ND		ug/l					
Propachlor		ND		ug/l					
Trifluralin		ND		ug/l					
Chlordane (tech)		ND		ug/l					
Toxaphene		ND		ug/l					
PCB-1016		ND		ug/l					
PCB-1221		ND		ug/l					
PCB-1232		ND		ug/l					
PCB-1242		ND		ug/l					
PCB-1248		ND		ug/l					
PCB-1254		ND		ug/l					
PCB-1260		ND		ug/l					
PCBs, Total		ND		ug/l					

LCS (W9H1090-BS1) **Prepared: 08/28/09 Analyzed: 08/31/09 18:40**

Analyte	Sample Result	QC Result	Qualifier	Units	Spike Level	%REC	%REC Limits	RPD	RPD Limit
Surrogate: Tetrachloro-meta-xylene		*0.101*		ug/l	*0.100*	*101*	*70-130*		
Surrogate: Decachlorobiphenyl		*0.0731*		ug/l	*0.100*	*73*	*70-130*		
Aldrin		0.111		ug/l	0.100	111	58-120		
alpha-BHC		0.0960		ug/l	0.100	96	62-125		
beta-BHC		0.0934		ug/l	0.100	93	54-139		

Weck Laboratories, Inc.
Analytical Laboratory Service - Since 1964

Certificate of Analysis

Chlorinated Pesticides and/or PCBs - Quality Control

Batch W9H1090 - EPA 508

LCS (W9H1090-BS1) **Prepared: 08/28/09 Analyzed: 08/31/09 18:40**

Analyte	Sample Result	QC Result	Qualifier	Units	Spike Level	%REC	%REC Limits	RPD	RPD Limit
delta-BHC		0.102		ug/l	0.100	102	63-142		
gamma-BHC (Lindane)		0.0990		ug/l	0.100	99	61-128		
4,4´-DDD		0.102		ug/l	0.100	102	47-147		
4,4´-DDE		0.104		ug/l	0.100	104	54-130		
4,4´-DDT		0.107		ug/l	0.100	107	42-143		
Dieldrin		0.103		ug/l	0.100	103	52-130		
Endosulfan I		0.0715		ug/l	0.100	71	44-119		
Endosulfan II		0.0797		ug/l	0.100	80	39-120		
Endosulfan sulfate		0.130		ug/l	0.100	130	63-158		
Endrin		0.103		ug/l	0.100	103	57-148		
Endrin aldehyde		0.0658		ug/l	0.100	66	53-123		
Heptachlor		0.0991		ug/l	0.100	99	56-142		
Heptachlor epoxide		0.0918		ug/l	0.100	92	57-124		
Methoxychlor		0.145		ug/l	0.100	145	45-165		

Matrix Spike (W9H1090-MS1) **Source: 9H27052-01** **Prepared: 08/28/09 Analyzed: 08/31/09 19:07**

Analyte	Sample Result	QC Result	Qualifier	Units	Spike Level	%REC	%REC Limits	RPD	RPD Limit
Surrogate: Tetrachloro-meta-xylene		*0.110*		ug/l	*0.100*	*110*	*70-130*		
Surrogate: Decachlorobiphenyl		*0.0726*		ug/l	*0.100*	*73*	*70-130*		
Aldrin	ND	0.114		ug/l	0.100	114	51-121		
alpha-BHC	ND	0.116		ug/l	0.100	116	57-127		
beta-BHC	ND	0.104		ug/l	0.100	104	60-130		
delta-BHC	ND	0.113		ug/l	0.100	113	67-137		
gamma-BHC (Lindane)	ND	0.116		ug/l	0.100	116	54-124		
4,4´-DDD	ND	0.105		ug/l	0.100	105	72-142		
4,4´-DDE	ND	0.107		ug/l	0.100	107	64-134		
4,4´-DDT	ND	0.118		ug/l	0.100	118	77-147		
Dieldrin	ND	0.0977		ug/l	0.100	98	52-122		
Endosulfan I	ND	0.0786		ug/l	0.100	79	52-122		
Endosulfan II	ND	0.0833		ug/l	0.100	83	57-127		
Endosulfan sulfate	ND	0.146	MS-05	ug/l	0.100	146	67-137		
Endrin	ND	0.112		ug/l	0.100	112	53-123		
Endrin aldehyde	ND	0.0727		ug/l	0.100	73	53-123		
Heptachlor	ND	0.106		ug/l	0.100	106	63-133		
Heptachlor epoxide	ND	0.106		ug/l	0.100	106	52-122		
Methoxychlor	ND	0.145	MS-05	ug/l	0.100	145	70-140		

Matrix Spike Dup (W9H1090-MSD1) **Source: 9H27052-01** **Prepared: 08/28/09 Analyzed: 08/31/09 19:35**

Analyte	Sample Result	QC Result	Qualifier	Units	Spike Level	%REC	%REC Limits	RPD	RPD Limit
Surrogate: Tetrachloro-meta-xylene		*0.0973*		ug/l	*0.100*	*97*	*70-130*		
Surrogate: Decachlorobiphenyl		*0.0649*	*S-GC*	ug/l	*0.100*	*65*	*70-130*		
Aldrin	ND	0.110		ug/l	0.100	110	51-121	4	25
alpha-BHC	ND	0.102		ug/l	0.100	102	57-127	13	25

Certificate of Analysis

Chlorinated Pesticides and/or PCBs - Quality Control

Batch W9H1090 - EPA 508

Matrix Spike Dup (W9H1090-MSD1) Source: 9H27052-01 Prepared: 08/28/09 Analyzed: 08/31/09 19:35

Analyte	Sample Result	QC Result	Qualifier	Units	Spike Level	%REC	%REC Limits	RPD	RPD Limit
beta-BHC	ND	0.0942		ug/l	0.100	94	60-130	10	25
delta-BHC	ND	0.0969		ug/l	0.100	97	67-137	15	25
gamma-BHC (Lindane)	ND	0.103		ug/l	0.100	103	54-124	11	25
4,4´-DDD	ND	0.0947		ug/l	0.100	95	72-142	10	25
4,4´-DDE	ND	0.0965		ug/l	0.100	96	64-134	10	25
4,4´-DDT	ND	0.108		ug/l	0.100	108	77-147	9	25
Dieldrin	ND	0.118		ug/l	0.100	118	52-122	19	25
Endosulfan I	ND	0.0727		ug/l	0.100	73	52-122	8	25
Endosulfan II	ND	0.0785		ug/l	0.100	78	57-127	6	25
Endosulfan sulfate	ND	0.141	MS-05	ug/l	0.100	141	67-137	4	25
Endrin	ND	0.104		ug/l	0.100	104	53-123	8	25
Endrin aldehyde	ND	0.0675		ug/l	0.100	67	53-123	7	25
Heptachlor	ND	0.0964		ug/l	0.100	96	63-133	9	25
Heptachlor epoxide	ND	0.0987		ug/l	0.100	99	52-122	8	25
Methoxychlor	ND	0.133	MS-05	ug/l	0.100	133	70-140	8	25

Diquat and Paraquat by EPA 549.2 - Quality Control

Batch W9H1034 - EPA 549.2

Blank (W9H1034-BLK1) Prepared: 08/26/09 Analyzed: 09/02/09 15:52

Analyte	Sample Result	QC Result	Qualifier	Units	Spike Level	%REC	%REC Limits	RPD	RPD Limit
Diquat		ND		ug/l					

LCS (W9H1034-BS1) Prepared: 08/26/09 Analyzed: 08/31/09 14:15

Analyte	Sample Result	QC Result	Qualifier	Units	Spike Level	%REC	%REC Limits	RPD	RPD Limit
Diquat		15.3		ug/l	20.0	76	54-135		

Matrix Spike (W9H1034-MS1) Source: 9H21012-01 Prepared: 08/26/09 Analyzed: 08/31/09 14:15

Analyte	Sample Result	QC Result	Qualifier	Units	Spike Level	%REC	%REC Limits	RPD	RPD Limit
Diquat	ND	5.20	MS-01	ug/l	20.0	26	52-130		

Matrix Spike (W9H1034-MS2) Source: 9H21013-01 Prepared: 08/26/09 Analyzed: 08/31/09 14:15

Analyte	Sample Result	QC Result	Qualifier	Units	Spike Level	%REC	%REC Limits	RPD	RPD Limit
Diquat	ND	16.6		ug/l	20.0	83	52-130		

Matrix Spike Dup (W9H1034-MSD1) Source: 9H21012-01 Prepared: 08/26/09 Analyzed: 08/31/09 14:15

Analyte	Sample Result	QC Result	Qualifier	Units	Spike Level	%REC	%REC Limits	RPD	RPD Limit
Diquat	ND	3.60	MS-01	ug/l	20.0	18	52-130	36	30

Matrix Spike Dup (W9H1034-MSD2) Source: 9H21013-01 Prepared: 08/26/09 Analyzed: 08/31/09 14:15

Analyte	Sample Result	QC Result	Qualifier	Units	Spike Level	%REC	%REC Limits	RPD	RPD Limit
Diquat	ND	15.3		ug/l	20.0	76	52-130	8	30

Weck Laboratories, Inc.
Analytical Laboratory Service - Since 1964

Certificate of Analysis

Endothall By EPA 548.1 - Quality Control

Batch W9H1122 - EPA 548.1

Blank (W9H1122-BLK1) — **Prepared: 08/28/09 Analyzed: 09/05/09 07:17**

Analyte	Sample Result	QC Result	Qualifier	Units	Spike Level	%REC	%REC Limits	RPD	RPD Limit
Endothall		ND		ug/l					

LCS (W9H1122-BS1) — **Prepared: 08/28/09 Analyzed: 09/05/09 07:36**

Analyte	Sample Result	QC Result	Qualifier	Units	Spike Level	%REC	%REC Limits	RPD	RPD Limit
Endothall		53.7		ug/l	100	54	3.5-143		

Matrix Spike (W9H1122-MS1) — **Source: 9H26017-01** — **Prepared: 08/28/09 Analyzed: 09/05/09 07:55**

Analyte	Sample Result	QC Result	Qualifier	Units	Spike Level	%REC	%REC Limits	RPD	RPD Limit
Endothall	ND	55.1		ug/l	100	55	3.5-137		

Matrix Spike Dup (W9H1122-MSD1) — **Source: 9H26017-01** — **Prepared: 08/28/09 Analyzed: 09/05/09 08:13**

Analyte	Sample Result	QC Result	Qualifier	Units	Spike Level	%REC	%REC Limits	RPD	RPD Limit
Endothall	ND	47.7		ug/l	100	48	3.5-137	14	30

Glyphosate by EPA 547 - Quality Control

Batch W9I0634 - EPA 547

Blank (W9I0634-BLK1) — **Prepared: 09/14/09 Analyzed: 09/14/09 22:16**

Analyte	Sample Result	QC Result	Qualifier	Units	Spike Level	%REC	%REC Limits	RPD	RPD Limit
Glyphosate		ND		ug/l					

LCS (W9I0634-BS1) — **Prepared: 09/14/09 Analyzed: 09/14/09 22:16**

Analyte	Sample Result	QC Result	Qualifier	Units	Spike Level	%REC	%REC Limits	RPD	RPD Limit
Glyphosate		24.7		ug/l	25.0	99	71-137		

Matrix Spike (W9I0634-MS1) — **Source: 9H25044-01** — **Prepared: 09/14/09 Analyzed: 09/14/09 22:16**

Analyte	Sample Result	QC Result	Qualifier	Units	Spike Level	%REC	%REC Limits	RPD	RPD Limit
Glyphosate	ND	17.5		ug/l	25.0	70	68-134		

Matrix Spike (W9I0634-MS2) — **Source: 9H26017-01** — **Prepared: 09/14/09 Analyzed: 09/14/09 22:16**

Analyte	Sample Result	QC Result	Qualifier	Units	Spike Level	%REC	%REC Limits	RPD	RPD Limit
Glyphosate	ND	22.9		ug/l	25.0	92	68-134		

Matrix Spike Dup (W9I0634-MSD1) — **Source: 9H25044-01** — **Prepared: 09/14/09 Analyzed: 09/14/09 22:16**

Analyte	Sample Result	QC Result	Qualifier	Units	Spike Level	%REC	%REC Limits	RPD	RPD Limit
Glyphosate	ND	21.9		ug/l	25.0	88	68-134	22	30

Matrix Spike Dup (W9I0634-MSD2) — **Source: 9H26017-01** — **Prepared: 09/14/09 Analyzed: 09/14/09 22:16**

Analyte	Sample Result	QC Result	Qualifier	Units	Spike Level	%REC	%REC Limits	RPD	RPD Limit
Glyphosate	ND	22.9		ug/l	25.0	92	68-134	0.05	30

Semivolatile Organic Compounds by GC/MS - Quality Control

Batch W9H1041 - EPA 525.2

Weck Laboratories, Inc 14859 East Clark Avenue, City of Industry, California 91745-1396 (626) 336-2139 FAX (626) 336-2634
www.wecklabs.com

Weck Laboratories, Inc.
Analytical Laboratory Service - Since 1964

Certificate of Analysis

Semivolatile Organic Compounds by GC/MS - Quality Control

Batch W9H1041 - EPA 525.2

Blank (W9H1041-BLK1) **Prepared: 08/27/09 Analyzed: 09/11/09 12:28**

Analyte	Sample Result	QC Result	Qualifier	Units	Spike Level	%REC	%REC Limits	RPD	RPD Limit
Surrogate: 1,3-Dimethyl-2-NB		*4.59*		ug/l	*5.00*	*92*	*73-136*		
Surrogate: Perylene-d12		*3.88*		ug/l	*5.00*	*78*	*48-141*		
Surrogate: Triphenyl phosphate		*4.57*		ug/l	*5.00*	*91*	*71-150*		
Benzo (a) pyrene		ND		ug/l					
Bis(2-ethylhexyl)adipate		ND		ug/l					
Bis(2-ethylhexyl)phthalate		ND		ug/l					
Alachlor		ND		ug/l					
Atrazine		ND		ug/l					
Bromacil		ND		ug/l					
Butachlor		ND		ug/l					
Captan		ND		ug/l					
Chloropropham		ND		ug/l					
Cyanazine		ND		ug/l					
Diazinon		ND		ug/l					
Dimethoate		ND		ug/l					
Diphenamid		ND		ug/l					
Disulfoton		ND		ug/l					
EPTC		ND		ug/l					
Metolachlor		ND		ug/l					
Metribuzin		ND		ug/l					
Molinate		ND		ug/l					
Prometon		ND		ug/l					
Prometryn		ND		ug/l					
Simazine		ND		ug/l					
Terbacil		ND		ug/l					
Thiobencarb		ND		ug/l					
Trithion		ND		ug/l					

LCS (W9H1041-BS1) **Prepared: 08/27/09 Analyzed: 09/11/09 12:55**

Analyte	Sample Result	QC Result	Qualifier	Units	Spike Level	%REC	%REC Limits	RPD	RPD Limit
Surrogate: 1,3-Dimethyl-2-NB		*4.97*		ug/l	*5.00*	*99*	*73-136*		
Surrogate: Perylene-d12		*4.46*		ug/l	*5.00*	*89*	*48-141*		
Surrogate: Triphenyl phosphate		*4.32*		ug/l	*5.00*	*86*	*71-150*		
Benzo (a) pyrene		3.99		ug/l	5.00	80	54-136		
Bis(2-ethylhexyl)adipate		3.46		ug/l	5.00	69	50-145		
Bis(2-ethylhexyl)phthalate		3.47		ug/l	5.00	69	54-142		
Alachlor		4.07		ug/l	5.00	81	58-164		
Atrazine		4.60		ug/l	5.00	92	68-133		
Bromacil		4.26		ug/l	5.00	85	43-177		
Butachlor		3.89		ug/l	5.00	78	55-178		
Captan		4.14		ug/l	5.00	83	20-215		
Chloropropham		4.46		ug/l	5.00	89	74-133		

Weck Laboratories, Inc 14859 East Clark Avenue, City of Industry, California 91745-1396 (626) 336-2139 FAX (626) 336-2634
www.wecklabs.com

Certificate of Analysis

Semivolatile Organic Compounds by GC/MS - Quality Control

Batch W9H1041 - EPA 525.2

LCS (W9H1041-BS1) **Prepared: 08/27/09 Analyzed: 09/11/09 12:55**

Analyte	Sample Result	QC Result	Qualifier	Units	Spike Level	%REC	%REC Limits	RPD	RPD Limit
Cyanazine		4.21		ug/l	5.00	84	69-131		
Diazinon		5.68		ug/l	5.00	114	42-212		
Dimethoate		4.12		ug/l	5.00	82	24-110		
Diphenamid		4.47		ug/l	5.00	89	82-144		
Disulfoton		4.14		ug/l	5.00	83	71-122		
EPTC		4.80		ug/l	5.00	96	75-110		
Metolachlor		4.16		ug/l	5.00	83	55-170		
Metribuzin		4.18		ug/l	5.00	84	44-149		
Molinate		4.79		ug/l	5.00	96	76-116		
Prometon		2.42		ug/l	5.00	48	6-110		
Prometryn		3.88		ug/l	5.00	78	34-152		
Simazine		3.71		ug/l	5.00	74	54-156		
Terbacil		4.81		ug/l	5.00	96	66-140		
Thiobencarb		4.01		ug/l	5.00	80	57-162		
Trithion		3.86		ug/l	5.00	77	62-149		

Weck Laboratories, Inc.
Analytical Laboratory Service - Since 1964

Certificate of Analysis

Notes:
The Chain of Custody document is part of the analytical report.
Any remaining sample(s) for testing will be disposed of one month from the final report date unless other arrangements are made in advance.
All results are expressed on wet weight basis unless otherwise specified.

