HELIX Environmental Planning

Palmdale Regional Groundwater Recharge and Recovery Project

Draft Environmental Impact Report

SCH No. 2015061054

November 2015

Prepared for:
Palmdale Water District
2029 East Avenue Q
Palmdale, CA 93550

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LIST OF ACRONYMS AND ABBREVIATIONS

$\mu g/m^3$	micrograms per cubic meter
AAQS	Ambient Air Quality Standards
AB	Assembly Bill
Æ	Applied EarthWorks, Inc.
AFY	acre-feet per year
AGR	agricultural supply
amsl	above mean sea level
AQMP	Air Quality Management Plan
APE	Area of Potential Effect
ASCE	American Society of Civil Engineers
ASTM International	American Society for Testing and Materials
ATS	advanced treatment systems
AVAQMD	Antelope Valley Air Quality Management District
AVGB	Antelope Valley Groundwater Basin
BAT	best available technology
BCT	best conventional pollutant control technology
bgs	below ground surface
BLM	Bureau of Land Management
BMPs	best management practices
CAA	Clean Air Act
CalEEMod	California Emission Estimator Model
CalEPA	California Environmental Protection Agency
Cal-OSHA	California Division of Occupational Safety and Health
Caltrans	California Department of Transportation
CARB	California Air Resources Board
CASQA	California Stormwater Quality Association
CBC	California Building Code
CCAA	California Clean Air Act
CCR	California Code of Regulations
CDFW	California Department of Fish and Wildlife
CDPH	California Department of Public Health
CEQA	California Environmental Quality Act
CESA	California Endangered Species Act
CFR	Code of Federal Regulations
cfs	cubic feet (foot) per second
CGS	California Geological Survey
CH_4	methane
CHRIS	California Historical Resources Information System
CLOMR/LOMR	Conditional Letter of Map Revision/Letter of Map Revision
CNEL	community noise equivalent level

CNPS	California Native Plant Society
CO	carbon monoxide
CO_2	carbon dioxide
CO_2e	carbon dioxide equivalent
COLD	cold freshwater habitat
COMM	commercial and sport fishing
County	County of Los Angeles
CRHR	California Register of Historic Resources
CSMP	Construction Site Monitoring Program
CUP	Conditional Use Permit
CWA	Clean Water Act
cy	cubic yard
dB	decibel
dBA	A-weighted decibel
DPM	diesel particulate matter
DPR	Department of Parks and Recreation
DRECP	Desert Renewable Energy Conservation Plan
DTSC	Department of Toxic Substance Control
DWR	Department of Water Resources
EIR	Environmental Impact Report
FEMA	Federal Emergency Management Agency
FESA	Federal Endangered Species Act
FLD	Flood peak attenuation/flood water storage
FRSH	freshwater replenishment
g	acceleration due to gravity
GAMA	Groundwater Ambient Monitoring and Assessment
GHG	greenhouse gas
GLO	General Land Office
gpm	gallons per minute
GPS	global positioning system
GWP	global warming potential
GWR	groundwater recharge
H_2S	hydrogen sulfide
HA	hydrologic area
HEC-RAS	Hydrologic Engineering Center-River Analysis System
Hertz	Hz
HFCs	hydrofluorocarbons
HMP	Habitat Management Plan
HU	Hydrologic Unit

