Draft
Environmental Impact Report

SCH#2005091117

Volume I
Chapters 1 through 10

Antelope Valley Water Bank Project
(By Western Development and Storage, LLC)

Specific Plan Amendment No. 13, Map 232
Specific Plan Amendment No. 2, Map 233
Alteration of Boundaries of
Agricultural Preserve No. 24 – Inclusion

Kern County
Planning Department
Bakersfield, California

April 2006

PLANNING DEPARTMENT

TED JAMES, AICP, Director
2700 "M" STREET, SUITE 100
BAKERSFIELD, CA 93301-2323
Phone: (661) 862-8600
FAX: (661) 862-8601 TTY Relay 1-800-735-2929
E-Mail: planning@co.kern.ca.us
Web Address: www.co.kern.ca.us/planning

RESOURCE MANAGEMENT AGENCY

DAVID PRICE III, RMA DIRECTOR
Community & Economic Development Department
Engineering & Survey Services Department
Environmental Health Services Department
Planning Department
Roads Department

April 10, 2006

ADDRESSEE LIST (See Distribution List)

Re: **Draft Environmental Impact Report for Antelope Valley Water Bank by Western Development and Storage (Specific Plan Amendment No. 13, Map 232, Specific Plan Amendment No 2, Map 233; Agricultural Preserve No. 24 - Inclusion -Willow Springs Specific Plan)**

Dear Interested Party:

Kern County has prepared a Draft Environmental Impact Report for the construction and operation of facilities to recharge and store imported surface water beneath agricultural properties in the west end of the Antelope Valley in Willow Springs. The proposed recharge and recovery area is a 21 square mile area (13, 440 acres) bounded by Rosamond Boulevard on the north, Avenue A to the south, 170th street west to the west and 100th Street west. Implementation of the project requires an amendment of the Willow Springs Specific Plan to change approximately 640 acres of residential and industrial designations to agricultural land use.

This Department, as Lead Agency, has determined that preparation of an Environmental Impact Report would be appropriate for the referenced projects. Enclosed is a copy of the Draft Environmental Impact Report (DEIR).

If we have not received a reply from you by **May 24, 2006, at 5:00 P.M.**, we will assume that you have no comments regarding this Draft EIR.

Sincerely,

Don Kohler
Planner 1

Chapter 5

Mandatory CEQA Considerations

5.1 Environmental Effects Found To Be Less than Significant

Section 15128 of the State CEQA Guidelines requires that an EIR contain a statement briefly indicating the reasons that various, possible, new significant effects of a project were determined not to be significant and were therefore not discussed in detail in the EIR.

Kern County has engaged the public to participate in the scoping of the environmental document. Comments received during scoping have been considered in the process of identifying issue areas that should receive attention in the EIR. The contents of this Draft EIR were established based on an Initial Study/NOP prepared in accordance with the State CEQA Guidelines, as well as public and agency input that was received during the scoping process.

Those specific issues that are found to have no impact or less-than-significant impacts during preparation of the Initial Study/NOP do not need to be addressed further in this EIR. Based on the findings of the NOP and the results of scoping (Appendix A), a determination was made that the EIR need not address in detail the following topics:

- aesthetics,
- public services, and
- recreation.

After further study and environmental review in this Draft EIR, the following environmental issues were determined to be less than significant, or could be reduced to less-than-significant levels with mitigation measures:

- agricultural resources,
- biological resources,
- cultural resources,
- geology and soils,

- hazards and hazardous materials,
- hydrology and water quality,
- land use and planning,
- mineral resources,
- noise,
- population and housing,
- public services,
- recreation,
- transportation and traffic, and
- utilities and service systems.

5.2 Significant Environmental Effects That Cannot Be Avoided

Section 15126.2 of the State CEQA Guidelines requires that an EIR describe any significant impacts, including those that can be mitigated but not reduced to less than significant. The following impact was determined to be significant and unavoidable after the project complies with all regulatory, statutory and all feasible and reasonable mitigation measures:

- Cumulatively considerable net increase of criteria pollutants for which the Project region is in non-attainment under an applicable Federal or State ambient air quality standards (Chapter 4.2 includes a full discussion of this impact).

Irreversible Impacts

Section 15126(f) of the State CEQA Guidelines provides the following direction for the discussion of irreversible changes:

> Uses of nonrenewable resources during the initial and continued phases of the project may be irreversible since a large commitment of such resources makes removal or nonuse thereafter unlikely. Primary impacts and, particularly, secondary impacts (such as highway improvements which provides access to a previously inaccessible area) generally commit future generations to similar uses. Also, irreversible damage can result from environmental accidents associated with the project. Irreversible commitments of resources should be evaluated to ensure that current consumption is justified.

Determining whether the Project would result in significant irreversible impacts requires a determination of whether key resources would be degraded or destroyed with little possibility of restoration.

The Project would result in an irreversible commitment of energy resources, primarily in the form of fossil fuels (e.g., fuel, oil, natural gas, and gasoline) for construction equipment. However, this amount is small and relatively insignificant.

The Project would include the installation of up to 40 new groundwater wells and two lift stations, which would use propane or electricity. The entire Project lies within the service area of Southern California Edison Electric Company, and the Southern California Gas Company (California Energy Commission 2005). Electrical utility lines cross the area proposed for the recharge basins. Gas utilities are adjacent to the recharge basin area. Propane would be purchased directly from local providers. Therefore, the Project would not require the construction of new utilities infrastructure.

Significant Cumulative Impacts

According to Section 15355 of the State CEQA Guidelines, the term cumulative impacts "…refers to two or more individual effects which, when considered together, are considerable or which compound or increase other environmental impacts." Individual effects that may contribute to a cumulative impact may be from a single project or a number of separate projects. Individually, the impacts of a project may be relatively minor, but when considered along with impacts of other closely related or nearly projects, including newly proposed projects, the effects could be cumulatively significant. A list of projects used in the cumulative analysis is contained in Chapter 3, "Project Description," and a full discussion of all cumulative impacts for each impact is contained in Chapter 4. The following impact was determined to be a significant and unavoidable cumulative impact that cannot be avoided after all regulatory, statutory, and feasible and reasonable mitigation measures:

- Cumulatively considerable net increase of criteria pollutants for which the Project region is in nonattainment under an applicable federal or state ambient air quality standards.

Growth-Inducing Impacts

Section 21100(b)(5) of CEQA requires an EIR to discuss how a proposed project, if implemented, could induce growth and the impacts of that induced growth (see also State CEQA Guidelines Section 15126). CEQA requires the EIR to specifically discuss (State CEQA Guidelines Section 15126.2[d]):

> the ways in which the proposed project could foster economic or population growth, or the construction of additional housing, either directly or indirectly, in the surrounding environment.

Evaluation of the growth-inducing impacts of the Project is based on a qualitative analysis of the direct impacts of constructing and operating the Project and the

indirect impacts that could result from use of the Project. This evaluation of potential growth-inducing impacts addresses whether the Project would directly or indirectly:

- foster economic, population, or housing growth;
- remove obstacles to growth;
- increase population growth that would tax community service facilities; or
- encourage or facilitate other activities that cause significant environmental impacts.

Section 15126.2(d) of the State CEQA Guidelines states specifically, "It must not be assumed that growth in any area is necessarily beneficial, detrimental, or of little significance to the environment." In other words, growth inducement is not to be considered adverse *per se*; impacts on resources resulting from growth may be too far removed from the actions of the agency to require mitigation by the agency. The goal of the EIR in this regard, therefore, is one of disclosure.

5.3 Relationship to Senate Bill 610 and Senate Bill 221, 2001

City and county land use decisions are based on a number of different factors, including economics, population dynamics, state law, and local policy. Water supply is often a secondary concern. At the same time, according to California law, water suppliers are required to serve the needs of users within their service areas (e.g., *Swanson v. Marin Municipal Water Dist*. (1976) 56 Cal.App.3d 512, 524 [water district has a "continuing obligation to exert every reasonable effort to augment its available water supply in order to meet increasing demands"]).

In an effort to improve coordination between water supply and land use planning, the State enacted in 2001 SB 610 and SB 221, which require cities and counties to obtain assessments of the availability of water to supply large new developments and to obtain assurance from water suppliers that sufficient water is available on a long-term basis before approving these new developments. Although neither of these statutes applies to the proposed Project, the Project would potentially affect the outcome of SB 610 and SB 221 assessments by improving the reliability of long-term water supplies.