An Absence of Total Coliform meets the drinking water standards as established by the State of California Department of Health Services.
The Reporting Limit (RL) is referenced as laboratory's Practical Quantitation Limit (PQL).
For Potable water analysis, the Reporting Limit (RL) is referenced as Detection Limit for reporting purposes (DLRs) defined by EPA.

If sample collected by Weck Laboratories, sampled in accordance to lab SOP MIS002

Authorized Signature
Contact: Kim G Tu (Project Manager)

ELAP # 1132
LACSD # 10143
NELAC # 04229CA

The results in this report apply to the samples analyzed in accordance with the chain of custody document. Weck Laboratories certifies that the test results meet all requirements of NELAC unless noted in the Case Narrative. This analytical report must be reproduced in its entirety.

Flags for Data Qualifiers:

MS-01	The spike recovery for this QC sample is outside of established control limits possibly due to sample matrix interference.
MS-05	The spike recovery and/or RPD were outside acceptance limits for the MS and/or MSD due to possible matrix interference. The LCS and/or LCSD were within acceptance limits showing that the laboratory is in control and the data is acceptable.
O-04	This analysis was performed outside the EPA recommended holding time.
Q-08	High bias in the QC sample does not affect sample result since analyte was not detected.
S-GC	Surrogate recovery outside of control limits due to a possible matrix effect. The data was accepted based on valid recovery of the remaining surrogate.
ND	NOT DETECTED at or above the Reporting Limit. If J-value reported, then NOT DETECTED at or above the Method Detection Limit (MDL).
Sub	Subcontracted analysis, original report enclosed.
Dil	The total dilution factor is expressed as a multiplication between the preparation dilution factor (a) and the analysis dilution factor (b) as “a x b”. (a) and (b) are indicated as whole numbers with rounding up for ≥ 0.5 and off for < 0.5
DL	Method Detection Limit
RL	Method Reporting Limit
MDA	Minimum Detectable Activity

Calscience Environmental Laboratories, Inc.
7440 LINCOLN WAY
GARDEN GROVE, CA 92841-1432
TEL: (714) 895-5494 . FAX: (714) 894-7501

TO: WECK

9426017

CHAIN OF CUSTODY RECORD

DATE: 08/25/09

PAGE: 1 OF 1

LABORATORY CLIENT: Calscience Environmental Laboratories, Inc.		CLIENT PROJECT NAME / NUMBER: 09-08-2053	P.O. NO.:
ADDRESS: 7440 Lincoln Way		PROJECT CONTACT: Vik Patel	QUOTE NO.:
CITY: Garden Grove, CA 92841-1427		SAMPLER(S): (SIGNATURE)	LAB USE ONLY
TEL: 714/895-5494	FAX: 714/894-7501	E-MAIL: vipatel@calscience.com	

TURNAROUND TIME

☐ SAME DAY ☐ 24 HR ☐ 48HR ☐ 72 HR ☐ 5 DAYS ☒ Standard

SPECIAL REQUIREMENTS (ADDITIONAL COSTS MAY APPLY)

☐ RWQCB REPORTING ☐ ARCHIVE SAMPLES UNTIL ___/___/___

SPECIAL INSTRUCTIONS

Standard TAT
Drinking Water Limits

REQUESTED ANALYSIS

LAB USE ONLY	SAMPLE ID	LOCATION/ DESCRIPTION	SAMPLING DATE	SAMPLING TIME	Matrix	#Cont	EPA 508 - Organochlorine Pesticides & PCBs	EPA 515.3 - Chlorinated Acid Herbicides	EPA 525.2 - Regulated 3 & 507 compounds	EPA 531.1 - Carbamates	EPA 547 - Glyphosate	EPA 548.1 - Endothall	EPA 549.2 - Diquat
	GWS-1		08/25/09	0815	W	9	X	X	X	X	X	X	X

Relinquished by: (Signature) [signature] CEL	Received by: (Signature) [signature] 3.2°C	Date: 8/26/09	Time: 10:56
Relinquished by: (Signature)	Received by: (Signature)	Date:	Time:
Relinquished by: (Signature)	Received by: (Signature)	Date:	Time:

FGL ENVIRONMENTAL

September 10, 2009

Calscience Environmental Laboratories
7440 Lincoln Way
Garden Grove, CA 92841-1432

Lab ID : SP 0908559
Customer : 2-17756

Laboratory Report

Introduction: This report package contains total of 5 pages divided into 3 sections:

Case Narrative	(2 pages)	: An overview of the work performed at FGL.
Sample Results	(1 page)	: Results for each sample submitted.
Quality Control	(2 pages)	: Supporting Quality Control (QC) results.

Case Narrative

This Case Narrative pertains to the following samples:

Sample Description	Date Sampled	Date Received	FGL Lab ID #	Matrix
GWS-1	08/25/2009	08/26/2009	SP 0908559-001	GW

Sampling and Receipt Information: The sample was received, prepared and analyzed within the method specified holding times. All samples arrived at 1 °C. All samples were checked for pH if acid or base preservation is required (except for VOAs). For details of sample receipt information, please see the attached Chain of Custody and Condition Upon Receipt Form.

Quality Control: All samples were prepared and analyzed according to the following tables:

Radio QC

900.0	09/08/2009:211667 All analysis quality controls are within established criteria.
	08/28/2009:209083 All preparation quality controls are within established criteria.
903.0	09/03/2009:211615 All analysis quality controls are within established criteria.
	09/01/2009:209223 All preparation quality controls are within established criteria, except: The following note applies to Total Alpha Radium (226): 435 Sample matrix may be affecting this analyte. Data was accepted based on the LCS or CCV recovery.
905.0	09/01/2009:211337 All analysis quality controls are within established criteria.
	08/27/2009:208938 All preparation quality controls are within established criteria, except: The following note applies to Total Strontium: 435 Sample matrix may be affecting this analyte. Data was accepted based on the LCS or CCV recovery.

September 10, 2009
Calscience Environmental Laboratories

Lab ID : SP 0908559
Customer : 2-17756

Radio QC

906.0	09/03/2009:211523 All analysis quality controls are within established criteria.
	08/31/2009:209153 All preparation quality controls are within established criteria.
908.0	09/01/2009:211346 All analysis quality controls are within established criteria.
	08/27/2009:209053 All preparation quality controls are within established criteria.
Ra - 05	09/03/2009:211526 All analysis quality controls are within established criteria.
	08/29/2009:209090 All preparation quality controls are within established criteria.

Certification:: I certify that this data package is in compliance with NELAC standards, both technically and for completeness, except for any conditions listed above. Release of the data contained in this data package is authorized by the Laboratory Director or his designee, as verified by the following electronic signature.

KD:DMB

Approved By **David Terz, B.A., M.B.A.** Digitally signed by David Terz, B.A., M.B.A. Title: QA Director Date: 2009-09-10

ENVIRONMENTAL

Analytical Chemists

September 10, 2009

Calscience Environmental Laboratories
7440 Lincoln Way
Garden Grove, CA 92841-1432

Lab ID : SP 0908559-001
Customer ID : 2-17756

Sampled On : August 25, 2009-08:15
Sampled By : Not Available
Received On : August 26, 2009-13:00
Matrix : Ground Water

Description : GWS-1
Project : 09-08-2053

Sample Result - Radio

Constituent	Result ± Error	MDA	Units	MCL/AL	Sample Preparation		Sample Analysis	
					Method	Date/ID	Method	Date/ID
Radio Chemistry P:1'5								
Gross Alpha	1.62 ± 1.43	1.63	pCi/L	15/5	900.0	08/28/09:209083	900.0	09/08/09:211667
Gross Beta	1.57 ± 1.37	1.69	pCi/L	50	900.0	08/28/09:209083	900.0	09/08/09:211667
Strontium 90	0.000 ± 0.282	0.766	pCi/L	8	905.0	08/27/09:208938	905.0	09/01/09:211337
Total Alpha Radium (226)	0.060 ± 0.117	0.353	pCi/L	3	903.0	09/01/09:209223	903.0	09/03/09:211615
Tritium	0.000 ± 223	381	pCi/L	20000	906.0	08/31/09:209153	906.0	09/03/09:211523
Uranium	2.16 ± 0.978	0.267	pCi/L	20	908.0	08/27/09:209053	908.0	09/01/09:211346
Ra 228	0.000 ± 0.728	0.268	pCi/L	2	Ra - 05	08/29/09:209090	Ra - 05	09/03/09:211526

ND=Non-Detected. PQL=Practical Quantitation Limit. Containers: (P) Plastic, (VOA) VOA Preservatives: HNO3 pH < 2

MDA = Minimum Detectable Activity (Calculated at the 95% confidence level) = Data utilized by DHS to determine matrix interference.
MCL / AL = Maximum Contamination Level / Action Level. Alpha's Action Level of 5 pCi/L is based on the Assigned Value (AV).
AV = (Gross Alpha Result + (0.84 x Error)). CCR Section 64442: Drinking Water Compliance Note: Do the following
If Gross Alpha's (AV) exceeds 5 pCi/L run Uranium. If Gross Alpha's (AV) minus Uranium exceeds 5 pCi/L run Radium 226.

Drinking Water Compliance:
Gross Alpha (AV) minus Uranium is less than or equal to 15 pCi/L
Uranium is less than or equal to 20 pCi/L
Radium 226 + Radium 228 is less than or equal to 5 pCi/L

Note: Samples are held for 3-6 months prior to disposal.

Corporate Offices & Laboratory
853 Corporation Street
Santa Paula, CA 93060
TEL: 805/392-2000
FAX: 805/525-4172
CA NELAP Certification No. 01110CA

Office & Laboratory
2500 Stagecoach Road
Stockton, CA 95215
TEL: 209/942-0182
FAX: 209/942-0423
CA ELAP Certification No. 1563

Office & Laboratory
563 E. Lindo Avenue
Chico, CA 95926
TEL: 530/343-5818
FAX: 530/343-3807
CA ELAP Certification No. 2670

Field Office
Visalia, California
TEL: 559/734-9473
Mobile: 559/737-2399
FAX: 559/734-8435

FGL ENVIRONMENTAL

Analytical Chemists

September 10, 2009
Calscience Environmental Laboratories

Lab ID : SP 0908559
Customer : 2-17756

Quality Control - Radio

Constituent	Method	Date/ID	Type	Units	Conc.	QC Data	DQO	Note
Radio								
Alpha	900.0	09/08/2009:211667	CCV	cpm	10670	43.3 %	39 - 48	
			CCB	cpm		0.1200	0.17	
Beta	900.0	09/08/2009:211667	CCV	cpm	10670	93.7 %	85 - 104	
			CCB	cpm		0.3800	0.61	
Gross Alpha	900.0	08/28/2009:209083	Blank	pCi/L		0.80	3	
			LCS	pCi/L	150.4	85.9 %	75-125	
			MS	pCi/L	150.4	96.2 %	60-140	
		(SP 0908559-001)	MSD	pCi/L	150.4	114 %	60-140	
			MSRPD	pCi/L	150.4	16.6%	≤30	
Gross Beta	900.0	08/28/2009:209083	Blank	pCi/L		0.50	4	
			LCS	pCi/L	48.49	87.4 %	75-125	
			MS	pCi/L	48.49	90.9 %	80-130	
		(SP 0908559-001)	MSD	pCi/L	48.49	98.8 %	80-130	
			MSRPD	pCi/L	150.4	8.0%	≤30	
Alpha	903.0	09/03/2009:211615	CCV	cpm	10680	40.1 %	39 - 42	
			CCB	cpm		0.100	0.14	
Total Alpha Radium (226)	903.0	09/01/2009:209223	RgBlk	pCi/L		-0.02	2	
			LCS	pCi/L	18.12	51.6 %	52-89	
			BS	pCi/L	18.12	45.4 %	43-92	
			BSD	pCi/L	18.12	38.0 %	43-92	435
			BSRPD	pCi/L	18.12	17.7%	≤35.5	
Beta	905.0	09/01/2009:211337	CCV	cpm	11160	89.6 %	89 - 90	
			CCB	cpm		0.4600	0.48	
Total Strontium	905.0	08/27/2009:208938	RgBlk	pCi/L		0.89	2	
			LRS	pCi/L	18.89	116 %	53-133	
			BS	pCi/L	18.89	126 %	75-125	435
			BSD	pCi/L	18.89	114 %	75-125	
			BSRPD	pCi/L	18.89	9.5%	≤20	
Tritium	906.0	08/31/2009:209153	Blank	pCi/L		3	1000	
			LCS	pCi/L	2099	93.1 %	75-125	
			BS	pCi/L	2099	85.4 %	75-125	
			BSD	pCi/L	2099	86.0 %	75-125	
			BSRPD	pCi/L	2099	0.8%	≤25	
	906.0	09/03/2009:211523	CCV	pCi/L	15400	89.8 %	90-110	
			CCB	pCi/L		-34	500	
Alpha	908.0	09/01/2009:211346	CCV	cpm	10680	40.1 %	39 - 43	
			CCB	cpm		0.0800	0.15	
Uranium	908.0	08/27/2009:209053	RgBlk	pCi/L		0.27	1	
			LRS	pCi/L	20.86	74.6 %	54-105	
			BS	pCi/L	20.86	81.6 %	75-125	
			BSD	pCi/L	20.86	81.3 %	75-125	
			BSRPD	pCi/L	20.86	0.4%	≤20	
Beta	Ra - 05	09/03/2009:211526	CCV	cpm	11160	89.6 %	89 - 92	
			CCB	cpm		0.4000	0.61	
Ra 228	Ra - 05	08/29/2009:209090	RgBlk	pCi/L		-0.08	3	
			LRS	pCi/L	86.33	37.7 %	27-59	
			BS	pCi/L	86.33	91.8 %	75-125	
			BSD	pCi/L	86.33	88.7 %	75-125	
			BSRPD	pCi/L	86.33	3.4%	≤25	

Definition

CCV : Continuing Calibration Verification - Analyzed to verify the instrument calibration is within criteria.
CCB : Continuing Calibration Blank - Analyzed to verify the instrument baseline is within criteria.
Blank : Method Blank - Prepared to verify that the preparation process is not contributing contamination to the samples.
RgBlk : Method Reagent Blank - Prepared to correct for any reagent contributions to sample result.
LCS : Laboratory Control Standard/Sample - Prepared to verify that the preparation process is not affecting analyte recovery.