IBC	International Building Code
ICC	International Code Council
in/sec	inches per second
IND	industrial service supply
IPCC	Intergovernmental Panel on Climate Change
KJC	Kennedy/Jenks Consultants
LACSD	Los Angeles County Sanitation District
LAWA	Los Angeles World Airports
LCFS	Low Carbon Fuel Standard
L_{DN}	Day Night sound level
L_{EQ}	time-averaged noise level
LOCWTP	Leslie O. Carter Water Treatment Plant
LOS	level of service
MBTA	Migratory Bird Treaty Act
MCL	maximum contaminant level
MDAB	Mojave Desert Air Basin
mg/l	milligrams per liter
MLD	Most Likely Descendent
MM	Mitigation Measure
mph	miles per hour
MRZ	Mineral Resource Zone
MS4s	Municipal Separate Storm Sewer Systems
MT	metric ton
MUN	municipal and domestic supply
N_2O	nitrous oxide
NAHC	Native American Heritage Commission
NO_2	nitrogen dioxide
NOP	Notice of Preparation
NO_X	nitrogen oxides
NPDES	National Pollutant Discharge Elimination System
NPPA	Native Plant Protection Act
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NSLU	noise sensitive land use
NWI	National Wetlands Inventory
O_3	ozone
OEHHA	Office of Environmental Health Hazard Assessment
Ohm-cm	ohms centimeter
OHP	Office of Historic Preservation
OPR	Governor's Office of Planning and Research
OSHA	Occupational Safety and Health Administration

Pb	lead
PCBs	polychlorinated biphenyls
PFCs	perfluorocarbons
PGA	peak ground acceleration
PM_{10}	particulate matter less than or equal to 10 microns
$PM_{2.5}$	particulate matter less than or equal to 2.5 microns
ppm	parts per million
PPV	peak particle velocity
PRC	Public Resources Code
PWD	Palmdale Water District
PVC	polyvinyl chloride
REAP	Rain Event Action Plan
REC-1	contact recreation water supply
REC-2	non-contact recreation water supply
RR	Rural Residential (-2.5)
RWQCB	Regional Water Quality Control Board
SAA	Streambed Alteration Agreement
SCAG	Southern California Association of Governments
SCAQMD	South Coast Air Quality Management District
SCCIC	South Central Coastal Information Center
SCS	Soil Conservation Service
SEA	Significant Ecological Area
SF_6	sulfur hexafluoride
SIP	State Implementation Plan
SLF	Sacred Lands File
SMCL	secondary maximum contaminant level
SNMP	Salt and Nutrient Management Plan
SO_2	sulfur dioxide
SO_X	sulfur oxides
SC	standard condition
SWAMP	Surface Water Ambient Monitoring Program
S_{WL}	sound power level
SWAMP	Surface Water Ambient Monitoring Program
SWP	State Water Project
SWPPP	Storm Water Pollution Prevention Plan
SWRCB	State Water Resources Control Board
TACs	Toxic Air Contaminants
TDS	total dissolved solid
TENS	Technical Noise Supplement
TMDL	total maximum daily load
UBC	Uniform Building Code
USACE	U.S. Army Corps of Engineers

USDA	U.S. Department of Agriculture
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
UWMP	Urban Water Management Plan
VOC	volatile organic compound
WARM	warm freshwater habitat
WDRs	Waste Discharge Requirements
WILD	wildlife habitat
WQE	water quality enforcement

EXECUTIVE SUMMARY

This chapter provides a summary of this Environmental Impact Report (EIR) for implementation of the Palmdale Water District's (PWD's) Palmdale Groundwater Recharge and Recovery Project (herein referred to as "proposed Project"). This EIR has been prepared in accordance with the California Environmental Quality Act (CEQA) of 1970 (Public Resources Code [PRC] Section 21000 et seq.) and the Guidelines for Implementation of CEQA (State CEQA Guidelines) published by the Public Resources Agency of the State of California (California Code of Regulations [CCR], Title 14, Section 15000 et seq.).

This chapter highlights the major areas of importance in the environmental analysis for the proposed Project as required by State CEQA Guidelines Section 15123. It provides a brief description of the proposed Project objectives, the proposed Project, and alternatives to the proposed Project. In addition, this chapter includes a table summarizing: (1) the direct impacts that would occur from implementation of the proposed Project; (2) the level of impact significance before mitigation; (3) the recommended mitigation measures that would avoid or reduce significant environmental impacts; and (4) the level of impact significance after mitigation measures are implemented.