The combined effect of SB 610 and SB 221 is to impose upon cities and counties the ultimate responsibility for determining the sufficiency and availability of water as part of their environmental review and approval processes. SB 610 and SB 221 require that water supply agencies inform land use jurisdictions regarding the availability of water supplies, type of infrastructure necessary to deliver the water, and impact of new development on supply reliability. SB 610 allows local land use agencies to approve development, despite a water agency's conclusion that the supplier's reliability levels would be compromised. Specifically, a water supplier could report to the local land use agency that water supplies are

insufficient, and development could still proceed regardless, should the land use authority decide to procure alternate supplies or, in the case of SB 610, adopt a statement of overriding considerations with respect to significant water supply impacts. While SB 610 and SB 221 do attempt to increase the consideration of water supply factors in development decision making, many proposed projects are not of a scale large enough to trigger the requirement to prepare a water supply assessment pursuant to SB 610 (i.e., 500 or more residences, nonresidential uses that would supply more than 1,000 persons, or mixed-use projects that would have a water demand equivalent to the demand of 500 residential units).

5.4 Current Projections of Growth

Regional planning documents and California Department of Finance (2000) data sets, and the *California Water Plan Update* (DWR 1998) were consulted for information related to current and future land use, population statistics, and planned growth rates.

California is a rapidly growing state. Its population is estimated to have increased by approximately 16% between 1990 and 2000 (California Department of Finance 2000) to a total of approximately 34 million people. The population is expected to rise to more than 47 million by 2020 (DWR 1998).

The Project is intended to serve primarily SWP contractors in Kern, Los Angeles, Orange, and San Diego counties Table 5-1 shows the projected population growth between 2005 and 2025 (in 5-year increments) for those counties.

Table 5-1. Population Forecasts

County	2005	2010	2015	2020	2025
Kern[1]	771,300	871,600	972,700	1,088,600	N/A
Northern Los Angeles[2]	614,502	735,262	852,964	967,387	1,076,013
Los Angeles[2]	10,872,806	11,453,269	11,966,736	12,469,271	12,946,947
Orange[2]	3,103,377	3,291,628	3,369,745	3,433,609	3,494,394
San Diego[1]	3,149,900	3,388,400	3,591,300	3,863,500	NA

Sources: [1] California Department of Finance 2000; [2] Southern California Association of Government 2004.

SWP contractors serving eastern Kern County and Los Angeles, Orange, and San Diego counties and their annual SWP water entitlements are listed below. (http://swpdelivery.water.ca.gov/SWP%20Delivery%20Reliability.final.2002.pdf)

- AVEK—141,400 af;
- Castaic Lake Water Agency—95,200 af;

- Little Rock Creek Irrigation District—2,300 af;
- Metropolitan Water District of Southern California—2,011,500 af;
- Palmdale Water District—21,300 af; and
- San Gabriel Valley Municipal Water District—28,800 af.

State CEQA Guidelines Section 15126.2(d) states in part that an EIR should discuss:

> …the ways in which the proposed project could foster economic or population growth, or the construction of additional housing, either directly or indirectly, in the surrounding environment. Included in this are projects which would remove obstacles to population growth (a major expansion of a waste water treatment plant might, for example, allow for more construction in service areas). Increases in the population [that] may tax existing community service facilities, requiring construction of new facilities that could cause significant environmental effects. Also [the EIR should] discuss the characteristic of some projects which may encourage and facilitate other activities that could significantly affect the environment, either individually or cumulatively.

Some guidance for dealing with growth-inducing impacts when the location and extent of the impacts is to some extent speculative is provided by the Court's ruling in *Napa Citizens for Honest Government v. Napa County Board of Supervisors* ([2001] 91 Cal. App. 4th 342). The sufficiency of analysis of growth-inducing impacts was an issue contested in that case. In its decision, the Court provided the following guidance:

> …the EIR must discuss growth-inducing impacts even though those impacts are not themselves a part of the project under consideration, and even though the extent of the growth is difficult to calculate.
>
> It does not follow, however, that an EIR is required to make a detailed analysis of the impacts of a project on housing and growth. **Nothing in the [CEQA] Guidelines, or in the cases, requires more than a general analysis of projected growth.** [Emphasis added.] The detail required in a particular case necessarily depends on a multitude of factors, including, but not limited to, the nature of the project, the directness or indirectness of the contemplated impact and the ability to forecast the actual effects the project will have on the physical environment…Indeed, the purpose of CEQA would be undermined if the appropriate governmental agencies went forward without an awareness of the effects a project will have on areas outside of the boundaries of the project area. That the effects of a project will be felt outside of the project area, however, is one of the factors that determines the amount of detail required in any discussion. Less detail, for example, would be required where those effects are more indirect than effects felt within the project area, or where it [would] be difficult to predict them with any accuracy.
>
> Because it cannot be known if the Project will cause growth in any particular area, and because the Project most likely will not be the sole contributor to growth in any particular area, it is not, however, reasonable to require the FSEIR [Final Supplemental EIR] to undertake a detailed analysis of the results of such growth.

> Neither CEQA itself, nor the cases that have interpreted it, require an EIR to anticipate and mitigate the effects of a particular project on growth [in] other areas.
>
> The FSEIR need not forecast the impact that the housing will have on as yet unidentified areas and propose measures to mitigate that impact. That process is best reserved until such time as a particular housing project is proposed.

Two CEQA-related concepts are important to keep in mind in determining the level of analysis to be provided. First, CEQA is concerned with identifying impacts related only to physical changes in the environment. To evaluate the growth-related physical changes in the environment that may occur from a project, it is necessary to identify where and to what extent future growth will occur. The direct growth-related impacts of a water supply project would involve localized economic impacts, such as job growth and temporary increased demand for housing related to project construction. The indirect impacts of water supply projects are related to the physical changes (i.e., new construction) that would occur as a result of the additional water supplies being available to local governments. It can be difficult to identify with any degree of precision potential indirect growth-related impacts resulting from an increase in water supply when the area subject to the increase is large and the specific locales that may receive additional water are not known.

The second important concept to keep in mind is that CEQA does not require undue speculation in predicting actual environmental consequences (State CEQA Guidelines §§ 15144, 15145). Thus, while it is acknowledged that additional water supplies can be growth-inducing, it is the responsibility of the lead agencies to describe the impacts of their project only to the extent that those impacts can be either known or reasonably predicted. Further, lead agencies are not required to adopt mitigation for impacts that require a great deal of speculation even to describe, and that are ultimately not within their control or statutory authority. (*Napa Citizens for Honest Government v. Board of Supervisors* [2001] 91 Cal.App.4th 342.)

The Project would increase the reliability and flexibility of water supplies for SWP contractors with existing entitlements. Although the Project does not include applications to appropriate water, it could remove or reduce an obstacle to growth because the available water supply would be increased as a result of greater reliability or flexibility. The degree to which the Project could remove an obstacle to growth is limited by uncertainties in the amount of SWP water that would be available to the Project, decreases in water supplies that have been available to southern California historically, and the size of the Project relative to planned growth in southern California.

If the Project could be fully utilized, on average, up to 90,000 af per year of water could be made available (100,000 af recharged minus 10% leave-behind) to entities holding SWP entitlements. The actual amount of increase in the available water supply would be significantly less than 90,000 af because water

would not be available for recharge in all years and the full recharge capacity is unlikely to be used in most years.

Additionally, future water supplies from the Owens Valley and Colorado River that have been available to southern California historically will not be available in the same quantities as in the past. Dust mitigation measures to be implemented in the Owens Valley by LADWP will require approximately 40,000 af of water per year (LADWP 2005). The amount of Colorado River water available to southern California is decreasing as Arizona and Nevada grow and demand more of their apportionments (MWD 2005). The relatively small increase in reliability afforded by the Project is unlikely to fully compensate for the decreasing reliability of other water supplies serving southern California. Thus, the Project may be used to meet current demand as these other supplies become less available or reliable.

Various estimates have been developed regarding household water demand, ranging from 0.5 af per year (MWD 2005) to 1.2 af per year (AVEK 2005). The water demands associated with current projections of growth for eastern Kern County, Los Angeles, Orange, and San Diego Counties over the next 20 years (approximately 3,700,000 people) far exceed the capacity of the proposed Project. By itself, AVEK's projections of water supply shortfalls approach the annual capacity of the proposed Project (AVEK 2005). The Project is not oversized such that it would induce growth throughout the region that it might potentially serve.