Corporate Offices & Laboratory
853 Corporation Street
Santa Paula, CA 93060
TEL: 805/392-2000
FAX: 805/525-4172
CA NELAP Certification No. 01110CA

Office & Laboratory
2500 Stagecoach Road
Stockton, CA 95215
TEL: 209/942-0182
FAX: 209/942-0423
CA ELAP Certification No. 1563

Office & Laboratory
563 E. Lindo Avenue
Chico, CA 95926
TEL: 530/343-5818
FAX: 530/343-3807
CA ELAP Certification No. 2670

Field Office
Visalia, California
TEL: 559/734-9473
Mobile: 559/737-2399
FAX: 559/734-8435

September 10, 2009
Calscience Environmental Laboratories

Lab ID : SP 0908559
Customer : 2-17756

Quality Control - Radio

Definition	
MS	: Matrix Spikes - A random sample is spiked with a known amount of analyte. The recoveries are an indication of how that sample matrix affects analyte recovery.
MSD	: Matrix Spike Duplicate of MS/MSD pair - A random sample duplicate is spiked with a known amount of analyted. The recoveries are an indication of how that sample matrix affects analyte recovery.
BS	: Blank Spikes - A blank is spiked with a known amount of analyte. It is prepared to verify that the preparation process is not affecting analyte recovery.
BSD	: Blank Spike Duplicate of BS/BSD pair - A blank duplicate is spiked with a known amount of analyte. It is prepared to verify that the preparation process is not affecting analyte recovery.
MSRPD	: MS/MSD Relative Percent Difference (RPD) - The MS relative percent difference is an indication of precision for the preparation and analysis.
BSRPD	: BS/BSD Relative Percent Difference (RPD) - The BS relative percent difference is an indication of precision for the preparation and analysis.
DQO	: Data Quality Objective - This is the criteria against which the quality control data is compared.

Explanation	
435	: Sample matrix may be affecting this analyte. Data was accepted based on the LCS or CCV recovery.

Calscience Environmental Laboratories, Inc.
7440 LINCOLN WAY
GARDEN GROVE, CA 92841-1432
TEL: (714) 895-5494 . FAX: (714) 894-7501

TO: FGL LABS

908559

CHAIN OF CUSTODY RECORD

DATE: 08/25/09
PAGE: 1 OF 1

LABORATORY CLIENT: Calscience Environmental Laboratories, Inc.		CLIENT PROJECT NAME / NUMBER: 09-08-2053	P.O. NO.:
ADDRESS: 7440 Lincoln Way		PROJECT CONTACT: Vik Patel	QUOTE NO.:
CITY: Garden Grove, CA 92841-1427		SAMPLER(S): (SIGNATURE)	LAB USE ONLY
TEL: 714/895-5494	FAX: 714/894-7501	E-MAIL: vipatel@calscience.com	

TURNAROUND TIME: ☐ SAME DAY ☐ 24 HR ☐ 48HR ☐ 72 HR ☐ 5 DAYS ☒ 10 DAYS

SPECIAL REQUIREMENTS (ADDITIONAL COSTS MAY APPLY): ☐ RWQCB REPORTING ☐ ARCHIVE SAMPLES UNTIL ___/___/___

SPECIAL INSTRUCTIONS:

REQUESTED ANALYSIS

LAB USE ONLY	SAMPLE ID	LOCATION/ DESCRIPTION	SAMPLING DATE	SAMPLING TIME	Matrix	#Cont	Radium 226	Radium 228	Gross Alpha & Beta	Strontium 90	Uranium 200.8	Tritium
	GWS-1		08/25/09	0815	GW	~~9~~ 8	X	X	X	X	X	X
						12						

~~1~~ 1 TL plastic (UP)
5 or plastic w/ HNO3
6 clear VOAs (UP)

Relinquished by: (Signature)	Received by: (Signature)	Date:	Time:
Wcbat CEL	GSO 5125141911	8/25/09	1630
Relinquished by: (Signature)	Received by: (Signature)	Date:	Time:
Relinquished by: (Signature) GSO	Received by: (Signature)	8/26/09	1300

1°C

FGL Environmental
Revision Date: 10/18/07

Doc ID: F2REC005.011
Page: 1 of 1

Santa Paula - Condition Upon Receipt (Attach to COC)

Sample Receipt:

1. Number of ice chests/packages received: 1
   Note as OTC if received over the counter unpackaged.
2. Were samples received in a chilled condition? Temps: 1 / / / /
   Acceptable is 2° to 6° C. Also acceptable is received on ice (ROI) for the same day of sampling or received at room temperature (RRT) if sampled within one hour of receipt. Client contact for temperature failures must be documented below. If many packages are received at one time check for tests/H.T.'s/rushes/Bacti's to prioritize further review. Please notify Microbiology personnel immediately of bacti samples received.
3. Do the number of bottles received agree with the COC? Yes No N/A
4. Were samples received intact? (i.e. no broken bottles, leaks etc.) Yes No
5. Were sample custody seals intact? N/A Yes No

Sign and date the COC, obtain LIMS sample numbers, select methods/tests and print labels.

Sample Verification, Labeling and Distribution:

1. Were all requested analyses understood and acceptable? Yes No
2. Did bottle labels correspond with the client's ID's? Yes No
3. Were all bottles requiring sample preservation properly preserved? Yes No N/A FGL
4. VOAs checked for Headspace? Yes No N/A
5. Were all analyses within holding times at time of receipt? Yes No
6. Have rush or project due dates been checked and accepted? N/A Yes No

Attach labels to the containers and include a copy of the COC for lab delivery.

Sample Receipt, Login and Verification completed by (initials): [illegible]

Discrepancy Documentation:

Any items above which are "No" or do not meet specifications (i.e. temps) must be resolved.

1. Person Contacted: Phil @ Calscience Phone Number: (714) 895-5494
   Initiated By: [illegible] Date: 8/26/09
   Problem:
   Rec'd 12 bottles total - not 9
   Resolution:
   Notified Phil @ Calscience 8/26/09. He said that is Okay
2. Person Contacted: Phone Number:
   Initiated By: Date:
   Problem:

   Resolution:

(2-17756)
Calscience Environmental Laboratories
SP 0908559
SRP-08/26/2009-14:26:22

FRONTIER
ANALYTICAL LABORATORY

September 14, 2009

FAL Project ID: 5669

Mr. Vik Patel
Calscience Environmental Laboratories, Inc.
7440 Lincoln Way
Garden Grove, CA 92841-1427

Dear Mr. Patel,

Attached are the results for Frontier Analytical Laboratory project **5669**. This corresponds to your project number **09-08-2053**. The one aqueous sample received on 8/26/2009 was extracted and analyzed by EPA Method 1613 for 2,3,7,8-TCDD only. Calscience requested a turnaround time of fifteen business days for project **5669.**

The following report consists of an Analytical Data section and a Sample Receipt section. The Analytical Data section contains our project-sample tracking log and the analytical results. The Sample Receipt section contains your original chain of custody, our sample login form and a sample photo. This report has been emailed to you as a PDF file. A hardcopy will not be sent to you unless specifically requested. The attached results are specifically for the samples referenced in this report only. These results meet all NELAC requirements and shall not be reproduced except in full.

If you have any questions regarding project **5669**, please contact me at (916) 934-0900. Thank you for choosing Frontier Analytical Laboratory for your analytical testing needs.

Sincerely,

Bradley B. Silverbush
Director of Operations

FRONTIER ANALYTICAL LABORATORY
5172 Hillsdale Circle • El Dorado Hills, CA 95762
Tel (916) 934-0900 • Fax (916) 934-0999
www.frontieranalytical.com

FRONTIER ANALYTICAL LABORATORY

Frontier Analytical Laboratory

Sample Tracking Log

FAL Project ID: **5669**

Received on: **08/26/2009** Project Due: **09/18/2009** Storage: **R1**

FAL Sample ID	Dup	Client Project ID	Client Sample ID	Requested Method	Matrix	Sampling Date	Sampling Time	Hold Time Due Date
5669-001-SA	1	09-08-2053	GWS-1	EPA 1613 TCDD	Aqueous	08/25/2009	08:15 am	08/25/2010

5172 Hillsdale Circle • El Dorado Hills, CA 95762 • Tel (916) 934-0900 • Fax (916) 934-0999 • www.frontieranalytical.com

EPA Method 1613
TCDD

FRONTIER ANALYTICAL LABORATORY

FAL ID: 5669-001-MB	Date Extracted: 09-10-2009	ICal: PCDDFAL3-8-13-09	Acquired: 09-11-2009
Client ID: Method Blank	Date Received: NA	GC Column: DB5	WHO TEQ: NA
Matrix: Aqueous	Amount: 1.000 L	Units: pg/L	
Batch No: X1817			

Compound	Conc	DL	Qual	MDL
2,3,7,8-TCDD	ND	0.432		0.320

Internal Standards	% Rec	QC Limits	Qual
13C-2,3,7,8-TCDD	78.6	31.0 - 137	
Cleanup Surrogate			
37Cl-2,3,7,8-TCDD	75.3	42.0 - 164	

A	Isotopic Labeled Standard outside QC range but signal to noise ratio is >10:1
B	Analyte is present in Method Blank
C	Chemical Interference
D	Presence of Diphenyl Ethers
E	Analyte concentration is above calibration range
F	Analyte confirmation on secondary column
J	Analyte concentration is below calibration range
M	Maximum possible concentration
ND	Analyte Not Detected
NP	Not Provided
S	Sample acceptance criteria not met
X	Matrix interferences
*	Result taken from dilution or reinjection

Analyst: [signature]
Date: 9/14/09

Reviewed By: [signature]
Date: 9/14/09

5172 Hillsdale Circle • El Dorado Hills, CA 95762 • Tel (916) 934-0900 • Fax (916) 934-0999 • www.frontieranalytical.com

EPA Method 1613
TCDD

FRONTIER ANALYTICAL LABORATORY

FAL ID: 5669-001-OPR	Date Extracted: 09-10-2009	ICal: PCDDFAL3-8-13-09	Acquired: 09-11-2009
Client ID: OPR	Date Received: NA	GC Column: DB5	WHO TEQ: NA
Matrix: Aqueous	Amount: 1.000 L	Units: ng/ml	
Batch No: X1817			

Compound	Conc	QC Limits
2,3,7,8-TCDD	8.28	7.30 - 14.6

Internal Standards	% Rec	QC Limits
13C-2,3,7,8-TCDD	87.4	25.0 - 141

Cleanup Surrogate		
37Cl-2,3,7,8-TCDD	89.4	37.0 - 158

A	Isotopic Labeled Standard outside QC range but signal to noise ratio is >10:1
B	Analyte is present in Method Blank
C	Chemical Interference
D	Presence of Diphenyl Ethers
E	Analyte concentration is above calibration range
F	Analyte confirmation on secondary column
J	Analyte concentration is below calibration range
M	Maximum possible concentration
ND	Analyte Not Detected
NP	Not Provided
S	Sample acceptance criteria not met
X	Matrix interferences
*	Result taken from dilution or reinjection

Analyst:

Date: 9/14/09

Reviewed By:

Date: 9/14/09

5172 Hillsdale Circle • El Dorado Hills, CA 95762 • Tel (916) 934-0900 • Fax (916) 934-0999 • www.frontieranalytical.com

EPA Method 1613
TCDD

FRONTIER ANALYTICAL LABORATORY

FAL ID: 5669-001-SA	Date Extracted: 09-10-2009	ICal: PCDDFAL3-8-13-09	Acquired: 09-11-2009
Client ID: GWS-1	Date Received: 08-26-2009	GC Column: DB5	WHO TEQ: NA
Matrix: Aqueous	Amount: 1.034 L	Units: pg/L	
Batch No: X1817			

Compound	Conc	DL	Qual	MDL
2,3,7,8-TCDD	ND	0.621		0.320

Internal Standards	% Rec	QC Limits	Qual
13C-2,3,7,8-TCDD	74.5	31.0 - 137	

Cleanup Surrogate			
37Cl-2,3,7,8-TCDD	80.6	42.0 - 164	

A	Isotopic Labeled Standard outside QC range but signal to noise ratio is >10:1
B	Analyte is present in Method Blank
C	Chemical Interference
D	Presence of Diphenyl Ethers
E	Analyte concentration is above calibration range
F	Analyte confirmation on secondary column
J	Analyte concentration is below calibration range
M	Maximum possible concentration
ND	Analyte Not Detected
NP	Not Provided
S	Sample acceptance criteria not met
X	Matrix interferences
*	Result taken from dilution or reinjection

Analyst: [signature]
Date: 9/14/09

Reviewed By: [signature]
Date: 9/14/09

5172 Hillsdale Circle • El Dorado Hills, CA 95762 • Tel (916) 934-0900 • Fax (916) 934-0999 • www.frontieranalytical.com

Calscience Environmental Laboratories, Inc.

7440 LINCOLN WAY
GARDEN GROVE, CA 92841-1432
TEL: (714) 895-5494 . FAX: (714) 894-7501

TO: FRONTIER

S1669
0°

CHAIN OF CUSTODY RECORD

DATE: 08/25/09

PAGE: 1 OF 1

LABORATORY CLIENT: Calscience Environmental Laboratories, Inc.	CLIENT PROJECT NAME / NUMBER: 09-08-2053
ADDRESS: 7440 Lincoln Way	PROJECT CONTACT: Vik Patel
CITY: Garden Grove, CA 92841-1427	SAMPLER(S): (SIGNATURE)
TEL: 714/895-5494 FAX: 714/894-7501 E-MAIL: vipatel@calscience.com	P.O. NO.:
	QUOTE NO.:
	LAB USE ONLY

TURNAROUND TIME

☐ SAME DAY ☐ 24 HR ☐ 48HR ☐ 72 HR ☐ 5 DAYS ☐ 10 DAYS

SPECIAL REQUIREMENTS (ADDITIONAL COSTS MAY APPLY)

☐ RWQCB REPORTING ☐ ARCHIVE SAMPLES UNTIL ___ / ___ / ___

SPECIAL INSTRUCTIONS

Standard TAT

REQUESTED ANALYSIS

LAB USE ONLY	SAMPLE ID	LOCATION/ DESCRIPTION	SAMPLING DATE	SAMPLING TIME	Matrix	#Cont	2,3,7,8-TCDD (Dioxin) Only EPA 1613
	GWS-1		08/25/09	0815	W	2	X

Relinquished by: (Signature)	Received by: (Signature)	Date:	Time:
Webat Cet	ONTRAC D10010224861735	8/25/09	1615
	Kathy Zipp	8-26-09	8:25AM

Frontier Analytical Laboratory

Sample Login Form

FAL Project ID: **5669**

Client:	Calscience
Client Project ID:	09-08-2053
Date Received:	08/26/2009
Time Received:	08:25 am
Received By:	KZ
Logged In By:	KZ
# of Samples Received:	1
Duplicates:	1
Storage Location:	R1

Method of Delivery:	California Overnight
Tracking Number:	D10010224861735
Shipping Container Received Intact	Yes
Custody seals(s) present?	No
Custody seals(s) intact?	No
Sample Arrival Temperature (C)	0
Cooling Method	Ice
Chain Of Custody Present?	Yes
Return Shipping Container To Client	Yes
Test for residual Chlorine	Yes
Thiosulfate Added	No
Earliest Sample Hold Time Expiration	08/25/2010
Adequate Sample Volume	Yes
Anomalies or additional comments:	

5172 Hillsdale Circle • El Dorado Hills, CA 95762 • Tel (916) 934-0900 • Fax (916) 934-0999 • www.frontieranalytical.com

FRONTIER ANALYTICAL LABORATORY

5172 Hillsdale Circle • El Dorado Hills, CA 95762 • Tel (916) 934-0900 • Fax (916) 934-0999 • www.frontieranalytical.com

Appendix C. Historic Water Quality Data From Wells in the AV Solar Ranch One Area.