ES.1 PROJECT LOCATION

The proposed Project site is located generally in the northeastern portion of the City of Palmdale in Los Angeles County and surrounding unincorporated Los Angeles County and City of Lancaster. More specifically, the proposed Project site is situated north of Highway 138, east of Highway 14, south of Edwards Air Force Base, and west of the community of Lake Los Angeles. The proposed Project site is located in portions of the Alpine Butte, Lancaster East, Littlerock, and Palmdale U.S. Geological Survey (USGS) 7.5-minute quadrangle maps. The proposed Project consists of a Recharge Site, a Distribution Site, a network of Recovery Wells surrounding the Recharge Site, and several associated pipelines. The Recharge Site is located south of East Avenue L, west of 105th Street East, north of Avenue L-8, and east of 100th Street East. The Distribution Site is located approximately 0.5 mile south of the Recharge Site's southern boundary. The Recovery Wells are located along side of East Avenue K-8, 110th Street East, East Avenue M, and 95th Street. The proposed Project also includes alignments for raw, potable, and recycled water supply mains that would be located mostly within existing streets. The pipelines are bounded by the East Avenue K-8 to the north, the East Branch of the California Aqueduct to the south, 106th Street to the east, and 60th Street East to the west.

Portions of the pipelines, the Recharge Site, and some of the Recovery Wells would be located within the City of Palmdale. Portions of the proposed Project occurring within the City of Lancaster are limited to the Recovery Wells located north of Avenue L, between 102nd Street East and 107th Street East. Portions of the proposed Project occurring within unincorporated Los Angeles County include the Potable Water and Raw Water/Return Water Pipelines south of East Avenue Q and east of 80th Street East.

ES.2 PROJECT DESCRIPTION

Project Objectives

The proposed Project is intended to meet PWD's long-term water needs through a solution that is reliable, sustainable, cost effective, and drought-resistant. The overarching objective of the proposed Project is to develop a groundwater banking, storage, and extraction program, using a combination of raw imported State Water Project (SWP) water and locally produced recycled water delivered to a new recharge basin located on undeveloped land in northeast Palmdale. Additional objectives of the proposed Project include:

- Help to provide a diversified portfolio of ground and surface water;
- Increase reliability of water supply;
- Replenish groundwater supplies;
- Save for future dry periods; and
- Provide a cost-effective solution for long-term water supply.

Proposed Project

The PWD plans to develop groundwater banking programs with new spreading grounds to recharge imported water and recycled water, as well as recovery facilities to help meet future water demands and improve reliability. Water for groundwater recharge would be obtained from two sources: raw water from the East Branch of the California Aqueduct (SWP water) and recycled water from the Los Angeles County Sanitation District's (LACSD's) Palmdale Water Reclamation Plant. The SWP water would be the blending source for the recharge water. The recharge capacity of the proposed Project is estimated to be approximately 50,000 to 52,000 acre-feet per year (AFY) (an acre-foot is approximately 326,000 gallons). For the magnitude of recharge envisioned under the proposed Project, SWP water would need to be recharged nearly year-round during wet years, which is estimated to occur approximately 6 out of every 10 years. During dry years (anticipated to be approximately 4 out of every 10 years), no SWP recharge would occur. Recycled water produced locally also would be included in the recharge (compliant with applicable regulations); this source is anticipated to be available at an approximately constant rate year-round.

The proposed Project would potentially occur in phases. The preliminary phase is intended to meet the PWD's water demands for the first 22 years of the proposed Project's life, providing a water supply of 14,125 AFY. The second phase is sized to meet PWD's water demand through the 50-year proposed Project evaluation period (through 2067), as well as ultimate buildout, providing a water supply of up to 24,250 AFY. If a partner agency joins PWD, up to 30,000 AFY could be pumped back to the SWP for use by the partner agency. The components of the proposed Project, which are each designed to accommodate the ultimate demand of the proposed Project, are as follows: a SWP Turnout, Recharge Site, Raw Water/Return Water Pipeline, Recycled Water Pipeline, sixteen Recovery Wells, a Distribution Site, Potable Water Pump Station and Potable Water Pipeline, and a Return Water Pump Station.