Although the Project is not oversized and may not completely compensate for the decreasing reliability of other water supplies serving southern California, it could nonetheless remove or reduce an obstacle to some level of growth. It cannot be known precisely when and where future growth may occur in Antelope Valley, Los Angeles County, Orange County, or San Diego County. It is, however, reasonable to assume that most of the growth would occur in accordance with current city and county general plans. By providing increased reliability, the Project could enable such jurisdictions to approve a larger aliquot of their planned growth than might have been possible under SB 610 and SB 221 without the Project. Removal or reduction of an obstacle to growth could accommodate growth that has already been planned for in those areas. Growth that could occur as a result of the removal of this obstacle could affect agricultural resources, air quality, biological resources, cultural resources, hydrology and water quality, noise, transportation and traffic, and utilities and services.

Chapter 6
Alternatives

6.1 Introduction

Section 15126.6 of the State CEQA Guidelines states:

> An EIR shall describe a range of reasonable alternatives to the project, or to the location of the project, which would feasibly attain most of the basic objectives of the project but would avoid or substantially lessen any of the significant effects of the project, and evaluate the comparative merits of the alternatives. An EIR need not consider every conceivable alternative to a project.

This chapter provides a description of Project alternatives and a comparative evaluation of the potential environmental effects of the Project relative to the alternatives. Five alternatives are analyzed in detail in this EIR:

- Alternative A: no project
- Alternative B: other locations in or near Antelope Valley,
- Alternative C: use of injection wells to place imported surface water into the aquifer,
- Alternative D: traditional (surface) reservoirs to store imported surface water, and
- Alternative E: in-lieu recharge.

This chapter describes the screening process for alternatives used in this planning effort and the differences in the construction-related and operation-related environmental effects expected under each alternative compared to the proposed Project. The preferred alternative is identified.

As indicated in Chapter 3, "Project Description," the Project would entail importing water from the SWP via the East Branch of the California Aqueduct to the Project for recharge and storage underground. When needed, up to 90% stored water would be recovered for delivery to various water agencies, such as those in Kern, Los Angeles, and Orange Counties.

6.2 Alternatives Screening Process

An EIR must describe a range of reasonable alternatives to the project or to the project location that feasibly would attain the basic project objectives while avoiding or substantially lessening the significant environmental impacts of the project. Alternatives may be eliminated from detailed consideration in the EIR if they fail to meet the basic project objectives, are determined to be infeasible, or cannot be demonstrated to avoid or lessen significant environmental impacts.

Alternatives analyzed in this EIR were developed considering Project objectives and significant environmental impacts of the Project.

Project Objectives

The applicant has stated that the primary purpose of the Project is to provide additional water storage to supply the needs of Antelope Valley and, potentially, other regions of southern California, through facilities that are of sufficient size and scope to be both cost effective and environmentally sound. To accomplish this purpose, the primary Project objective is to import SWP water when it is available (typically, wet years) for recharge and storage underground, and then recover it when needed. A secondary objective is to leave some of the recharged water in the aquifer to aid in recovery of overdraft or to slow the decline of the water table. A third objective is to continue farming Project lands using organic farming practices when the land is not being used for recharge purposes.

The applicant's objectives for the Project are to:

- enhance water supply reliability and flexibility in a cost-effective and environmentally sound manner;
- help reduce aquifer overdraft;
- allow continuation of agricultural uses on Project lands; and
- encourage conjunctive use, where appropriate.

Site characteristics that are important for water recharge and recovery projects are summarized in Table 6-1.

Significant Environmental Impacts of the Project

Significant potential impacts are identified for the following subject areas: agricultural resources, air quality, biology, cultural resources, geology and soils, hazards and hazardous materials, hydrology and water quality, noise, and traffic. Mitigation measures have been proposed that would reduce all potential impacts to less than significant levels except for the Project's cumulatively considerable net increase of criteria pollutants for which the Project region is in non-

Table 6-1. Important Water Bank Siting Criteria

Hydrogeologic Criteria
Sandy near surface soils (0–15 feet below ground surface, bgs) with an average vertical saturated hydraulic conductivity of at least 0.5 foot/day
No significant, laterally continuous hardpan, silts, or clays between the surface and the current water table
At least 100 feet of dewatered aquifer space for water storage.
At least 300,000 af of available storage space
The portion of the aquifer in which water is to be stored should be isolated hydrogeologically from large urban pumping centers.
Average well yields of at least 1,000 gpm
No California Title 22 water quality criteria or USEPA Maximum Contaminant Level exceedances in groundwater
No significant leachable salts remaining in soils (i.e., long-term irrigation has already leached most salts)
Water Availability Criteria
At least two available water sources
No California Title 22 water quality criteria or USEPA Maximum Contaminant Level exceedances in source water
A history of having used the source surface water locally with no adverse impact on native groundwater
Water available over at least 4 months in wet years
Location and Conveyance Criteria
Within the service area of a water agency with responsibility for delivering surface water supplies
Uphill of the major pumping plants to take advantage of off-peak pumping costs when available
Topographically lower than conveyances used to deliver water into the facility to minimize storage costs
Topographically higher than client agencies that would use the storage to minimize delivery costs
Near to at least two regional conveyances
Electrical and gas utility lines available within 1 mile
Existing wells and piping that could be incorporated into the facility
At least 200 cfs of wheeling capacity in regional conveyances
Economic Criteria
An ability to continue obtaining agricultural revenues from the land through organic farming during non-recharge periods (up to 70% of the time)
Environmental and Permitting Criteria
Well documented historical land use and crop types
No historical land uses that could have left behind leachable concentrations of contaminants that could significantly degrade groundwater when mobilized by recharge operations
No current or past surrounding land uses that would degrade groundwater quality (1-mile radius)
In a county that is familiar with water banks and accepts water banks as compatible with Williamson Act contracts
No wetlands, or other waters of the United States
Political and Land Use Criteria
Local need
No known historical or current opposition to water banking
Available parcels not significantly subdivided

attainment under an applicable Federal or State ambient air quality standards. This cumulative impact is significant and unavoidable.

6.3 Alternatives Analyzed in the Draft Environmental Impact Report

The following alternatives have been evaluated for their feasibility and their ability to achieve the Project objectives while avoiding, reducing, or minimizing significant impacts identified for the Project. These alternatives (with the exception of the *No-Project* Alternative) could meet some of the Project objectives.

The degree to which these alternatives substantially lower the significant impacts identified for the Project is discussed below. All subject areas for which significant impacts were identified are analyzed for each alternative, although at a more general level than in Chapter 4, as provided by CEQA.

6.4 Comparison of Alternatives

Alternative A: No-Project Alternative

No project would mean that a project to store available SWP water underground in the western Antelope Valley would not developed. The Willow Springs Specific Plan (WSSP) would not be amended, and 640 acres would not be included in Agricultural Preserve No. 24. The properties would continue to be used primarily for agriculture.

Impact Analysis

If the Project were not constructed, the potential adverse impacts related to the Project would not occur. Air quality and noise impacts associated with ongoing agricultural operations, however, would continue. Additionally, beneficial impacts associated with Project, such as enhancing water supply reliability and helping reduce the rate of aquifer overdraft, also would not occur.

6.5 Alternatives

Alternative B: Other Locations in or near Antelope Valley

Characteristics

This alternative would entail construction of a similar project at a different location that can feasibly receive SWP water, store it, and have the water be recoverable and feasibly returnable to the SWP. Based on the selection criteria described above, WDS considered eight specific locations in greater detail. Three locations had highly permeable near-surface soils—the proposed Project location, a site approximately 7 miles west of the proposed Project, and a site approximately 7 miles southwest of the proposed Project.

Impact Analysis

Agricultural Resources

Potential agricultural impacts associated with adverse soil and crop effects from elevated groundwater levels under Alternative B would likely be less than those associated with the proposed Project because the alternative sites have less agricultural development.

Air Quality

Air quality impacts under Alternative B would be same as those associated with the proposed Project because the size of the projects, the nature of construction impacts (disturbance of large areas and volumes of soil), and operations impacts (emissions from fossil-fuel powered pumps) would be the same. Alternative B would result in a cumulatively considerable net increase of criteria pollutants for which the region is in non-attainment under an applicable Federal or State ambient air quality standards. This cumulative impact would be significant and unavoidable.

Biology

Biological impacts associated with Alternative B would be similar although greater than those of the proposed Project. They would be similar in nature because they would occur in similar habitats. The impacts would be greater, however, because recharge basins associated with Alternative B would disturb a greater area of natural habitat, whereas the proposed Project would locate the recharge basins in agricultural areas.

Cultural Resources

Potential impacts on cultural resources would be expected to be greater for Alternative B than the proposed Project. Alternative B considers locations closer to the western and southern edges of Antelope Valley. These alternative locations would be considered more sensitive for cultural resources than the valley floor because analyses of previous cultural surveys in the western end of the Antelope Valley suggests that the valley floor has a low sensitivity for prehistoric and historical cultural resources.