Appendix C. Historic Water Quality Data From Wells in the AV Solar Ranch One Area

Well Number	Date	Depth[1]	Silica[2]	Ca[2]	Mg[2]	Na[2]	K[2]	HCO_3[2]	SO_4[2]	Cl[2]	F[2]	NO_3[2]	TDS[2]	Hardness	Spec.Cond	pH
8N/13W-31M1	6/15/1971	700	39	28	5.0	52	2.1	173	23	28	0.9		286	90	435	7.0
	6/12/1972		35	46	8.4	45	1.8	212	29	26	0.7		312	150	500	7.0
8N/14W-11G1	8/15/1953	500		11	1.5	80	1.8	137	27	39	1.4	7.4	265	34	418	7.8
	11/20/1953			36	3.0	38	2.3	173	23	11	0.3	15	233	102	368	7.7
	9/5/1958		29	35	6.0	41	1.5	180	25	20			258	111	402	7.6
8N/14W-13G1	6/2/1970	485	41	38	3.7	61	2.5	178	29	42	0.8	10	322	110	492	8.0
	5/6/1975		37	46	4.9	46	2.7	179	42	33	0.4		313	140	492	7.3
	5/18/1976		37	46	4.7	48	2.3	181	40	32	0.4		313	130	490	7.2
	8/9/1977		35	48	4.6	49	2.5	180	40	34	0.5		310	140	520	7.7
8N/14W-18N1	1/4/1956	865		34	4.0	43	2.5	174	11	18	0.3	18	251	100	400	8.2
	3/8/1956			32	4.0	42	1.7	173	15	18	0.3	18	255	96	357	8.0
	3/6/1956		31	16	2.0	74	2.0	153	17	20	0.7	16	271	48	420	8.4
8N/15W-10P1	11/20/1953	203		34	7.0	38	1.7	161	30	15	0.5	20	225	110	392	7.6
	10/19/1954			36	6.0	38	1.2	156	24	14	0.4	17	259	110	380	8.1
	9/4/1958		37	31	8.0	39	1.0	165	25	21	0.1		337	110	534	7.4
	7/31/1963		36	40	0.8	40	1.7	155	24	14	0.4	20	244	100	400	8.1
	3/26/1964		32	37	4.4	41	1.5	160	29	15	0.6	20	258	110	370	7.9
	6/2/1965			32	8.0	40	2.0	160	27	20	0.2	20	268	120	400	8.1
	6/4/1968			38	5.0	39	1.0	149	28	18	0.4	25	240	120	416	8.2
	5/21/1969			39	7.0	37	2.0	147	33	25	0.5	24	233	130	424	8.0
	5/6/1971			61	11.0	44	1.0	127	56	68	0.3	42	388	200	599	7.8
8N/15W-22N1	3/15/1949	177.5		64	18.0	0		216	34	12			254	234		7.3
	9/21/1949			56	18.0	16		208	53	16		5	266	214		7.0
	6/28/1950			104	23.0	24		212	204	14		3	476	354		8.2
	8/22/1951			128	8.0			196	61	24		10	402	352		7.1
8N/15W-24B2	1950	252		40	6.0	41		189	12	14		15	221	130	370	8.2
	6/4/1953			39	8.6	36	2	176	17	20	0.2	30	238	130	397	7.6
	9/4/1958		27	40	6.0	37	2.4	154	18	26	0.2	22	258	120	424	7.7
	7/13/1963		29	45	1.6	40	1.8	169	16	17	0.4	27	262	120	410	8.1
	3/26/1964			46	3.2	39	2.1	183	13	16	0.4	26	268	130	400	7.8
	6/8/1965			40	6.0	36	2	173	17	16	0.5	25	245	120	400	8.0
	6/4/1968			39	6.0	36	2	173	12	15	0.4	26	236	120	416	8.3
	5/21/1969			39	7.0	33	3	169	13	17	0.5	24	213	130	393	8.1
	5/6/1971			38	5.8	34	3	176	13	14	0.7	23	223	120	387	8.2
8N/15W-24B3	**8/25/2009**	**600**	**34**	**8.9**	**3.5**	**43**	**2.8**	**133**	**11**	**8.9**	**0.25**	**5.1**	**226**	**100**	**360**	**7.6**
8N/15W-33F1	12/18/1956	801	23	39	11	23	2.3	190	13	13	0.7	9	250	143	300	7.7
	6/11/1961		27	37	15	21	1.5	212	8.6	9	0.1	0.45	219	155	398	7.5

Appendix C. Historic Water Quality Data From Wells in the AV Solar Ranch One Area

Well Number	Date	Depth[1]	Silica[2]	Ca[2]	Mg[2]	Na[2]	K[2]	HCO_3[2]	SO_4[2]	Cl[2]	F[2]	NO_3[2]	TDS[2]	Hardness	Spec.Cond	pH
8N□15W-36M1	11□19□1953	290		33	6	28	1.3	144	14	17	0.3		223	110	333	7.5
	10□19□1954			34	5	26	0.5	137	16	16	0.1	14	225	110	286	7.7
9N□14W-32C1	12□18□1956	970	19	17	3	42	1.6	123	10	20	0.3	9.1	220	55	250	7.8
	9□4□1958		22	26	3	30	1.6	122	17	11	0.4	15	179	77	297	8.4
	8□9□1960							128		11				58	287	7.4
	6□14□1961							134		10				54	286	7
9N□14W-36B1	7□24□2008		19	23	4.4	49	1.6	118	29	37	0.9		230	75	403	8.1

Notes:

[1]Depth in feet below ground surface

[2]Units of milligrams per liter (mg/L)

APPENDIX J.2
WATER REQUIREMENTS AND GROUNDWATER SUPPLY
AV SOLAR RANCH ONE

A technical Memorandum (Water Requirements and Groundwater Supply AV Solar Ranch One) prepared by Luhdorff □ Scalmanini Consulting Engineers and an accompanying cover letter from the Los Angeles County Development of Public Works (LACDPW 2010) are presented herein for reference. This information supports the water supply assessment presented in Section 5.14 of the Draft EIR.

COUNTY OF LOS ANGELES

DEPARTMENT OF PUBLIC WORKS

"To Enrich Lives Through Effective and Caring Service"

900 SOUTH FREMONT AVENUE
ALHAMBRA, CALIFORNIA 91803-1331
Telephone: (626) 458-5100
http://dpw.lacounty.gov

GAIL FARBER, Director

ADDRESS ALL CORRESPONDENCE TO:
P.O. BOX 1460
ALHAMBRA, CALIFORNIA 91802-1460

June 10, 2010

IN REPLY PLEASE REFER TO FILE: LD-0

TO: Sorin Alexanian
Deputy Director
Department of Regional Planning

FROM: Dennis Hunter
Assistant Deputy Director
Department of Public Works

ANTELOPE VALLEY (AV) SOLAR RANCH ONE PROJECT
COUNTY PROJECT NO. R2009-02239
VESTING TENTATIVE MAP NO. TR071035
CONDITIONAL USE PERMIT (CUP) NO. 200900026
ENVIRONMENTAL ASSESSMENT NO. 200900027

Public Works has reviewed the Screencheck Draft Environmental Impact Report with respect to water supply impacts, in addition to the attached technical memorandum titled: "Water Requirements and Groundwater Supply–AV Solar Ranch One," prepared by Luhdorff and Scalmanini Consulting Engineers.

Under the California Environmental Quality Act, it is our conclusion that the proposed project will have less than a significant impact on groundwater supply resources. As discussed in the technical memorandum, the primary reasons for this conclusion include:

- Compared to existing land uses, where unit water requirements for both agricultural and municipal land uses are within an overall range of about 3 to nearly 7 acre feet per year, the water requirements on the nearly 2,100 acre proposed project are exceptionally small.

- The proposed AV Solar Ranch One project is a notable exception to traditional land uses in the AV in that it represents a locally large area within the overall Antelope Valley Area of Adjudication (AVAA), but with associated water requirements which fall well below a conservative allocation of AVAA groundwater yield. Consequently, its water use can be considered to be, without special provisions, consistent with sustainable use of groundwater at the scale of the entire AVAA; strictly interpreted, its water use would be as much as an order of magnitude less than (e.g., well within) a unitized allocation of sustainable groundwater use on the overall 2,100 acre project site.

If you have any additional questions, please contact me at (626) 458-4900 or by e-mail at dhunter@dpw.lacounty.gov.

DH:la
P:\ldpub\ADMIN\DENNIS\AV SOLAR RANCH ONE.doc

Attach.

Water Requirements and Groundwater Supply AV Solar Ranch One

PREPARED FOR: Dennis Hunter
Assistant Deputy Director
Los Angeles County Department of Public Works

PREPARED BY: Joseph C. Scalmanini

DATE: June 1, 2010

PROJECT NUMBER: 10-6-071

The AV Solar Ranch One project is proposed to construct, operate and maintain a 230 megawatt solar photovoltaic electrical power generation facility on a total of nearly 2,100 acres (2,093 acres) of land in the western part of the Antelope Valley, about 15 miles west-northwest of Lancaster. In terms of water requirements, the proposed project has an estimated one-time water requirement of about 150 acre-feet per year (afy) during construction, for dust control, construction materials (concrete), domestic use, and drip irrigation of screening vegetation. That short-term use of about 150 afy is estimated to extend over an approximately 38-month construction period. After construction, the ongoing operation and maintenance of the project have been estimated to require about 12 afy: 3 afy on a year-round basis for domestic uses associated with operations and maintenance; and about 9 afy, most of which would be used on two occasions during the year, each for about a month, for washing of solar panels; some of that total would also be used for other small maintenance needs.

This technical memorandum describes groundwater resources in the Antelope Valley, with some focus on the ongoing groundwater adjudication in the court-determined Antelope Valley Area of Adjudication (AVAA), which includes the area of the proposed project. Included in this description are current estimates of the yield of the AVAA, i.e. the amount of groundwater which can be pumped on an annual basis without depleting the resource. Also included are estimates of historical and current groundwater pumping in the AVAA for comparison to its yield. Projected land and water use at the project site are included to provide a context for assessing historical groundwater pumping as well as assessing proposed groundwater pumping relative to sustainable groundwater supply.

The reporting herein derives from work prepared for, and currently being organized into report form for Los Angeles County and the other municipal purveyors in the AVAA. It reflects the opinions intended to be offered in the AVAA court proceedings on basin yield and overdraft, which are scheduled to begin in late September, 2010. However, while this memo attempts to place that work in an appropriate context, notably with regard to the ongoing debate over the yield and status of the basin (AVAA), it cannot conclusively report on an adjudicated groundwater yield or allocation of groundwater rights. That said, it attempts to illustrate how the long-term dedication of the project site to a land use that has a comparatively very small water requirement, particularly on a unitized per-acre basis for a substantial area, should fit in the realm of ultimate groundwater use at an overall sustainable rate in the AVAA.

Antelope Valley Area of Adjudication

The Antelope Valley is located in the southwest portion of the Mojave Desert in southern California, about 40 miles north of the city of Los Angeles. Approximately two-thirds of the Valley area is located in northern Los Angeles County and the remainder is located in adjacent southeastern Kern County. The Valley is bounded on the south and west by the San Gabriel and Tehachapi Mountains, respectively; on the north by the Rosamond and Bissell Hills; and on the east by the buttes and alluvial fans of the Hi Vista area. Adjacent to the Antelope Valley are the Fremont Valley to the north and the Victor Valley to the east.

The Antelope Valley is a closed basin, approximately 1,390 square miles in area, comprised of relatively flat valley land and dry lake beds, with coalescing alluvial fans and scattered buttes around the periphery. Surface elevations in the Valley range from about 2,300 feet to nearly 3,500 feet above mean sea level (MSL). Several creeks, most notably perennial Big Rock and Little Rock Creeks, drain the surrounding mountains, cross the alluvial fans, and typically become dry washes. The Los Angeles Aqueduct traverses the western end of the Valley and the California Aqueduct runs along the Valley's southern edge, flanking the San Gabriel Mountains.

Urban centers in the Antelope Valley include the cities of Lancaster, Palmdale, and Rosamond along State Highway 14, as well as a large portion of Edwards Air Force Base (Edwards AFB) in the Valley's northeast corner. The population in the Palmdale/Lancaster urbanized area has increased rapidly since the 1980's and is currently around 280,000. Agricultural lands occupy various parts of the area near the cities and Edwards AFB, historically exceeding 60,000 acres and currently comprising approximately 25,000 acres.

At the completion of Phase 1 of the overall Antelope Valley Groundwater Cases, the Court concluded in its Order dated November 3, 2006 that the alluvial basin as described in California Department of Water Resources Bulletin 118-2003 should be the basic jurisdictional boundary for purposes of the litigation. The Area of Adjudication for the Antelope Valley Groundwater Adjudication is illustrated in Figure 1, which also shows the location of the proposed AV Solar Ranch in the AVAA.

Land Uses, Water Requirements and Water Supplies

Land Uses - There are generally four land uses with which water requirements can be associated in the AVAA: agricultural, municipal and industrial (M&I, including mutual water companies and military), rural residential, and environmental/open space (artificial lakes). Beginning with about 5,000 acres of alfalfa and orchards around 1910, agriculture expanded into areas where farming continues to be practiced today. Total land in agricultural production progressively increased, except for a decline through the Great Depression, to about 55,000 acres by 1950. For most of the next 30 years, some 55,000 to 60,000 acres remained in agricultural production, dominated by alfalfa but with stable acreages of truck, field, and deciduous (orchard) crops and a noteworthy increase in grain crops. From the mid to late-1970's through the 1980's, agricultural land use significantly declined, to about 12,000 acres by 1990-91. Through the decade of the 1990's, agricultural land use progressively increased, by more than double, to about 28,000 acres; since 2000, agricultural land use has slightly declined to its current level of about 25,000 acres. The period of recent increase and general stability in agricultural land use has been marked by somewhat constant alfalfa farming but significantly increased truck cropping.