ES.3 SCOPE OF ENVIRONMENTAL ANALYSIS

This EIR contains a discussion of the potential significant environmental effects resulting from implementation of the proposed Project, including information related to existing site conditions, analyses of the type and magnitude of individual and cumulative environmental impacts, and feasible mitigation measures that could reduce or avoid environmental impacts. For analysis purposes, certain assumptions were made in the types, quantities, and uses of equipment and workers. These assumptions reflect the best level of judgment and information available about the design of the proposed Project, but they also allow necessary flexibility for adjustments during final design and performance of the work. Refinements in the proposed Project may result in minor variations in specific types, numbers, and uses of equipment and workers; however, the assumptions used in the analyses are considered as conservative proposed Project scenarios for assessing air emissions and noise. Actual emissions and noise levels could be lower than shown in the analysis conclusions.

In accordance with the State CEQA Guidelines, PWD circulated a Notice of Preparation (NOP) for this Draft EIR on June 19, 2015 to responsible agencies and other interested parties, to solicit comments on the scope of the Draft EIR. The 30-day public review period ended on July 20, 2015. The NOP and comment letters received on the NOP are included in Appendix A of this document. This EIR analyzes the potential environmental effects of the proposed Project for the following issue areas:

1. Air Quality
2. Biological Resources
3. Cultural and Paleontological Resources
4. Geology and Soils
5. Greenhouse Gas Emissions
6. Hydrology and Water Quality
7. Noise

The proposed Project would result in less than significant impacts to the following environmental issue areas; therefore, these issue areas are discussed in Chapter 7.0, *Effects Found Not to be Significant*:

1. Aesthetics
2. Agriculture and Forestry Resources
3. Hazards and Hazardous Materials
4. Land Use and Planning
5. Mineral Resources
8. Population and Housing
9. Public Services
10. Recreation
11. Transportation and Traffic
12. Utilities and Service Systems

ES.4 AREAS OF CONTROVERSY/ISSUES TO BE RESOLVED

Section 15123 of the State CEQA Guidelines requires the identification of any areas of controversy known to the lead agency, including issues raised by other agencies and the public. No areas of controversy were identified for the proposed Project in the NOP comment letters or during the public scoping meeting.

ES.5 SUMMARY OF PROJECT ALTERNATIVES

Alternatives are analyzed in Chapter 6.0, *Project Alternatives*, of this Draft EIR. A number of alternatives were identified and subjected to screening analysis, as part of the proposed Project design process. These alternatives are discussed briefly at the beginning of the chapter. The objective of the alternatives analysis is to consider a reasonable range of potentially feasible alternatives to foster informed decision-making and public participation. Two off-site alternatives were carried forward for analysis in Chapter 6.0.

ES.6 SUMMARY OF IMPACTS AND MITIGATION MEASURES

Table ES-1, *Environmental Impacts and Mitigation Measures*, provides a summary of the environmental impacts that could result from implementation of the proposed Project and feasible mitigation measures that could reduce or avoid environmental impacts. For each impact, Table ES-1 identifies the significance of the impact prior to and following implementation of mitigation measures. All Project-specific significant impacts would be reduced to below a level of significance following implementation of the mitigation measures. Project-related impacts combined with impacts from other projects in the cumulative project study area also would not result in significant and unmitigable cumulative impacts.