Geology and Soils

Potential soil erosion and topsoil impacts under Alternative B would be same as those associated with the proposed Project because the size of the projects and the nature of construction impacts (disturbance of large areas and volumes of soil) would be the same.

Hazards and Hazardous Materials

Impacts under Alternative B associated with potential hazardous materials releases would be same as those associated with the proposed Project because the size of the projects and the nature of hazardous materials use would be the same. Impacts under Alternative B associated with potential increases in mosquito populations would be same as those associated with the proposed Project because the size of the projects and the nature of recharge activities (e.g., seasonality, depth of water, duration of recharge) would be the same. The proposed Project could affect flight operations within the R-2508 Complex if the recharge basins were to attract birds. These birds could create a bird air strike hazard. Alternative B would present a similar potential impact, and, although the alternate locations would be located farther from Edwards Air Force Base, they nonetheless lie within the R-2508 Complex.

Hydrology and Water Quality

Potential impacts on hydrology and water quality would be expected to be the same for Alternative B and the proposed Project because the nature of construction and operation would be the same. The location 7 miles west of the proposed Project, however, has not been irrigated with SWP water historically, and arsenic in groundwater has been identified as a potential concern.

Noise

Potential impacts related to noise impacts would be expected to be the same for Alternative B and the proposed Project because the nature of construction and operation would be the same.

Transportation and Traffic

Potential impacts on traffic would be expected to be the same for Alternative B and the proposed Project because the nature of construction and operation would be the similar, although locations considered for Alternative B would not cross State Route 138.

Alternative C: Use of Injection Wells

Characteristics

This alternative would entail the installation of injection wells for recharge, rather than infiltration basins. Based on extrapolation of pilot tests performed in Lancaster, WDS estimates that approximately 189 injection wells would be needed to provide the same recharge capacity as the proposed Project and that the capital costs of building an injection well system would be more than $91 million. Additionally, imported water would have to be treated before being injected in order to remove suspended solids that would otherwise clog the well or the aquifer formation. Therefore, a water treatment system would need to be constructed and then operated for the duration of the project.

The Los Angeles County Department of Public Works proposed a small-scale injection well project in Antelope Valley in 2003, the Waterworks District No. 40 Antelope Valley Aquifer Storage and Recovery Project (California Office of Planning and Research 2005).

Impact Analysis

Agricultural Resources

Potential agricultural impacts associated with adverse soil and crop effects from elevated groundwater levels under Alternative C would be the same as those associated with the proposed Project.

Air Quality

Temporary construction-related air quality impacts would be less than those of the proposed Project because no recharge basins would be constructed. However, ongoing operations-related impacts would be greater than those associated with the proposed Project because pumps would have to be operated to inject the imported surface water into the aquifer. Alternative B would result in a cumulatively considerable net increase of criteria pollutants for which the region is in non-attainment under an applicable Federal or State ambient air quality standards. This cumulative impact would be significant and unavoidable.

Biology

Potential biological impacts associated with Alternative C would be marginally less than those associated with the proposed Project. Although Alternative C would have a smaller project footprint because recharge basins would not be constructed, the recharge basins would have little impact on biological resources because the proposed Project would locate them on agricultural lands. Biological impacts associated with construction of recovery wells and delivery pipelines would be the same as those associated with the proposed Project.

Cultural Resources

Potential impacts on cultural resources associated with Alternative C would be marginally less than those associated with the proposed Project. Although Alternative C would have a much smaller project footprint because recharge basins would not be constructed, the proposed Project would locate the recharge basins in an area that has a low sensitivity for cultural resources and has been extensively disturbed by agricultural practices.

Geology and Soils

Potential geology and soils impacts associated with Alternative C would be less than those associated with the proposed Project because in Alternative C the recharge basins would not be constructed. Impacts associated with construction of recovery wells and distribution pipelines would be the same as those associated with the proposed Project.

Hazards and Hazardous Materials

Construction-related impacts under Alternative C associated with potential hazardous materials releases would be less than those associated with the proposed Project because the recharge basins would not be constructed. Similarly, impacts under Alternative C associated with potential increases in mosquito populations would be less than those associated with the proposed Project because there would not be large open water bodies. Alternative C would not create potential bird air strike hazards because recharge basins would not be constructed.

Hydrology and Water Quality

Potential hydrology and water quality impacts associated with Alternative C are greater than those associated with the proposed Project. Under the proposed Project, imported surface water placed in the recharge basins is “filtered” as it passes through subsurface soils. Left untreated, injection of the imported surface

water would deliver both dissolved and suspended materials directly into the aquifer.

Noise

Temporary construction-related noise impacts would be less than those of the proposed Project because no recharge basins would be constructed. Impacts associated with construction of recovery wells and distribution pipelines would be similar to those associated with the proposed Project. However, ongoing operations-related impacts would be greater than those associated with the proposed Project because pumps would have to be operated to inject the imported surface water into the aquifer.

Transportation and Traffic

Temporary construction-related traffic impacts would be less than those of the proposed Project because no recharge basins would be constructed. Impacts associated with construction of recovery wells and distribution pipelines, including crossing State Route 138, would be the same as those associated with the proposed Project.

Alternative D: Aboveground Storage

Characteristics

This alternative would entail construction of a reservoir at a location with suitable characteristics. The topography and soil permeability of the proposed Project site are not suitable for a reservoir.

A specific location for an off-stream reservoir has not been proposed in Antelope Valley; however, Reclamation and the DWR have considered facilities of similar capacity for the southern San Joaquin Valley. With a capacity of 450,000 af, the Yokohl Valley Reservoir is an example of such a project. As envisioned, water from the Friant-Kern Canal, when available, would be pumped to the reservoir. When needed, the water would be released from the reservoir back to the Friant-Kern Canal via Yokohl Creek. Initial investigations that assessed the feasibility of the Yokohl Valley Reservoir found it would have a surface area of approximately 4,550 acres and would require a total of 9,280 acres of land acquisition. Construction costs were estimated to be $350 million, exclusive of land acquisition, reservoir clearing, road construction or relocation, and needed environmental mitigation (Montgomery Watson Harza 2003)

Lake Isabella, constructed by the U.S. Army Corps of Engineers in 1953, is another example of a Kern County reservoir. Its capacity of 568,000 af is

comparable to that of the Project. Lake Isabella has a surface area of approximately 14,000 acres (Reclamation 2005).

Impact Analysis

Agricultural Resources

Potential agricultural impacts associated with adverse soil and crop effects from elevated groundwater levels under Alternative D would be less than those associated with the proposed Project because the water would not be stored underground.

Air Quality

Construction-related impacts on air quality would be greater than those of the proposed Project because, in order to achieve the desired storage capacity, a much larger area would be disturbed. Alternative D would result in a cumulatively considerable net increase of criteria pollutants for which the region is in non-attainment under an applicable Federal or State ambient air quality standards. This cumulative impact would be significant and unavoidable.

Biology

Impacts on biological resources likely would be greater than those of the proposed Project because, in order to achieve the desired storage capacity, a much larger area would be disturbed.

Cultural Resources

Impacts on cultural resources likely would be greater than those of the proposed Project because, in order to achieve the desired storage capacity, a much larger area would be disturbed.

Geology and Soils

Impacts on cultural resources likely would be greater than those of the proposed Project because, in order to achieve the desired storage capacity, a much larger area would be disturbed.

Hazards and Hazardous Materials

Impacts associated with hazards and hazardous materials would be greater than those of the proposed Project. The greater surface area associated with a traditional reservoir would likely attract more birds that could present hazards to aviation.

Hydrology and Water Quality

Potential hydrology and water quality impacts associated with Alternative D are greater than those associated with the proposed Project. Under the proposed Project, imported surface water placed in the recharge basins is filtered as it passes through subsurface soils. Storage of imported surface water in reservoirs would not provide this benefit, and the water recovered from such a reservoir may require additional treatment. Importantly, water stored in a surface reservoir would not offer the benefits of helping reduce the aquifer overdraft condition that exists in Antelope Valley.

Noise

Construction-related noise impacts would be greater than those of the proposed Project because, in order to achieve the desired storage capacity, a much larger area would be disturbed. Operations-related noise impacts may be similar to the proposed Project, depending on the location of the reservoir and the pumps required to deliver water back to the SWP.

Transportation and Traffic

Impacts on transportation and traffic likely would be greater than those of the proposed Project because, in order to achieve the desired storage capacity, a much larger area would be disturbed.