Since the 1940's, when the town of Lancaster was the largest and essentially only urban center, with a reported population of less than 4,000 people, the total population and extent of urban development in the Valley have continually grown. From 1950 to 1970, the Valley's population is reported to have grown from around 3,600 to over 70,000. In 1970, the City of Palmdale and towns like Quartz Hill, Rosamond, and Littlerock were still quite small, and it wasn't until the late 1980s that a marked increase in total population occurred, specifically from about 85,000 in 1980 to over 206,000 in 1990. Further, the population in the City of Palmdale had grown sufficiently to approach that of Lancaster and, by the year 2000, the two cities each had a population of about 125,000. Presently, the AVAA has a total population of over 300,000 with Lancaster and Palmdale having by far the greatest populations of any urban center in the AVAA (about 135,000 each). In contrast, Quartz Hill, Rosamond, Littlerock, and North Edwards, the developments of Desert View Highlands and Lake Los Angeles, as well as the Edwards AFB, each has a population of about 15,000 or less.

The combined populations of the mutual and private water companies in the AVAA are estimated to be around 12,000. While there is no readily available record of rural residential population in the AVAA, available data from Los Angeles and Kern Counties indicate that slightly more than 7,000 improved parcels are located throughout the AVAA, outside the service areas of municipal water purveyors or smaller mutual or other private water companies.

Two environmental/open space areas in the AVAA are recognized as having water requirements separate from those associated with M&I or agricultural land use, specifically the Paiute Ponds wetlands and Apollo Lakes Park impoundments. The Paiute Ponds were originally created in 1961 with the construction of a dike across Amargosa Creek to prevent its overflow into Rosamond Dry Lake. Currently, the Paiute Ponds wetlands occupy an area of 400 acres, and consist of five main ponds and an extensive marshland area. Within the wetlands, a minimum of 200 acres is to be maintained as marsh-type habitat according to a three-party Letter of Agreement between the LACSD14, the California Dept. of Fish and Game, and Edwards AFB. The ponds include a series of impoundments occupying an additional 90 acres for duck hunting built by Ducks Unlimited and Edwards AFB in 1991.

The recreational impoundments at the Apollo Lakes Park occupy a collective area of about 40 acres, and they first received deliveries of recycled (currently tertiary-treated) water from the Lancaster WRP in 1972.

Water Requirements - Total historical water requirements in the AVAA, consisting of agricultural, M&I, and environmental water uses, are illustrated in Figure 2. The total water requirements have varied greatly throughout the historical period, primarily affected by agricultural water use. During the period of agricultural expansion through 1950, the AVAA experienced the greatest increase in water requirements from early development to nearly 360,000 afy. Agricultural water demand comprised the vast majority of the total requirements through that period, increasing to nearly 350,000 afy by 1950; at that time, M&I use was about 10,000 afy. During the period of peak agricultural activity through the early 1970s, total water requirements remained high, between about 300,000 and 370,000 afy. Through that period, agricultural water use was slightly declining, and M&I water requirements were gradually increasing, from about 10,000 to 30,000 afy.

With the subsequent significant decline in agricultural activity through the early 1990s, total water requirements substantially decreased, from approximately 300,000 to about 150,000 afy, primarily as a result of the substantial decline in agricultural water demand from about 260,000 afy to about 70,000 afy. During the latter half of that period of agricultural decline, M&I water requirements increased from about 30,000 afy to about the same as the agricultural water demand, about 70,000 afy, by 1990. Both agricultural and M&I water requirements increased at comparable rates throughout the 1990s. By 2000, total water requirements, by then including a small amount for environmental uses, had increased to approximately 255,000 afy. Since 2000, total water demand has remained generally stable, a result of a generally offsetting increase in M&I water use and decrease in agricultural water use. By 2006, the agricultural water demand was about 114,000 af; total M&I water requirements were about 118,000 af (105,000 af for all uses by the main purveyors and about 13,000 af of municipal-type use by mutual, small private and rural residential users); and environmental water use was about 9,600 af to maintain wetlands and recreational lakes.

Water Supplies - Prior to 1972, essentially all water requirements in the AVAA were met by local groundwater, augmented by a small amount of local surface water, generally less than 3,000 afy, diverted from Littlerock Creek. Beginning in 1972, supplemental water has been imported into the AVAA from the State Water Project (SWP) to augment the local water supplies. Water is imported from the SWP by three State Water Contractors in the AVAA, specifically AVEK, PWD, and LCID; their collective SWP Table A amounts are 165,000 acre-feet per year (although that total amount is not available in all years, nor is it all dedicated to the AVAA). Imported SWP water was first made available for treatment and municipal use by Littlerock Creek Irrigation District in 1972; SWP water was initially imported by AVEK in 1976 for agricultural water supply to augment local groundwater production.

Littlerock Creek diversions have been stable since 1946, typically providing a total of 1,000 to 3,000 afy of local surface water toward agricultural and M&I water supplies. There have been only a few years, in the 1960s and in 2002, when water was not available for diversion. Beginning in the mid-1990s, coincident with the dam rehabilitation project (during which time the dam was also raised 12 feet, increasing the reservoir's capacity), total diversions have typically exceeded 3,000 afy and in some years have approached 7,000 afy, all toward M&I water supplies.

Beginning in 1976, about 27,000 af of SWP water were delivered for agricultural irrigation supplies by AVEK. Imported SWP water for irrigation notably increased into the early 1980's, reaching a peak of nearly 64,000 af in 1981. Since then, deliveries of SWP water for agricultural irrigation have been notably smaller, approaching 40,000 af in only one year (1982) and less than 30,000 af in all other years. Over the decade through 2006, deliveries of SWP water for agricultural use ranged between approximately 7,000 and 28,000 afy and averaged about 15,000 afy. They increased to nearly 18,000 af in 2007, and then substantially declined to near 3,500 af in 2008.

SWP deliveries for municipal water supply nearly linearly increased since the early 1980's, to about 70,000 afy in 2006 and 2007, followed by decreased delivery of about 52,000 af in 2008. Combined SWP deliveries for agricultural and municipal water supply reached a peak of nearly 90,000 af in 2007, but declined to about 55,000 af in 2008 (Figure 3).

Overall, groundwater pumping to meet both agricultural and M&I water requirements in the AVAA has ranged from as much as 370,000 to 380,000 afy in the 1950's-1960's to slightly less than 90,000 afy by 1990. Since then, total groundwater pumping has increased, as high as about 175,000 afy by 2002, followed by a decline to nearly 150,000 af in 2005, and to slightly less than 135,000 af in 2006 and 2007, followed by an increase to about 160,000 af in 2008 (Figure 4).

Recycled water from both LACSD14 (Lancaster) and LACSD20 (Palmdale) water reclamation plants has been utilized for agricultural irrigation and environmental water use in the AVAA since at least the early 1990s. Use of recycled water for irrigation and environmental water supply has steadily increased over recent time, from approximately 1,100 and 3,800 afy for irrigation and environmental uses, respectively, in 1988, to about 11,800 and 9,600 afy, respectively, in 2006. Total recycled water use for irrigation and environmental supplies in the AVAA is now about 20,000 afy (Figure 5).

Sustainable Groundwater Yield

The sustainable yield of a groundwater basin is considered to be the amount of pumping that, for given land use conditions, produces return flows which, in combination with other recharge, result in no long-term depletion of groundwater storage. Based on a combination of estimated natural recharge to the groundwater basin, utilization of supplemental water and its contribution to groundwater recharge, and land use practices in the AVAA that utilize water in different ways and thus contribute different amounts of return flows as contributions to groundwater recharge, estimates of sustainable (production) yield have been made for both “native” and “supplemental” conditions. Under native conditions, return flows derive from the use of local groundwater only; those return flows are the only source of recharge other than natural recharge that derives from local precipitation and runoff within the watershed surrounding the AVAA. Under supplemental conditions, return flows derive from the use of both local groundwater and supplemental water; those return flows add to other sources of recharge that include natural recharge, again from local precipitation and runoff within the watershed surrounding the AVAA, plus any purposeful recharge of supplemental water.

Since agricultural and municipal-type land uses contribute different return flow fractions that, in turn, contribute to the sustainable yield of the groundwater basin, sustainable yield is not necessarily a constant and can thus be a variable that is dependent on prevailing land use in the basin. To capture the variations in the preceding factors, which are commonly described as part of cultural conditions in a given basin, two sets of sustainable yields were prepared for the AVAA: one set for different mixes of land use under “native” conditions, where only natural recharge is the primary source of sustainable groundwater supply in the basin; and a second set, also for different mixes of land use but under “supplemental” conditions, where natural recharge is augmented by recharge from the use of supplemental water supplies such as has occurred with the importation of SWP water since the 1970’s.

Throughout the periods considered for estimating sustainable yield of the AVAA, the respective proportions of agricultural and municipal-type land uses have been comparable, with both increasing in the late 1990’s, followed by some agricultural decline in the 2000’s and general stability in municipal-type land use over that same time. Under “native” conditions, largely independent of variations in prevailing land uses since the mid-1990’s, the native sustainable yield of the AVAA is about 82,300 afy. In addition to that, however, for the five-year period prior to the filing of the current adjudication, average use of supplemental water was nearly 68,000 afy. Its use augmented natural recharge sufficiently to support total sustainable groundwater yield of nearly 108,000 afy. Since then, use of supplemental water increased, to an average of about 73,000 afy over the 1996-2005 period, and to 73,500 af in 2005; those uses augmented natural recharge to support increases in total sustainable yield to about 110,000 afy. While “rights” to all the total sustainable yield are not equally distributable to all interests in the AVAA, in part because separate priorities attach to the increases attributable to supplemental water use, both the “native “ sustainable yield of 82,300 afy and the total sustainable yield of 110,000 afy are used in this technical memorandum in order to place the water requirements of the proposed AV Solar Ranch project in a quantitative context.

Project Water Supply

The proposed project would use groundwater to meet the estimated water requirements described above, about 150 afy through a 38-month construction period, followed by about 12 afy on an ongoing basis for a combination of domestic and maintenance purposes. On a unitized basis, those equate to about 0.07 af per acre per year during construction, and less than 0.01 af per acre per year during operations (0.006 af/a/yr). Compared to existing land uses described above, where unit water requirements for both agricultural and municipal land uses are within an overall range of about three to nearly seven af per acre per year, the water requirements on the nearly 2,100 acres proposed project are exceptionally small.

The sustainable yield values described above can conservatively be reported to be the smallest values that have been publicly represented by any of the parties to the ongoing Antelope Valley Adjudication. Thus, while this technical memorandum cannot report what the court might determine with regard to the yield of the AVAA, it is logical that it will not find the total sustainable yield to be any smaller than about 110,000 afy, and not find the native sustainable yield to be any smaller than about 82,300 afy.

Further, as introduced above, this technical memorandum cannot report on any allocation of groundwater rights that might follow a determination of groundwater basin yield; such an allocation is not yet scheduled for hearing by the court, which is currently only scheduled to establish yield and determine overdraft beginning in late September 2010. However, it is logical that the total sustainable yield will be allocated first to attribute a portion to the importers who are responsible for the importation of supplemental water that results in the associated increase in total groundwater yield; the remainder of total sustainable yield, or "native" yield, will then most logically be allocated in such a way that, in aggregate based on an average unitized pumping allocation, total pumping will not exceed sustainable yield. At the size of the AVAA, 1,390 square miles or about 890,000 acres, native sustainable yield equates to nearly 0.1 af per acre per year. If the court were to unilaterally allocate total sustainable yield without regard to attribution for importation of supplemental water, the unitized total sustainable yield would be about 0.125 af per acre per year.

Traditional agricultural and municipal land uses in the Antelope Valley cannot subsist on small water allocations such as 0.1 to 0.125 af/a/yr, so the ultimate allocations of sustainable yield are most likely to be into pooled amounts where higher unitized water requirements, e.g. 3 to 7 af/a/yr for typical existing land uses, could be satisfied, but at the expense of other lands which could then not pump groundwater at those rates (without special provisions such as providing "replacement" water from a supplemental source). The proposed AV Solar Ranch project is a notable exception to traditional land uses in the Antelope Valley in that it represents a locally large area within the overall AVAA, but with associated water requirements which fall well below a conservative allocation of AVAA groundwater yield. Consequently, its water use can be considered to be, without special provisions, consistent with sustainable use of groundwater at the scale of the entire AVAA; strictly interpreted, its water use would be as much as an order of magnitude less than, i.e. well within, a unitized allocation of sustainable groundwater use on the overall 2,100 acre project site.

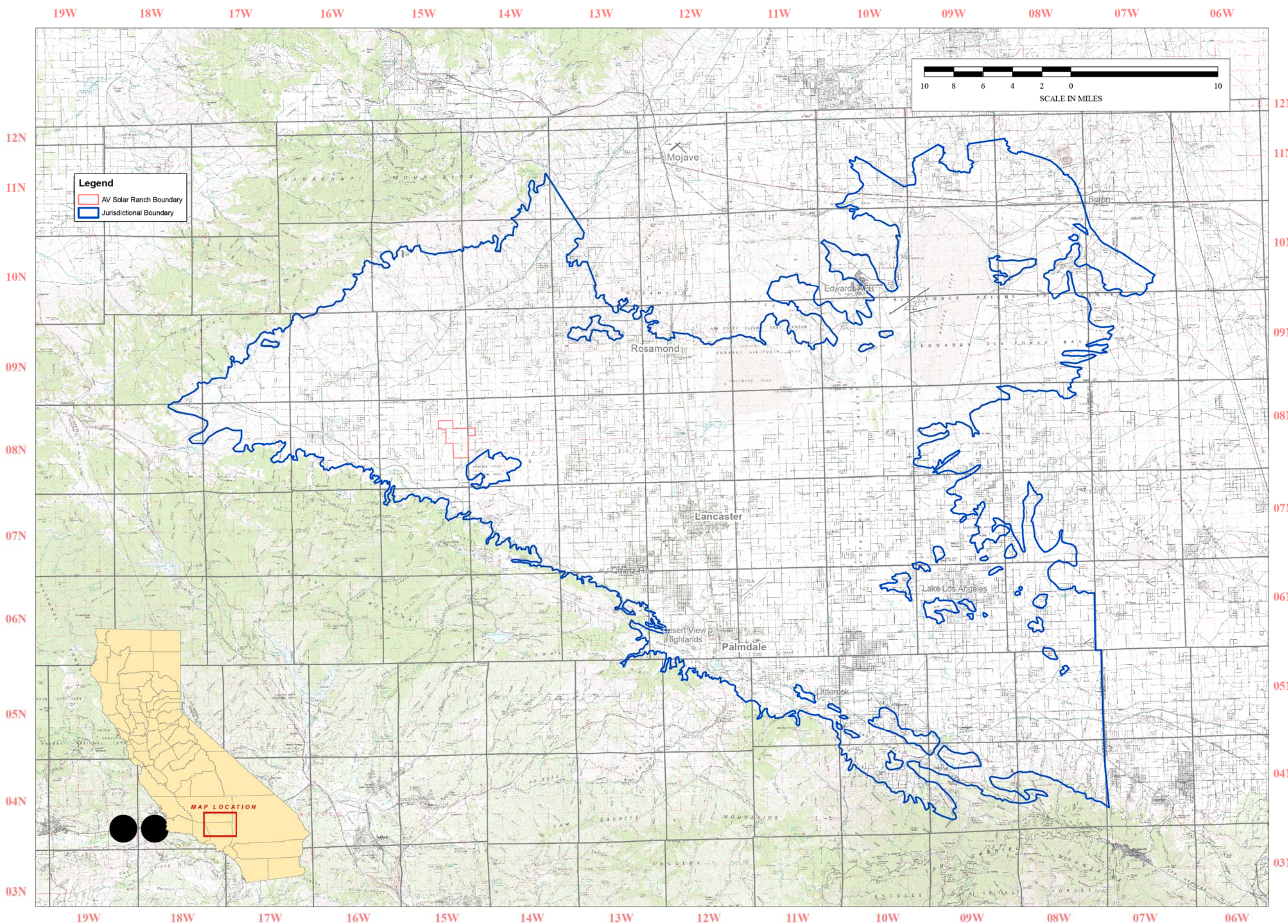


Figure 1
Locations - AV Solar Ranch Project and Antelope Valley Area Adjudication