Alternative E: In-Lieu Recharge

Characteristics

In-lieu recharge refers to the practice whereby overlying pumpers, most often farmers, substitute imported surface water supplies for those supplies that otherwise would have been pumped from the underlying aquifer. Water supplies banked by in-lieu means are not physically introduced into the aquifer (except for a small quantity), but instead a like amount of water is not pumped from the groundwater basin. Water customers are offered surface water supplies at rates that are competitive with the cost of pumping groundwater. This price incentive

encourages them to purchase surface water supplies, which are banked, instead of pumping groundwater.

The major drawback to in-lieu recharge is that the ability to bank water is limited by customer demand, which frequently does not coincide with the availability of water to be banked. This limitation obviously constricts the overall ability of a region to bank water based on the annual agricultural demand. This constriction is exacerbated further because agricultural water demand is most often at its peak during summer months, while surplus water supplies, which would be available for banking, are most often available during winter and early spring.

According to AVEK's Draft Urban Water Management Plan, the entire agricultural demand for surface water in AVEK's service territory is anticipated to be less than 8,000 af/yr (AVEK 2005). Additionally, as previously stated, the seasonal demand does not necessarily coincide with the availability of imported SWP water.

Impact Analysis

Agricultural Resources

Potential agricultural impacts associated with adverse soil and crop effects from elevated groundwater levels under Alternative E would be similar to those associated with the proposed Project because both projects would store water underground.

Air Quality

Construction-related air quality impacts would be less than those of the proposed Project because no recharge basins would be constructed. However, ongoing operations-related impacts would be the same as those associated with the proposed Project because pumps would still need to be operated to recover and deliver the water back the California Aqueduct. Alternative E would result in a cumulatively considerable net increase of criteria pollutants for which the region is in non-attainment under an applicable Federal or State ambient air quality standards. This cumulative impact would be significant and unavoidable.

Biology

Potential biological impacts associated with Alternative E would be similar to those associated with the proposed Project. Although Alternative E would have a smaller project footprint because recharge basins would not be constructed, the recharge basins would have little impact on biological resources because the proposed Project would locate them on agricultural lands. Impacts associated with construction of delivery pipelines would be the same as those associated with the proposed Project.

Cultural Resources

Potential impacts on cultural resources associated with Alternative 4 would be marginally less than those associated with the proposed Project. Although Alternative E would have a much smaller project footprint because recharge basins would not be constructed, the proposed Project would locate the recharge basins in an area that has a low sensitivity for cultural resources and has been extensively disturbed by agricultural practices.

Geology and Soils

Potential geology and soils impacts associated with Alternative E would less than those associated with the proposed Project. Alternative E would have a smaller project footprint because recharge basins would not be constructed. Impacts associated with construction of delivery pipelines would be the same as those associated with the proposed Project.

Hazards and Hazardous Materials

Construction-related impacts under Alternative E associated with potential hazardous materials releases would be less than those associated with the proposed Project because the recharge basins would not be constructed. Similarly, impacts under Alternative E associated with potential increases in mosquito populations would be less than those associated with the proposed Project because there would not be large open water bodies. Alternative C would not create potential bird air strike hazards because recharge basins would not be constructed.

Hydrology and Water Quality

Potential water quality impacts associated with Alternative E are the same as those associated with the proposed Project. However, the proposed Project could recharge and recover water whenever it is available. The capacity and flexibility of an in-lieu program would be limited by the demand for irrigation water.

Noise

Temporary construction-related noise impacts would be less than those of the proposed Project because no recharge basins would be constructed. Impacts associated with construction of delivery pipelines and recovery of the water would be the same as those associated with the proposed Project.

Transportation and Traffic

Temporary construction-related traffic impacts would be less than those of the proposed Project because no recharge basins would be constructed. Impacts associated with construction of delivery pipelines would be the same as those associated with the proposed Project.

Summary of Alternatives Comparison

The proposed Project is preferred over the other alternatives considered for environmental and other reasons. Table 6-2 compares the relative degree of potential environmental impacts of each of the alternatives with the proposed Project.

Table 6-2. Degree of Potential Environmental Impact for Each Alternative Compared to the Proposed Project

Resource Area	Alternative B Alternate Location	Alternative C Use of Injection Wells	Alternative D Aboveground Storage	Alternative E In-lieu Recharge
Agricultural Resources	+	+	+	=
Air quality	=	–	–	+
Biological resources	–	+	–	+
Cultural resources	–	+	–	+
Geology and soils	=	+	–	+
Hazards and hazardous materials	=	+	–	+
Hydrology and water quality	–	–	–	–
Noise	=	–	–	+
Transportation and traffic	=	=	–	+

+ fewer impacts than the proposed Project.
– greater impacts than the proposed Project.
= relatively equivalent to the proposed Project.

Alternative A (No-Project Alternative)

If the Project were not constructed, the potential adverse impacts related to the Project would not occur. Air quality and noise impacts associated with ongoing agricultural operations, however, would continue. The No-Project Alternative would not satisfy the Project objectives. Specifically, it would not:

- enhance water supply reliability and flexibility,
- help reduce the rate of aquifer overdraft, and
- encourage conjunctive use.

Alternative B (Alternate Location)

Alternative B could result in greater adverse impacts related to biological resources, cultural resources, and water quality. Although Alternative B could reduce the potential for bird air strike hazards because it could be located farther from Edwards Air Force Base, it would nonetheless lie within the R-2508 Complex. Therefore, the proposed Project is preferred for environmental reasons. The proposed Project also offers greater storage capacity than alternate locations that have been identified.

Alternative C (Use of Injection Wells)

Alternative C would result in greater adverse impacts related to air quality, water quality, and noise. Although the proposed Project could result in greater impacts on biological resources, cultural resources, geology and soils, and traffic, this increase is associated with construction in disturbed agricultural areas and represents a marginal increase. Alternative C would not create a bird air strike hazard. Implementation of the proposed mitigation measures reduces impacts of the proposed Project on those resources to less-than-significant levels.

The applicant estimates that capital costs would be twice as great using injection wells compared to the recharge basins. Operational costs are greater because the imported surface water must be treated before it is injected to reduce the levels of suspended sediments that would otherwise clog the injection pump and/or the aquifer formation. Additional costs are incurred to actively pump the treated water into the aquifer, rather than relying on gravity as the proposed Project does. Because of the high capital costs of installing and operating injection wells, this alternative is not financially viable.

Alternative D (Aboveground Storage)

Because of its much larger project footprint, Alternative D would likely result in greater adverse impacts related to agricultural resources, air quality, geology and soils, hazards and hazardous materials, hydrology and water quality, and traffic. Therefore, the proposed Project is preferred for environmental reasons. Additionally, because of the high capital costs of constructing a reservoir, this alternative is not financially viable.

Alternative E (In-Lieu Recharge)

Alternative E could result in greater adverse impacts related to hydrology and water quality, but with respect to other environmental considerations, it is an attractive alternative. This alternative, however, does not offer the flexibility desired by municipal water agencies because operations would be constrained by irrigation demands. If irrigation demand were low, available water could not be recharged. If irrigation demand were high, capacity might not be available to recover or deliver the stored water. Therefore, while in-lieu banking is a feasible alternative to direct recharge under the right conditions and could be implemented successfully in the Antelope Valley, the overall agricultural demand in the Antelope Valley would not allow the amount of recharge proposed by the Antelope Valley Water Bank. This alternative does not meet the proponent's objectives concerning capacity, reliability, and flexibility.

Environmentally Superior Alternative

An EIR must identify the environmentally superior alternative to the proposed Project. Alternative A, *No Project,* would be environmentally superior to the proposed Project on the basis of avoidance of physical environmental impacts. The CEQA Guidelines require that, if the no-project alternative is found to be environmentally superior, "the EIR shall also identify an environmentally superior alternative among the alternatives" (CEQA Guidelines Section 15126[e][2]).

The proposed Project and all of the alternatives (except Alternative A) would result in a cumulatively considerable net increase of criteria pollutants for which the region is in non-attainment under an applicable Federal or State ambient air quality standards. This cumulative impact would be significant and unavoidable for all alternatives. With implementation of the proposed mitigation, all other significant potential impacts associated with the proposed Project would be reduced to less than significant levels. In terms of effects on the environment, none of the alternatives would feasibly attain most of the basic objectives of the project and avoid or substantially lessen any of the significant effects of the project.

Chapter 7

Responses to Comments

To come

Chapter 8

Organizations and Persons Consulted

Alexanian, Sorin. Planner. County of Los Angeles Department of Regional Planning, Los Angeles, CA. November 8, 2005—e-mail correspondence.

Arron, Allen. Project Manager for the LA & Kern County Regulatory Branch. U.S. Army Corps of Engineers, LA District, California. September 8, 2005. Phone call.

Asserson, Bill. Wildlife Biologist. California Department of Fish and Game. Bakersfield, California. September 1, 2005. Phone call.

Chmiel, Frank. Planner 3. Kern County Planning Department, Bakersfield, CA. June 13, 2005—e-mail correspondence.

Deakin, Dwight. Edwards Air Force Base., October 2005—telephone calls.

Dyas, Keith. Edwards Air Force Base. 2 November 2005—Phone call.

Ellis, Jim. Planning Operations Division Chief. Kern County Planning Department, Bakersfield, CA. July 26, 2005—telephone conversation.

Griese, Bill. Edwards Air Force Base. 2 November 2005—Phone call

Hagan, Mark. Biologist. Edwards Air Force Base. Edwards Air Force, California. August 10, 2005. Phone call. Thompson, Rocky. Wildlife Biologist. California Department of Fish and Game. Ridgecrest, California. August 24, 2005. Phone call

Hagan, Mark. Edwards Air Force Base. 2 November 2005—Phone call.

Harris, Scott. Biologist. California Department of Fish and Game. Lancaster, California. February 9, 2006—Phone Call.

Jeglum, Pam. Edwards Air Force Base. 2 November 2005—Phone call.

Kratz, Cei. District Manager. Antelope Valley Mosquito Abatement District. 8 November 2005—Phone conversation.

Lin, Annie. Planner. County of Los Angeles Department of Regional Planning, Los Angeles, CA. July 21, 2005—e-mail correspondence.

Nienke, Barry. Traffic Engineer. Kern County Roads Department, Bakersfield, CA. 27 July 2005—Phone call.

O'Rullian, Bill. Vector Control Program Supervisor. Kern County Environmental Health Services. 18 July 2005—Phone conversation.

Parisi, Tony. China Lake Naval Weapons Station. October 2005—Phone call.

Tong, Glenn, Engineer, Los Angeles County Department of Public Works, Palmdale, CA, 13 March 2006—Phone call.

Chapter 9

List of Preparers

9.1 Kern County Planning Lead Agency

- Ted James, AICP—Planning Director
- David B. Rickels, AICP—Planning Division Chief
- Lorelei Oviatt, AICP—Supervising Planner
- Don Kohler—Planner 1

9.2 Jones & Stokes

Project Management Team

- Alan Solbert—Project Director
- Jim James—Project Manager
- Laurel Armer—Project Coordinator

Technical Team

- Alan Solbert—Mandatory CEQA Considerations, Hydrology and Water Quality
- Jim James—Introduction, Executive Summary, Project Description, Mandatory CEQA Considerations, Alternatives
- Laurel Armer—Hazards and Hazardous Materials, Population and Housing, Utilities and Service Systems
- John Jarecki—Agricultural Resources, Land Use and Planning
- Lynn Wall—Air Quality, Noise
- Dave Buehler—Noise
- Tim Rimpo—Air Quality

- Kate Carpenter—Biological Resources
- Will Kohn—Biological Resources
- Brad Schaeffer—Biological Resources
- Terry Rivasplata—Mandatory CEQA Considerations
- Mark Robinson—Cultural Resources
- Gabriel Roark—Cultural Resources
- Ken Casaday— Geology, Seismicity, and Soils; Mineral Resources
- Jennifer Barnes—Transportation and Traffic
- Russ Grimes—Hydrology and Water Quality
- Lisa Harmon—Hazards and Hazardous Materials
- Josh Johnson—Geographic Information Systems
- Liz Irvin—Lead Technical Editor
- Christina Hur—Technical Editor
- Julie Engebretson—Technical Editor
- Darle Tilly—Technical Editor
- Carol-Anne Hicks—Publications Specialist
- Corrine Ortega—Publications Specialist

Chapter 10
Bibliography

Amdur, M. O., J. Doull, and C. D. Klaassen (eds). 1991. *Casarett and Doull's toxicology, the basic science of poisons*. 4th edition. New York: McGraw-Hill, Inc.

Antelope Valley East Kern Water Agency. 2005. *Draft Urban Water Management Plan.* December 2005.

Antelope Valley–East Kern Water Agency (AVEK). 2005. *2005 Urban Water Management Plan, Draft*. April 2005.

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

Bird Strike Committee USA. 2005. *Why is there a bird strike committee?* Available at: <http://www.birdstrike.org/birds.htm>. Accessed: October 2005

Blackburn, Thomas C., and Lowell John Bean. 1978. Kitanemuk in Handbook of North American Indians, Volume 11, Great Basin, edited by Warren L. D'Azevedo, pp. 564-569. Smithsonian Institution, Washington, D. C.

Bloyd, R.M. 1967. *Water resources of the Antelope Valley–East Kern Water Agency area, California*. U.S. Geological Survey Open-File Report. Washington, DC.

Bohart, R. M., and R. K. Washino. 1978. *Mosquitoes of California.* 3rd edition. Berkeley: University of California, Division of Agricultural Sciences.

Brown, Patricia E., and Elizabeth D. Pierson. 1996. Natural History and Management of Bats in California and Nevada. Presented by the Western Section of the Wildlife Society. November 13-15, 1996. Sacramento, California.

California Department of Conservation. 2002. Farmland Mapping and Monitoring Program GIS Data. Sacramento, CA: Division of Land Resource Protection.

California Department of Conservation. 2003. Land Resource Protection – Status Reports. Last revised: 25 July 2005. Available: <http://www.consrv.ca.gov/DLRP/lca/stats_reports/index.htm>. Accessed: 25 July 2005.

California Department of Conservation. 2004. *A Guide to the Farmland Mapping and Monitoring Program.* Sacramento, CA: Division of Land Resource Protection

California Department of Conservation. 2005. Farmland Mapping and Monitoring Program, 2002–2004 Farmland Conversion Data. Available: [http://www.consrv.ca.gov/DLRP/fmmp/pubs/2000_2002/conversion_tables/kercon02.xls]. Accessed October 2005.

California Department of Finance. 2000. Interim county population projections. July. Available: [http://scrtpa.org/2004rtpfinal-appdx-f-county%20population.pdf]. Accessed October 2005.

California Department of Transportation. 2004. *Traffic and Vehicle Data Systems Home.* Last revised: n.d. Available: <http://www.dot.ca.gov/hq/traffops/saferesr/trafdata/>. Accessed: 27 July 2005.

California Department of Water Resources (DWR). 2002. *The State Water Project delivery reliability report, final*.

California Department of Water Resources (DWR). 1998. *California Water Plan update.*

California Department of Water Resources. 2000. Water quality assessment of the State Water Project, 1998-99. Sacramento, CA.

California Department of Water Resources. 2003. *California's Groundwater, Bulletin 118, Update 2003*. Sacramento, CA

California Department of Water Resources. 2004. *Management of the California State Water Project, Bulletin 132, December 2004*. Sacramento, CA

California Division of Mines and Geology. 1969. *Geologic map of California – Los Angeles Sheet*. Scale 1:250,000. Sacramento, CA.

California Energy Commission. 2005. *Energy Maps of California.* Last revised: 15 February 2005. Available: <http://www.energy.ca.gov/maps/index.html>. Accessed: 8 July 2005.

California Geological Survey. 2005. *Seismic shaking hazards in California-based on the USGS/CGS probabilistic seismic hazards assessment (PSHA) model, 2002 (revised April 2003)*. Available at: <http://www.consrv.ca.gov/cgs/rghm/pshamap/pshamain.html>.

California Office of Planning and Research. 2005. CEQANet Database. Available at: http://www.usbr.gov/dataweb/html/cvpcoestat.htm . Accessed October 24, 2005.

California Regional Water Quality Control Board, Lahonton Region, 1994. *Water Quality Control Plan for the Lahontan Region (Basin Plan)*.

Certified Unified Program Agencies of Los Angeles County. 2002

CNDDB (California Natural Diversity Database). 2005. RareFind, Version 3.0.3 (May 2005 update). Sacramento, CA: California Department of Fish and Game.

CNPS (California Native Plant Society). 2001. *California Native Plant Society's inventory of rare and endangered vascular plants of California*, 6th Edition. California Native Plant Society. Sacramento, CA.

Collins, J. N., and V. H. Resh. 1989. *Guidelines of the ecological control of mosquitoes in non-tidal wetlands of the San Francisco Bay area.* Berkeley: California Mosquito and Vector Control Associations, Inc., and the University of California Mosquito Research Program.