Figure 2
Estimated Historical Total Water Requirements

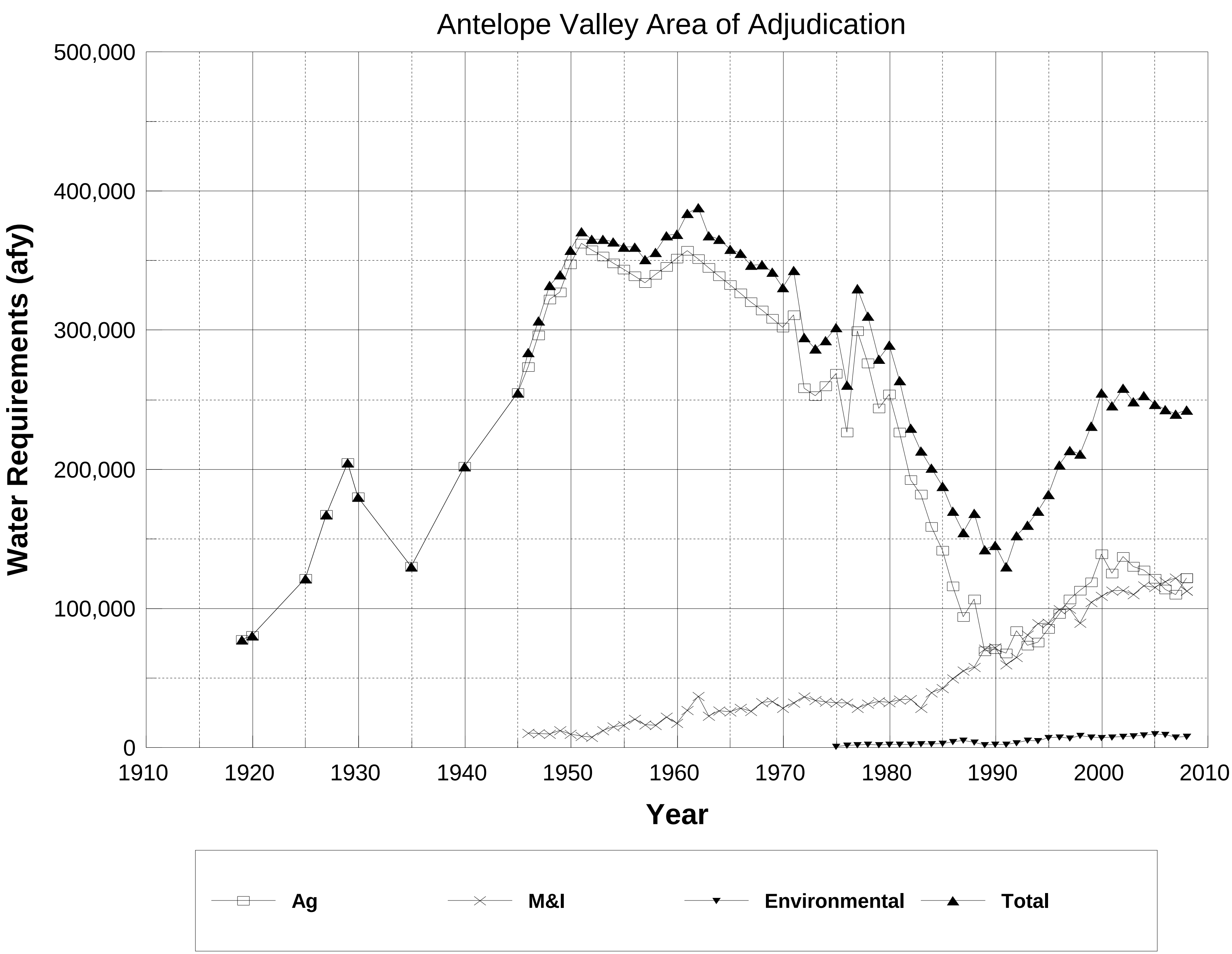


Figure 3
Historical Supplemental Surface Water by Source

Antelope Valley Area of Adjudication

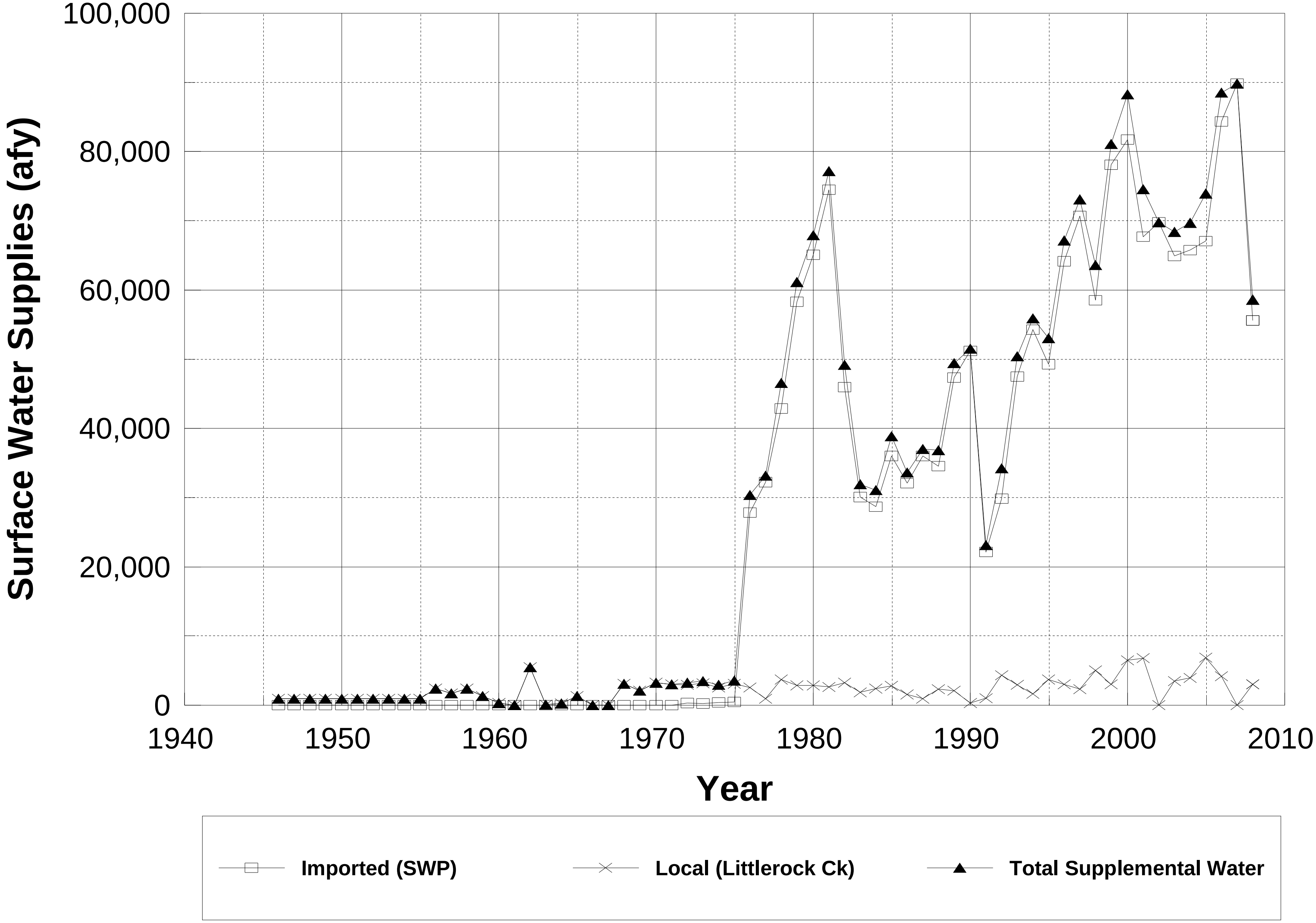
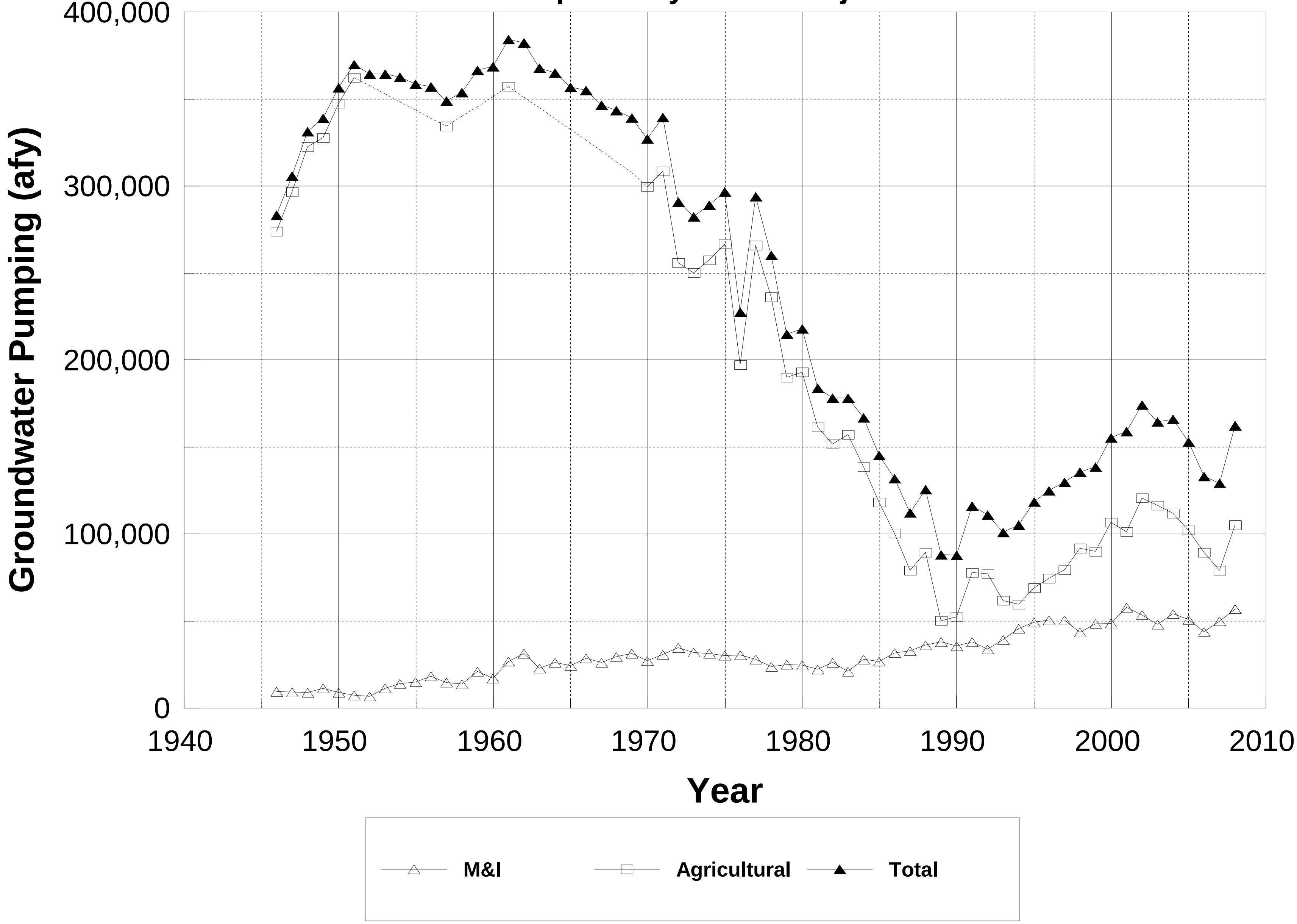


Figure 4
Estimated Historical Groundwater Pumping
Antelope Valley Area of Adjudication



APPENDIX K
VEGETATION MANAGEMENT AND
FIRE CONTROL MEASURES PLAN

This appendix presents the Vegetation Management and Fire Control Measures Plan for the AV Solar Ranch One Project. This plan supports the fire hazards assessment presented in Section 5.4 of the Draft EIR.

AV SOLAR RANCH ONE
VEGETATION MANAGEMENT AND FIRE CONTROL MEASURES

INTRODUCTION

The purpose of the AV Solar Ranch One (AVSR1) Vegetation Management Plan is to minimize the potential for wildfire on the project site, while maintaining habitat value and providing for control of fugitive dust. The design of the AVSR1 facility allows for flexibility in maintaining native vegetation. However, during the permitting of AVSR1, Los Angeles County Fire Department expressed concern with the potential fire risk from maintaining existing vegetation within the solar field. The SEA TAC, environmental organizations, and other stakeholders expressed a desire to maintain at least some vegetation to provide wildlife habitat and to control dust. This plan attempts to address the concerns of Fire Department and other stakeholders to the extent feasible.

PROJECT CONSTRUCTION

Prior to installation of project facilities, all on-site vegetation will be cut to a height of approximately 3 to 6 inches above ground surface. Project construction will require temporary vegetation removal and/or grading over a portion of the site for installation of facilities such as construction staging and laydown areas, storm water retention facilities, and solar equipment fabrication areas. In other location, such as the permanent operation and maintenance building, electrical substation, and on-site access roads, permanent vegetation removal will be required. Areas of temporary disturbance will be revegetated with native grasses and wildflowers following facility installation. No woody vegetation, such as rabbit brush will be planted or maintained within the solar field.

Permanent fire breaks will be provided as shown on the attached site plan. This will include a 100-foot perimeter fire break around the facility from the edge of the property line, including along both sides of Highway 138 (West Avenue D) and 170th Street West. Where the project property boundary is adjacent to sensitive resources such as along the southern boundary of the site and the Joshua Tree Woodland SEA to the north, the fire break will be maintained inside the project perimeter fence line. Additionally, 200-hundred foot-wide fire breaks will be maintained within the facility, approximately every ½ mile, as shown on the site plan. All fire breaks will be regularly maintained through mechanical and herbicide treatment to ensure that vegetation does not become established.

PROJECT OPERATIONS

During facility operations, vegetation within the solar field will be controlled annually to minimize the risk of wildfire. Vegetation will be cut in April of each year to a height of no more than 6 inches above the ground surface, and will be maintained at approximately this height through January. Grasses and wildflowers will be allowed to grow to a height of no more than 18 inches from February through April to ensure that a seed supply is maintained to perpetuate this vegetation. This vegetation will again be cut each April, prior to the fire season.

Access

All weather access roads, consisting of compacted soil, will be installed at regular intervals throughout the site. These will include a 30-foot wide perimeter access road, 30-foot wide north-south roads approximately every 1,300 feet, and 20-foot wide east-west roads approximately every 1,000 feet. Additionally, 6-foot to 12-foot wide unimproved two-track access roads will be provided between each row of solar panels, either north-south or east-west, depending on solar field design. If the unimproved roads are at least 12 feet wide, a 20-foot wide road will be provided after every fifth row of solar panels. If the roads are less than 12 feet wide, a 20-foot wide road will be provided at least every 300 feet.