County of Los Angeles Department of Regional Planning. 1980. *General Development Policy Map.* Adopted 25 November, 1980. Los Angeles, CA.

County of Los Angeles Department of Regional Planning. 1986. *Antelope Valley Areawide General Plan.* Adopted December 4, 1986. Los Angeles, CA.

County of Los Angeles Department of Regional Planning. 1993. *County of Los Angeles General Plan.* Adopted 25 November 1980. Los Angeles, CA.

County of Los Angeles. 2005. *Los Angeles County Code of Ordinances.* Updated 1 July 2005. Los Angeles, CA.

Cowan, J. P. 1994. *Handbook of Environmental Acoustics.* New York: Van Nostrand Reinhold.

DFG (California Department of Fish and Game). 1993. 5-Year Status Review: Swainson's Hawk (*Buteo swainsoni*). California Department of Fish and Game, Nongame Bird and Mammal Section, Wildlife Management Division, Sacramento, California. Obtained from: http//www.dfg.ca.gov/hcpb/info/bm_research/bm_pdfrpts/92_16.pdf

DFG (California Department of Fish and Game). 1994. *Staff report regarding mitigations for impacts to Swainson's Hawks (Buteo swainsoni) in the Central Valley of California*. Sacramento, California.

DFG (California Department of Fish and Game). 1995. *Staff Report on Burrowing Owl Mitigation.* Sacramento, CA.

DFG (California Department of Fish and Game). 2005. CNDDB (California Natural Diversity Database) records search for the Liebre Twins, Tylerhorse Canyon, Willow Springs, Soledad Mountain, Rosamond, Little Buttes, Fairmont Butte, Neenach, Burnt Peak, Lake Hughes, Del Sur, Lancaster West, Sleepy Valley, Green Valley, and Warm Springs Mountain 7.5-Minute U.S. Geological Survey (USGS) quadrangles. Sacramento, CA.

Dibblee, T.W. 1967. *Areal geology of the western Mojave Desert, California.* U.S. Geological Survey Professional Paper 522. Washington, DC.

DOF (California Department of Finance). 2005. *State Population Tops 36.8 Million; Annual Growth More than 500,000 for Sixth Year in a Row*. May 2005. Available: <http://www.dof.ca.gov/HTML/DEMOGRAP/e-1press.pdf>. Accessed: October 2005.

Dugger, B. D., and K. M. Dugger. 2002. Long-Billed Curlew (*Numenius americanus*). The Birds of North America, No. 628 (A. Poole and F. Guill, eds.). The Birds of North America, Inc., Philadelphia, PA.

Dunk, J. R. 1995. White-tailed Kite (*Elanus lucurus*). The Birds of North America, No. 178 (A. Poole and F. Gill, eds.). The Academy of Natural Sciences, Philadelphia and The American Ornithologists' Union, Washington, DC.

England, A. S., M. J. Bechard, and C. S. Houston. 1997. Swainson's Hawk (*Buteo swainsoni*). *In* The Birds of North America, No. 265 (A. Poole and F. Gill, eds.). The Academy of Natural Sciences, Philadelphia and The American Ornithologists' Union, Washington, DC.

Environmental Data Resources (EDR). 2005. *EDR DataMap™, Area Study, Antelope Valley Water Bank Project*. Inquiry number 01468999.1r. July 20.

Federal Transit Administration. 1995. *Transit Noise and Vibration Impact Assessment*. Washington, DC.

Goetzmann, William H. 1978. Exploration and Empire: The Explorer and the Scientist in the Winning of the American West. W.W. Norton & Company, New York.

Goetzmann, William H. 1979. Army Exploration in the American West, 1803-1863. University of Nebraska Press, Lincoln.

Guerrero, Kyle, and Dena S. Komporlides. 1995. Final Research Design for Cultural Resources Investigations of 10 Desert Homesteads, Edwards Air Force Base, California. Prepared by Tetra Tech, Inc., San Bernardino. Prepared for the U.S. Army Corps of Engineers, Sacramento and the Air Force Flight Test Center Environmental Management Office, Edwards Air Force Base, California.

Hart, E.W. and W.A. Bryant. 1999. *Fault-rupture hazard zones in California*. California Division of Mines and Geology Special Publication 42. Sacramento, CA.

Haug, E.A., B. A. Millsap, and M. S. Martell. 1993. Burrowing Owl (*Speotyto cunicularia*). *In* The Birds of North America, No. 61 (A. Poole and F. Gill, Eds.). Philadelphia: The Academy of Natural Sciences; Washington, DC.: The American Ornithologists' Union.

Hensher, Alan. 1991. Ghost Towns of the Mojave Desert. California Classics Books, Los Angeles, California.

Hine, Robert V. 1953. California's Utopian Colonies. Yale University Press, New Haven, Connecticut.

Holland, R. F. 1986. Preliminary description of the terrestrial vegetation of California. California Resources Agency, Department of Fish and Game. Sacramento, CA.

Hoover, R. M., and R. H. Keith. 1996. *Noise Control for Buildings, Manufacturing Plants, Equipment and Products*. Houston, TX: Hoover & Keith, Inc.

Jennings, C.W. 1994. *Fault activity map of California and adjacent areas*. Scale: 1:750,000. California Division of Mines and Geology Geologic Data Map No. 6. Sacramento, CA.

Jennings, M. R., and M. P. Hayes. 1994. *Amphibian and Reptile Species of Special Concern in California.* Final report. California Department of Fish and Game, Inland Fisheries Division. Rancho Cordova, CA.

Jones & Stokes. 2005. *Environmental Impact Report for the Madera Irrigation District Water Supply Enhancement Project.* Draft. June. (J&S 05120.05.) Sacramento, CA.

Joseph, S.E., R.V. Miller, S.S. Tan, and R.W. Goodman. 1987. *Mineral Land Classification of the Greater Los Angeles Area: Classification of Sand and Gravel Resource Areas, Saugus-Newhall Production-Consumption Region and Palmdale Production-Consumption Region.* California Geological Survey Special Report 143, Part V. Sacramento, CA

Kern COG (Kern Council of Governments). 2001. *Regional Housing Allocation Plan*. Bakersfield, CA. May 17. Available: <http://kerncog.org/pdf/RHAP_00.pdf>. Accessed: October 2005.

Kern County Air Pollution Control District. 1999. *Guidelines for implementation of the California Environmental Quality Act (CEQA) of 1970, as amended*. Adopted: July 11, 1996. Amended: July 1,1999.

Kern County Board of Supervisors 2004. Kern County General Plan. Bakersfield, CA.

Kern County Planning Department. 1992. *Willow Springs Specific Plan.* Bakersfield, CA.

Kern County Planning Department. 2003. *Draft program environmental impact report for the Kern County General Plan update*. July. Bakersfield, CA.

Kern County Planning Department. 2004. *Agricultural Preserve Standard Uniform Rules.* Bakersfield, CA.

Kern County Planning Department. 2004. *Kern County General Plan*. 2004-192. Bakersfield, CA.

Kern County Planning Department. 2004a. *Airport Land Use Compatibility Plan, County of Kern*. Adopted 1996. Amended 2003. Bakersfield, CA.

Kern County Planning Department. 2005. *Kern County Zoning Ordinance – Title 19 of the Kern County Ordinance Code.* Bakersfield, CA.

Kern County Planning Department. 2005. *Notice of Preparation of the Antelope Valley Water Bank Project Environmental Impact Report*. Bakersfield, CA. September 21.

Kern County Roads Department. 2004. *Kern County Roads Department Traffic Engineering Division.* Available: <http://www.co.kern.ca.us/roads/trafficengineering.asp>. Accessed: 27 July 2005.

Kern County Waste Management Department. 2005. *List of Landfills*. Last revised: January 21, 2005. Available: http://www.co.kern.ca.us/wmd/Services/Facilities/Landfills/landfills_2.html. Accessed: October 2005.

Knopf, F. L. 1996. Mountain Plover (*Charadrius montanus*). The Birds of North America, No. 211 (A. Poole and F. Gill, eds.). The Academy of Natural Sciences, Philadelphia and The American Ornithologists' Union, Washington, DC.

Koehler, B. 1999. *Mineral Land Classification of Southeastern Kern County, CA. California Geological Survey Open-File Report 99-15*. Sacramento, CA

Kohler, S. 2002. *Aggregate Availability in California*. California Geological Survey Map Sheet 52. Sacramento, CA.