Fire Control

A 100,000 gallon Fire Water/Process Water tank will be provided at the operations and maintenance building, 90,000 gallons of which will be reserved for firefighting. The discharge line for process water will be located at the 90,000 gallon elevation on the tank to ensure that 90,000 gallons of water are always available for firefighting purposes. Additionally, a 10,000 gallon fire water tank with a draft hydrant will be provided near the site access road along 170th Street West, south of State Route 138.

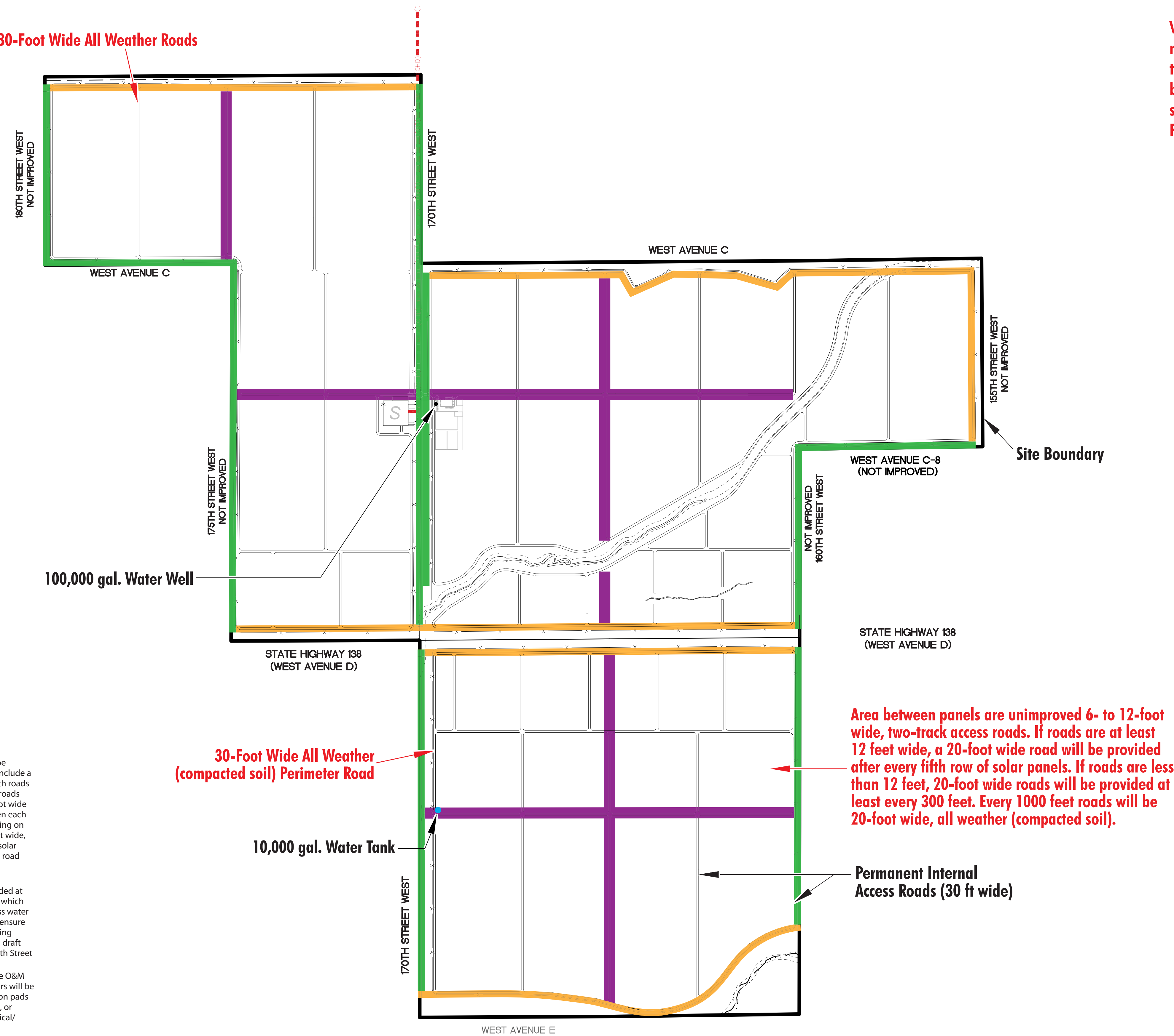
Fire protection measures will include sprinkler systems in the O&M building, and portable carbon dioxide (CO_2) fire extinguishers will be mounted outside inverter/electrical distribution containers on pads throughout the solar array. A FM200 fire suppression system, or equivalent, will be used in the plant control room and electrical/control rooms.

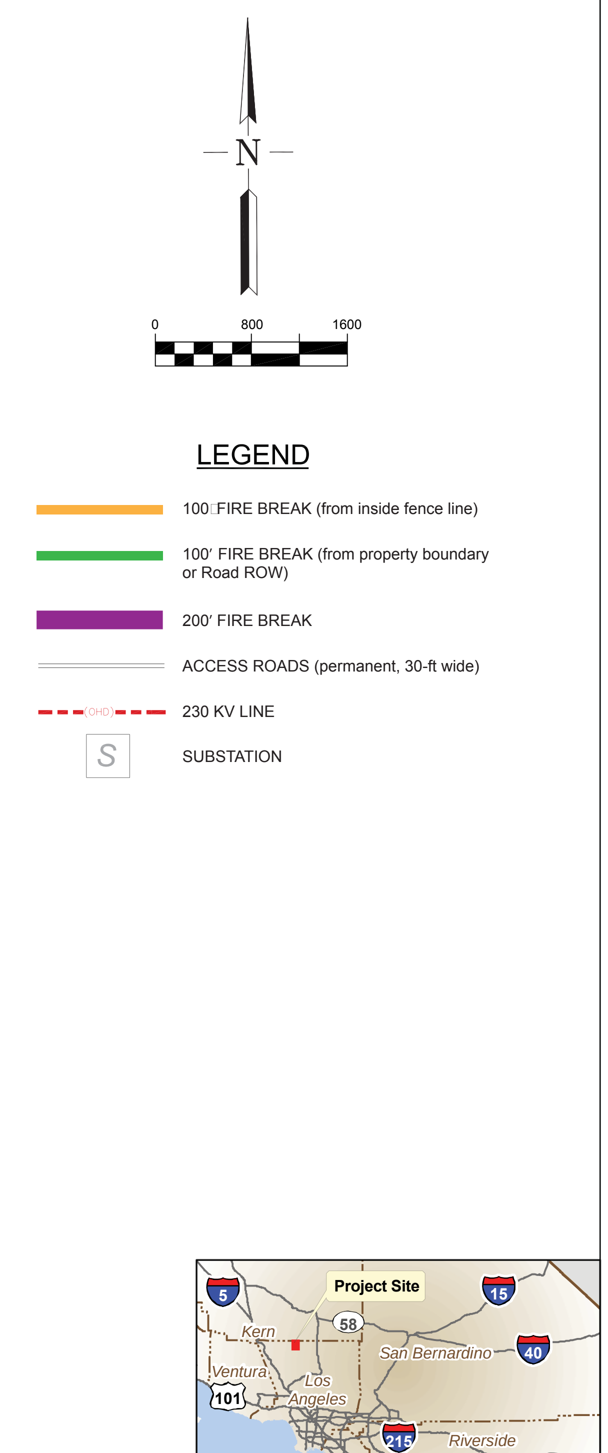
The PV panels within the solar array have been tested in accordance with Underwriters Laboratories (UL): 1) UL1703 Section 31.1 (spread of flame) and 31.2 (burning brand); as well as 2) UL790 (Standard Test Methods for Fire Tests of Roof Coverings). In accordance with these tests, the panels are rated for residential rooftop applications and have a Class C fire resistance rating (able to withstand light exposure to fire from outside sources).

T/Ladd/NextLight/ADEIR□5/AppendixK/1009-192E

Vegetation Management

Vegetation within the solar field will be maintained at a maximum of 6 inches high during the fire season (May through January), including under the solar panels and between panels. From February through April, vegetation shall be maintained at a height of no more than 18 inches. Fire breaks, as shown, will be maintained free of vegetation.





Access

All weather access roads, consisting of compacted soil, will be installed at regular intervals throughout the site. These will include a 30-foot wide perimeter access road, 30-foot wide north-south roads approximately every 1,300 feet, and 20-foot wide east-west roads approximately every 1,000 feet. Additionally, 6-foot to 12-foot wide unimproved two-track access roads will be provided between each row of solar panels, either north-south or east-west, depending on solar field design. If the unimproved roads are at least 12 feet wide, a 20-foot wide road will be provided after every fifth row of solar panels. If the roads are less than 12 feet wide, a 20-foot wide road will be provided at least every 300 feet.

Fire Control

A 100,000 gallon Fire Water/Process Water tank will be provided at the operations and maintenance building, 90,000 gallons of which will be reserved for firefighting. The discharge line for process water will be located at the 90,000 gallon elevation on the tank to ensure that 90,000 gallons of water are always available for firefighting purposes. Additionally, a 10,000 gallon fire water tank with a draft hydrant will be provided near the site access road along 170th Street West, south of State Route 138.

Fire protection measures will include sprinkler systems in the O&M building, and portable carbon dioxide (CO2) fire extinguishers will be mounted outside inverter/electrical distribution containers on pads throughout the solar array. A FM200 fire suppression system, or equivalent, will be used in the plant control room and electrical/control rooms.

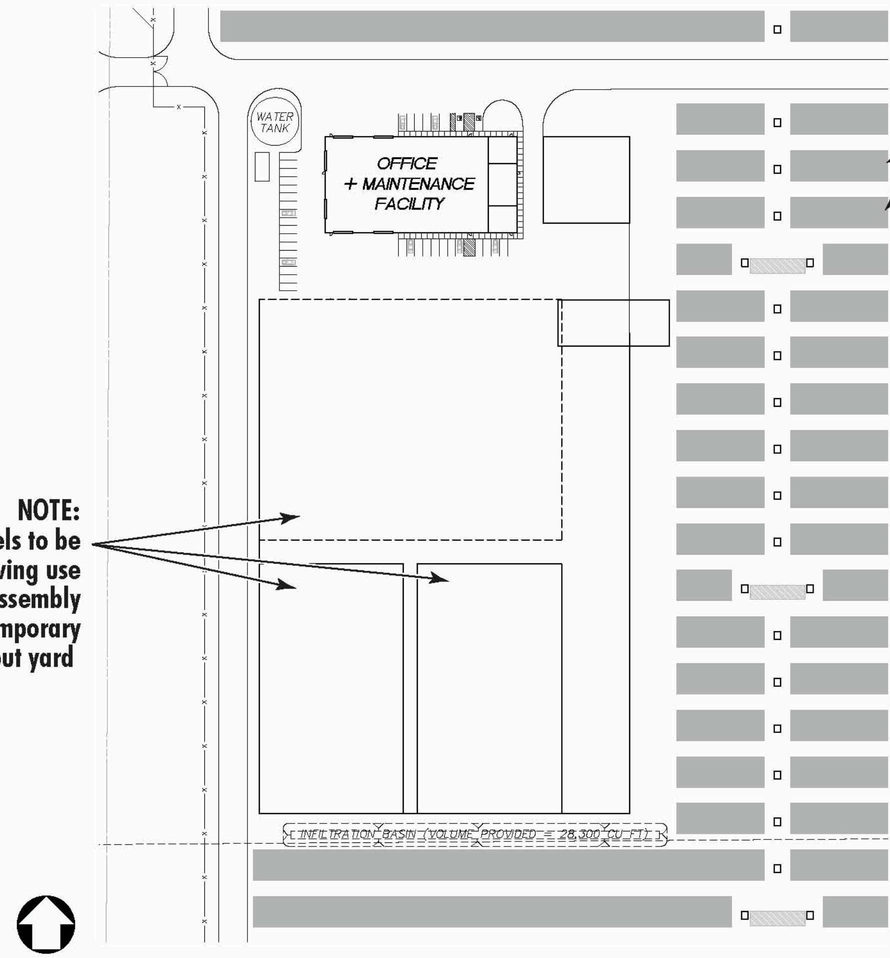
The PV panels within the solar array have been tested in accordance with Underwriters Laboratories (UL): 1) UL1703 Section 31.1 (spread of flame) and 31.2 (burning brand); as well as 2) UL790 (Standard Test Methods for Fire Tests of Roof Coverings). In accordance with these tests, the panels are rated for residential rooftop applications and have a Class C fire resistance rating (able to withstand light exposure to fire from outside sources).

Source: Psomas and Patch Services Dated 2010 Adapted from Patch Drawing D-5408-2001	AV Solar Ranch One	VEGETATION MANAGEMENT AND FIRE CONTROL	2010

T/Ladd/NextLight/ADEIR#5/AppendixK/1009-188D

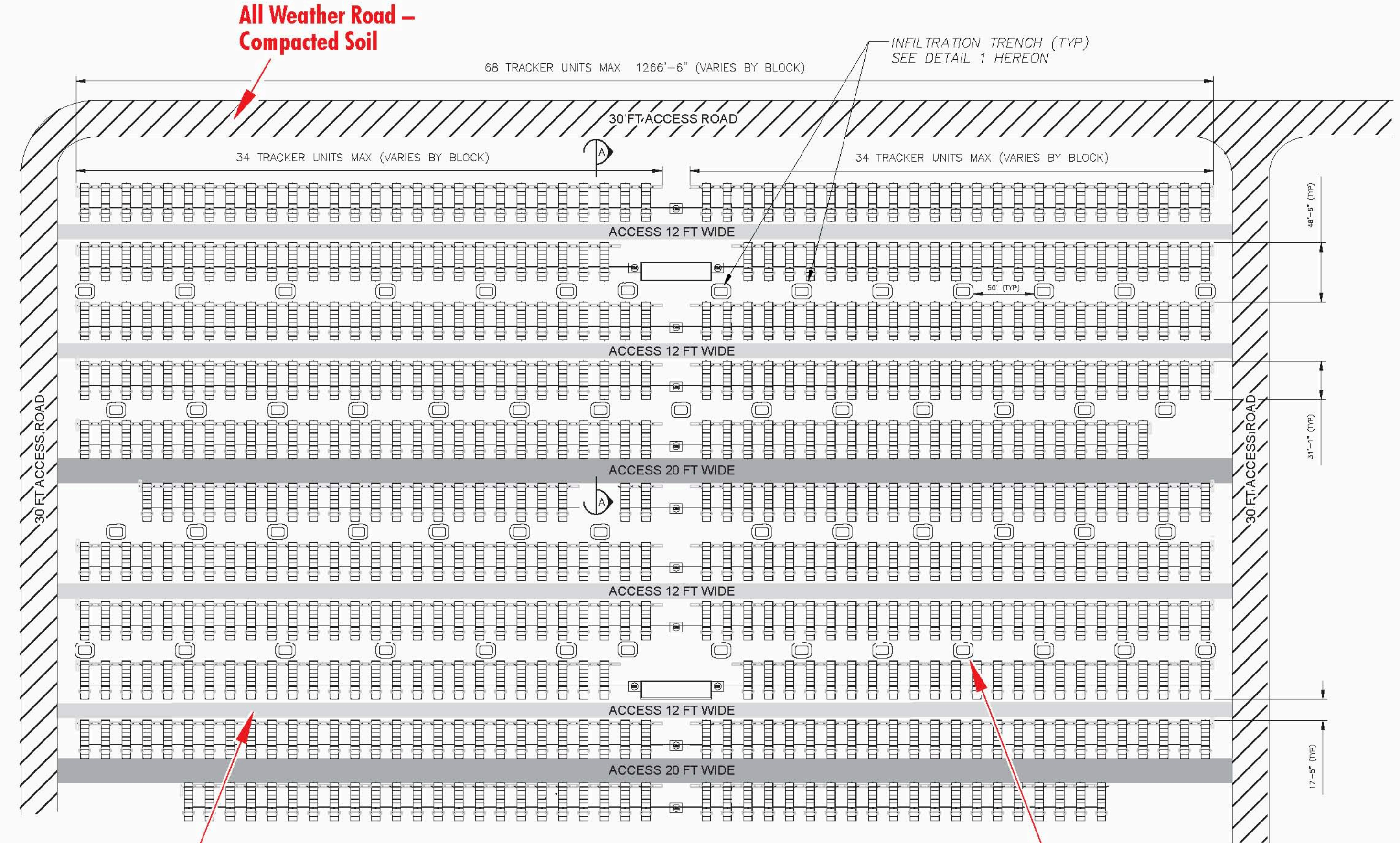
Solar panels

NOTE:
Solar panels to be installed following use of temporary assembly areas and temporary layout yard



OFFICE AND MAINTENANCE FACILITY
NOT TO SCALE

All Weather Road – Compacted Soil



TYPICAL TILTED SOLAR PANEL LAYOUT
NOT TO SCALE

All weather access roads, consisting of compacted soil, will be installed at regular intervals throughout the site. These will include a 30-foot wide perimeter access road, 30-foot wide north-south roads approximately every 1,300 feet, and 20-foot wide east-west roads approximately every 1,000 feet. Additionally, 6-foot to 12-foot wide unimproved two-track access roads will be provided between each row of solar panels, either north-south or east-west, depending on solar field design. If the unimproved roads are at least 12 feet wide, a 20-foot wide road will be provided after every fifth row of solar panels. If the roads are less than 12 feet wide, a 20-foot wide road will be provided at least every 300 feet.

Infiltration Trenches as Required by County Low Impact Development Standard

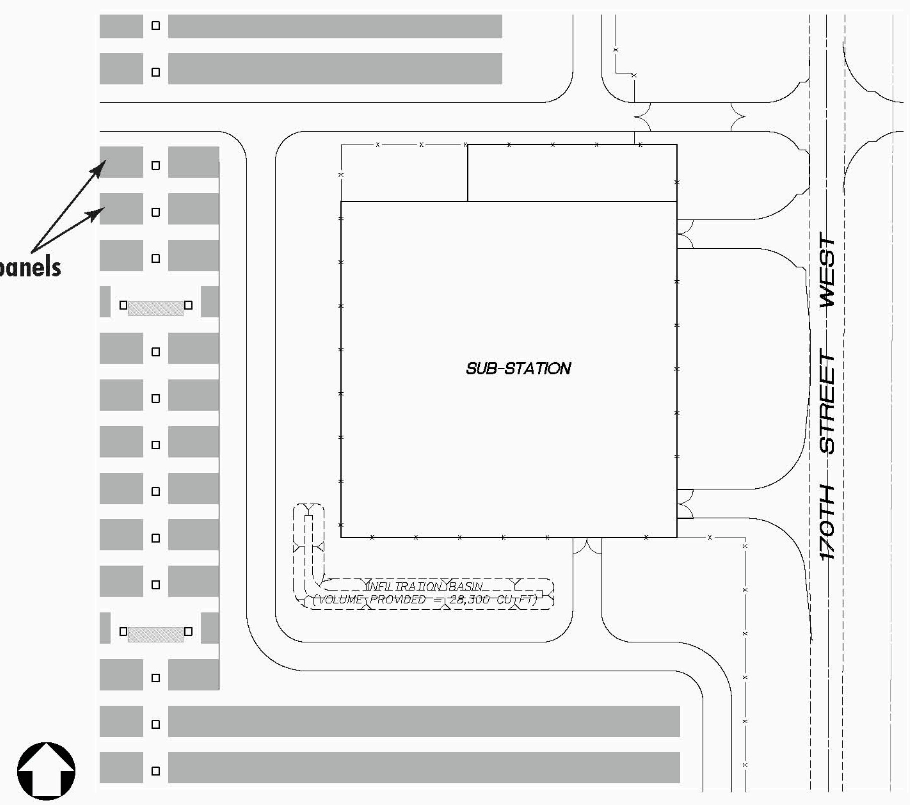
LEGEND:

- 30 FT WIDE PERMANENT ALL-WEATHER ACCESS ROAD
- 20 FT WIDE ACCESS PATHWAYS
- 12 FT WIDE ACCESS PATHWAYS
- INFILTRATION TRENCH

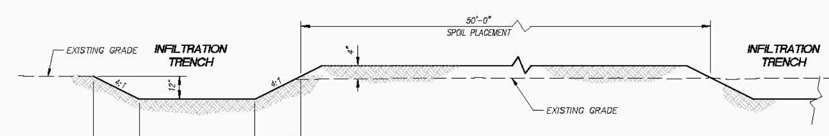
NOTE:

1. THE TILTED TRACKER INFILTRATION TRENCHES SHOWN WERE DERIVED FROM DRAINAGE CONCEPT / HYDROLOGY / LID / SUSMP DATED DEC 21, 2009

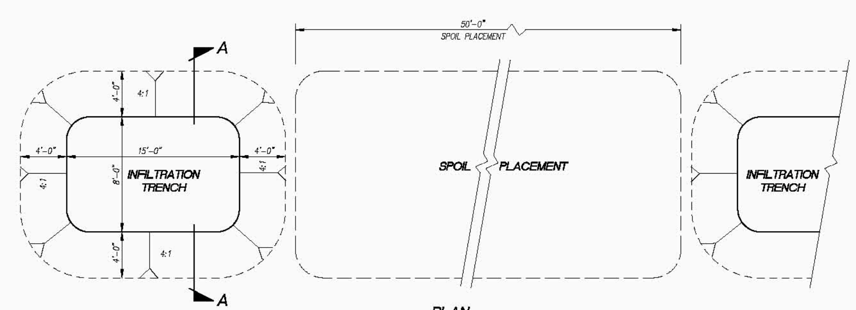
Solar panels



SUB-STATION LAYOUT
NOT TO SCALE



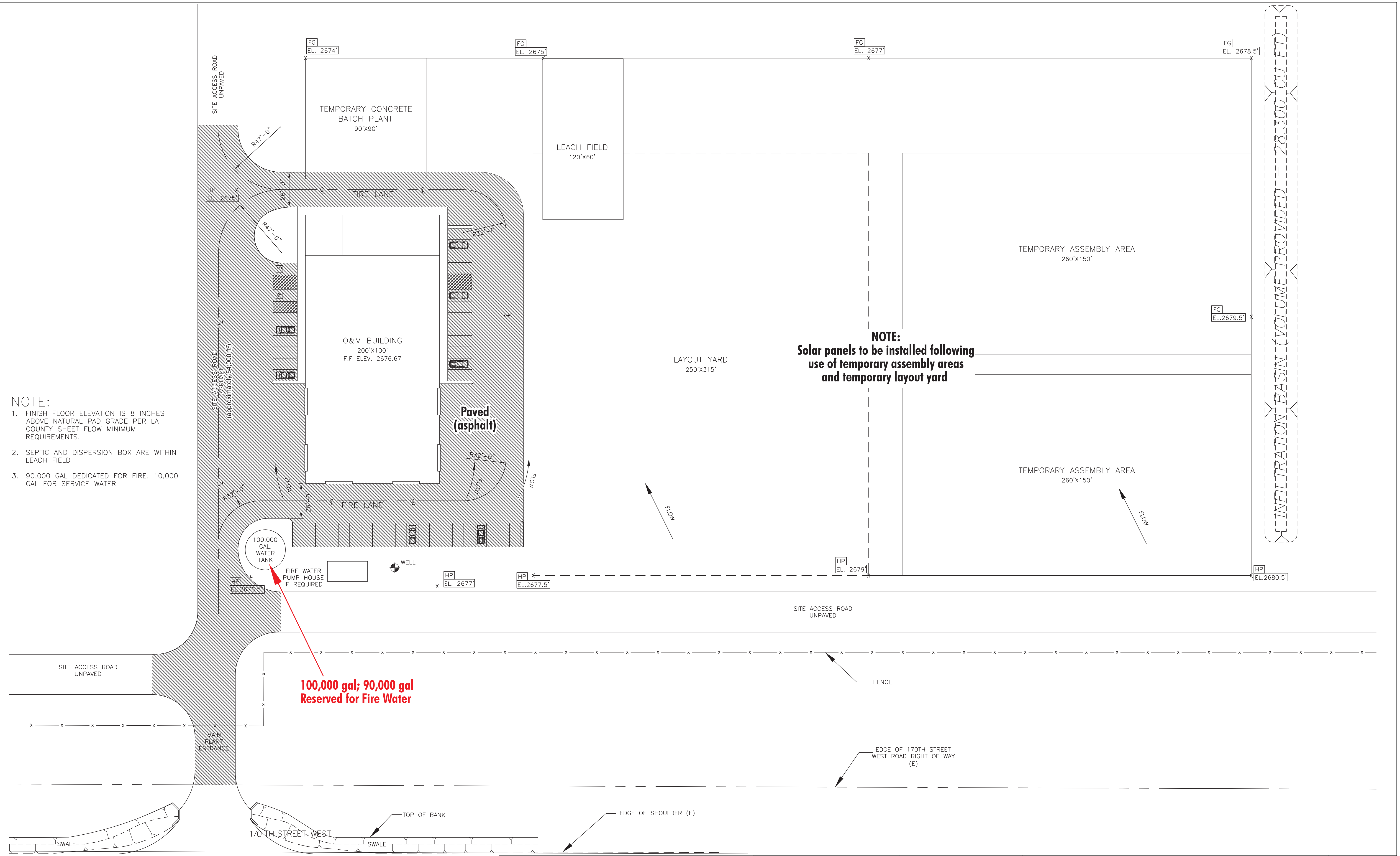
SECTION A-A



PLAN

1 TYPICAL INFILTRATION TRENCH DETAIL
NOT TO SCALE

Source: Psomas Project No.1NEX010100 HD08-01 DWG Patch: D-5408-2054	AV Solar Ranch One	SOLAR FIELD DETAIL	2010



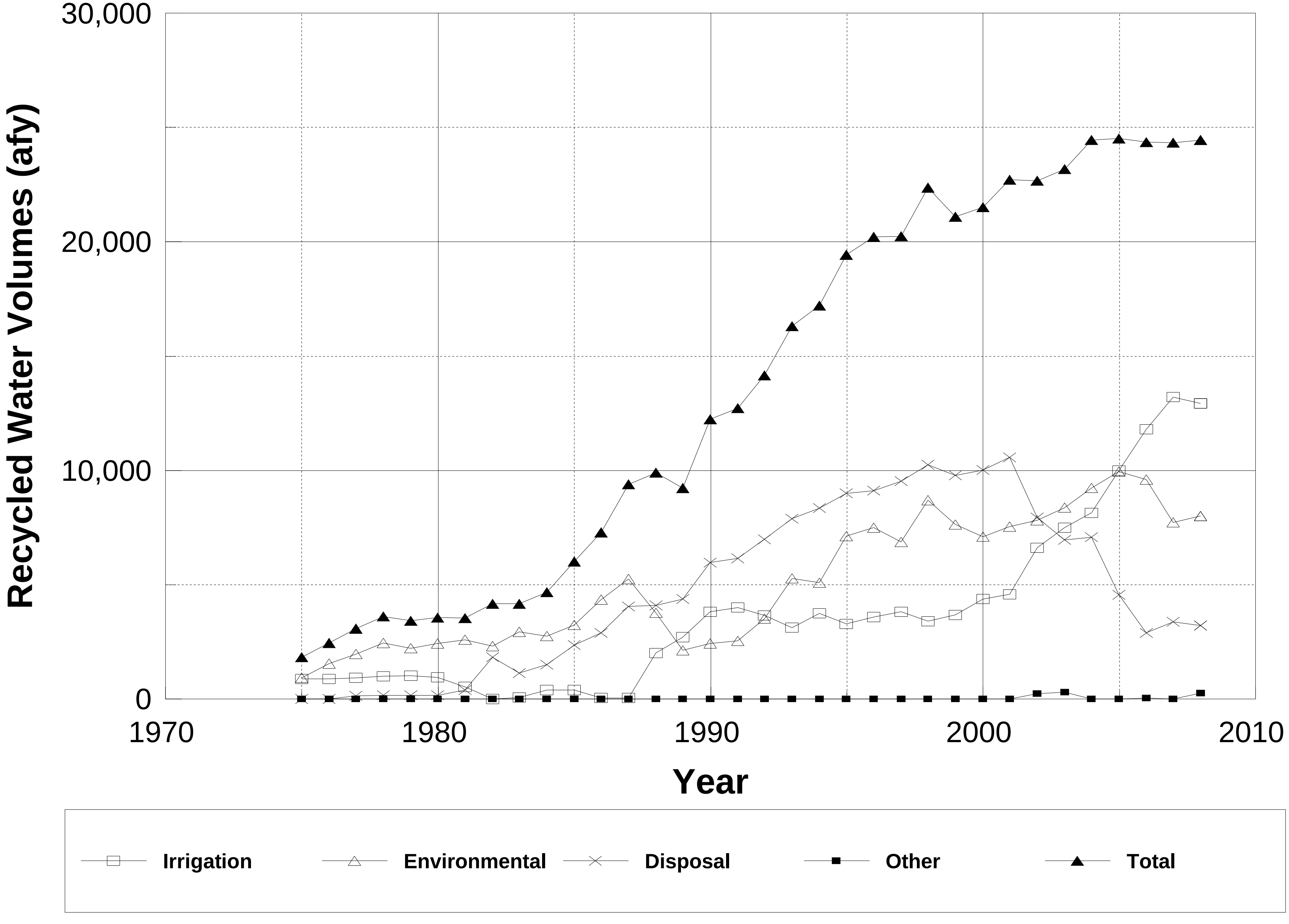
NOTE:

1. FINISH FLOOR ELEVATION IS 8 INCHES ABOVE NATURAL PAD GRADE PER LA COUNTY SHEET FLOW MINIMUM REQUIREMENTS.
2. SEPTIC AND DISPERSION BOX ARE WITHIN LEACH FIELD
3. 90,000 GAL DEDICATED FOR FIRE, 10,000 GAL FOR SERVICE WATER

Source: Patch Services Dated 5 4 2010 Patch Drawing 5408-2004 Q	AV Solar Ranch One	OPERATIONS MAINTENANCE FACILITY AREA	2010

Figure 5
Recycled Water Supply

Antelope Valley Area of Adjudication



CONFIDENTIAL APPENDIX C
NATIVE AMERICAN CONSULTATION

This appendix contains confidential archaeological site resource information and is not appropriate for public distribution. The Los Angeles County Department of Regional Planning will consider requests for this information from individuals that meet the U.S. Secretary of the Interior's Professional standards or California State Personnel Board criteria for Associate State Archaeologist or State Historian II. Disclosure to individuals not meeting these criteria violates the California Office of Historic Preservation's records access policy.