LA County. 2004. General Plan Update Program; Significant Ecological Areas Proposed Regulatory Changes. Available:

<http://planning.co.la.ca.us/gp_update/drp_gp_supp_info.htm>. Accessed: August 2005.

Layne GeoSciences. 2003. *Exploratory Test Hole Data – Van Dam Farm Test Hole 2, 3, and 4, Antelope Valley, California*. Prepared for Western Development and Storage. Fontana, CA.

Leighton, D.A. and S. Phillips. 2003. *Simulation of ground-water flow and land subsidence in the Antelope Valley ground-water basin, California.* U.S. Geological Survey Water Resource Investigation Report 03-4016. Washington, DC.

Los Angeles County Department of Public Works. 2005. *Waterworks Districts.* Last revised: n.d. Available: <http://ladpw.org/general/facilities/app_waterworks.cfm>. Accessed: July 7, 2005.

Los Angeles Department of Water and Power. 2005. Available: [http://wsoweb.ladwp.com/Aqueduct/EnvironmentalProjects/owenslakedustmitigation/mitigation.htm. Accessed: October 2005.

Magruder, Genevieve Kratka. 1950. The Upper San Joaquin Valley 1772-1870. Original Manuscript Presented to the Faculty of the Department of History at the University of Southern California in 1937 in Partial Fulfillment of the Requirements for the Degree of Master of Arts. Published through Cooperation of the Kern County Historical Society and Kern County Chamber of Commerce. Available at the Garden Grove Regional Library, Garden Grove, CA.

McDougall, Dennis P., M.C. Horne, J.A. Onken, M.C. Robinson, R.S. Anderson and R. Harro. 2003. Inland Feeder Pipeline Project Final Synthetic Report of Archaeological Findings, Riverside County California. Edited by Susan K. Goldberg. Submitted to the Metropolitan Water District of Southern California by Applied EarthWorks, Inc., Hemet, California.

Metropolitan Water District of Southern California. 2005. Available: (http://www.mwdh2o.com/mwdh2o/pages/yourwater/supply/colorado/colorado04.html). Accessed October 2005.

Miller, R.V., 1994. *Update of Mineral Land Classification of Portland Cement Concrete Aggregate in Ventura, Los Angeles, and Orange Counties, California, Part II - Los Angeles County*. California Geological Survey Open File Report 94-14. Sacramento, CA.

Montgomery Watson Harza. 2003. Upper San Joaquin River Basin Storage Investigation, Phase 1 Investigation Report. October.

Moratto, Michael J. 1984. California Archaeology. Academic Press, Inc. Orlando and London.

Peterson, M.D. et al. 1996. *Probabilistic seismic hazard assessment for the State of California*. California Division of Mines and Geology Open-File Report 96-08 and U.S. Geological Survey Open-File Report 96-706. Sacramento, CA.

Robinson, Mark C. 2001. CA-RIV-4627/H IN Eastside Reservoir Project, Final Report of Archaeological Investigations: Volume II. Edited by Susan K. Goldberg. Submitted to the Metropolitan Water District of Southern California by Applied EarthWorks, Inc., Hemet, California.

Rogers, M. J. 1966. Ancient Hunters of the Far West, edited by R. F. Pourade. Tribune Publishing, San Diego.

Ross, Lester A. 1998. Agricultural Land Acquisition and Settlement Patterns in the Far West, ca. 1840s-1930s: A Proposed Historical Archaeological Model for Private Land Entry Periods. Available at: <http://www.spiretech.com/~lester/ahapn/research/homestead/ross.htm>.

SCAG (Southern California Association of Governments). 2000. *Regional Housing Needs Assessment*. November 2000. Available: <http://api.ucla.edu/rhna/RegionalHousingNeedsAssessment/frame.htm>. Accessed: October 2005.

SCAG (Southern California Association of Governments). 2004. *Regional Transportation Plan/ Growth Visions: Socioeconomic Forecast Report*. June 2004. Available: <http://www.scag.ca.gov/forecast/downloads/forecastreport2004.pdf>. Accessed: October 2005.

Sheppard, J. M. 1996. Le Conte's Thrasher (*Toxostoma lecontei*). *In* The Birds of North America, No. 230 (A. Poole and F. Gill, eds.). The Academy of Natural Sciences, Philadelphia and The American Ornithologists' Union, Washington, DC.

Smith, G. A. 1963. Archaeological Survey of the Mojave River Area and Adjacent Regions. San Bernardino County Museum Association, San Bernardino, California.

Southern California Association of Governments. 2004. *Regional Transportation Plan/ Growth Visions: Socioeconomic Forecast Report*. June 2004. Available: [http://www.scag.ca.gov/forecast/downloads/forecastreport2004.pdf] Accessed: October 2005.

Sutton, M. Q. 1981. Archaeology of the Antelope Valley, Western Mojave Desert, California. Manuscript. In possession of the author.

Thompson, David G. 1929. The Mohave Desert Region, California: A Geographic, Geologic, and Hydrologic Reconnaissance. Water-Supply Paper No. 578. U.S. Department of the Interior, Geological Survey, U.S. Government Printing Office, Washington, DC.

Toppozada, T. et al. 2000. *Epicenters and areas damaged by M>5 California earthquakes, 1800–1999*. California Division of Mines and Geology Map Sheet 49. Sacramento, CA.

Transportation Research Board. 2002. Highway Capacity Manual. Special Report 209. National Research Council. Washington, DC.

U.S. Census Bureau. 2000. Census 2000 Housing Units. Available: <http://quickfacts.census.gov/cgi-bin/hunits/counts.pl> and <http://www.co.kern.ca.us/econdev/maps/rosamondstats.pdf>. Accessed: October 2005.

U.S. Air Force. 2003. *Bird aircraft strike hazard (BASH) Plan 91-202*. Edwards Air Force Base, California. January.

U.S. Census Bureau. 2005. *State and County Quickfacts*. Available at: <http://quickfacts.census.gov/cgi-bin/qfd/lookup>. Accessed: October 2005.

U.S. Department of Health and Human Resources, Centers for Disease Control. 2005. West Nile Virus. Last revised: January 11, 2005. Available: <http://www.cdc.gov/ncidod/dvbid/westnile/index.htm>. Accessed: March 3, 2005.

U.S. Department of Interior, Bureau of Reclamation. 2005. Central Valley Project Statistical Summary of Army Corp Units Integrated into the Central Valley Project. Available: http://www.usbr.gov/dataweb/html/cvpcoestat.htm. Accessed: October 24, 2005.

U.S. Department of the Interior, Bureau of Reclamation (Reclamation). 2005. Central Valley Project Corps of Engineers statistics. Available at: (http://www.ceqanet.ca.gov/NODdescription.asp?DocPK=557566. Accessed October 24, 2005.

U.S. Soil Conservation Service. 1970. *Soil survey of the Antelope Valley area, California*. Prepared in cooperation with the University of California Agricultural Experiment Station. Washington, DC.

United States Air Force. 2003. *Bird Aircraft Strike Hazards (BASH) Plan 91-202*. January 1, 2003. Edwards Air Force Base, California.

United States Air Force. Aviation Safety Division. 2005. *Strike Stats*. Available at: <http://afsafety.af.mil/AFSC/Bash/stats.html>. Last Updated: 3 January 2005. Accessed on: November 3, 2005.

United States Bureau of Land Management. 2005. Final Environmental Impact Report and Statement for the West Mojave Plan.

Warren, C. N. 1984. The Desert Region. In California Archaeology, by M. J. Moratto. Academic Press, New York.

WDS. 2005. *Antelope Valley Water Bank: Water Banking Feasibility Evaluation-Appendix E Hydroscience Modeling Results*. February 2005. Los Angeles, CA.

Western Development and Storage. 2005. Water banking feasibility determination–Antelope Valley Water Bank. Los Angeles, CA.

Yosef, R. 1996. Loggerhead Shrike (*Lanius ludovicianus*). The Birds of North America, No. 231 (A. Poole and F. Gill, eds.). The Academy of Natural Sciences, Philadelphia and The American Ornithologists' Union, Washington, DC.

Zeiner D.C., W. F. Laudenslayer, K. E. Mayer, and M. White. 1990a. *California Wildlife. Volume II: Birds*. California Department of Fish and Game. Sacramento, CA.

Zeiner D.C., W. F. Laudenslayer, K. E. Mayer, and M. White. 1990b. *California Wildlife. Volume III: Mammals*. California Department of Fish and Game. Sacramento, CA.

Zeiner, D. C., W. F. Laudenslayer, K. E. Mayer, and M. White. 1988. *California Wildlife; Volume I: Reptiles.* California Department of Fish and Game. Sacramento, CA.