Table ES-1
ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Issue	Impact	Significance Before Mitigation	Mitigation Measure(s)	Significance After Mitigation
Air Quality				
Conflict with Applicable Air Quality Plans	The proposed Project would not exceed the assumptions in the applicable air quality planning documentation.	Less than significant	No mitigation is required.	Less than significant
Conformance with Air Quality Standards	Proposed Project construction and operation emissions would not exceed regional criteria pollutant thresholds established by the Antelope Valley Air Quality Management District (AVAQMD) for criteria pollutants.	Less than significant	No mitigation is required.	Less than significant
Cumulatively Considerable Net Increase in Criteria Pollutants	The proposed Project would not result in regional and localized exceedances of thresholds established by AVAQMD nor contribute to cumulative impacts.	Less than significant	No mitigation is required.	Less than significant
Expose Sensitive Receptors to Pollutants	Proposed Project-related local emissions of criteria pollutants and toxic air contaminants would not expose nearby residences, schools, or other sensitive receptors to significant health risks.	Less than significant	No mitigation is required.	Less than significant
Create Objectionable Odors	Proposed Project-related odors from construction and operations would be small magnitude and short term and would not be objectionable to a substantial number of people.	Less than significant	No mitigation is required.	Less than significant

Table ES-1 (cont.)
ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Issue	Impact	Significance Before Mitigation	Mitigation Measure(s)	Significance After Mitigation
Biological Resources				
Adversely Affect Candidate, Sensitive, or Special Status Species	The proposed Project has the potential to cause direct, adverse effects to sensitive animal species (burrowing owl and nesting birds) during construction.	Potentially significant	**MM BIO-1:** A pre-construction take avoidance survey shall be conducted for each phase of construction at the Recharge and Distribution Sites, Recovery Wells, Well Collection Pipeline, temporary Percolation Pond parcels, and the undeveloped portion of 105th Street East. The survey shall be completed no more than 14 days prior to ground-disturbing activities and shall cover the proposed Project impact area and all potential burrowing owl habitat within 500 feet, as feasible. More specifically, the survey shall cover all proposed Project features except: (1) where the 30-inch Potable Water Pipeline would occur in East Palmdale Boulevard and (2) where the 36-inch Raw Water/Return Water Pipeline would be constructed between East Avenue R2 in the north and East Avenue S in the south. If there is no sign of burrowing owl occupation (as defined in CDFW 2012), then no further mitigation is required. If sign of occupation is present, the following measures shall be implemented. • Direct impacts to occupied burrowing owl burrows shall be avoided during the breeding period from February 1 through August 31 (CDFW 2012). "Occupied" is defined as a burrow that shows sign of burrowing owl occupancy within the last three years.	Less than significant

Table ES-1 (cont.)
ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Issue	Impact	Significance Before Mitigation	Mitigation Measure(s)	Significance After Mitigation
Biological Resources (cont.)				
			• Direct impacts to occupied burrows shall also be avoided during the non-breeding season. If present, burrowing owls may be excluded from their burrows. Burrow exclusion is a technique of installing one-way doors in burrow openings during the non-breeding season to temporarily exclude burrowing owl, or permanently exclude burrowing owl and close burrows after verifying burrows are empty by site monitoring and scoping. Eviction of burrowing owl during the non-breeding season would require prior CDFW approval of a Burrowing Owl Exclusion Plan (CDFW 2012). • The burrowing owl and its habitat adjacent to, but outside of, Project impact areas, if present, shall be protected in place, and disturbance impacts shall be minimized through the use of buffer zones, visual screens, or other measures (CDFW 2012) as deemed necessary by a qualified biologist. • Mitigation for direct, permanent impacts to nesting, occupied, and satellite burrows and/or burrowing owl habitat shall be required such that the habitat acreage and number of burrows and burrowing owls impacted are replaced based on the burrowing owl life history information provided in Appendix A of the Staff Report on Burrowing Owl Mitigation (CDFW 2012), site-specific analysis, and consultation with the CDFW. A Burrowing Owl Mitigation Plan shall be prepared and submitted to the CDFW for approval prior to impacts to the burrowing owl and/or its habitat.	

Table ES-1 (cont.)
ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Issue	Impact	Significance Before Mitigation	Mitigation Measure(s)	Significance After Mitigation
Biological Resources (cont.)				
			MM BIO-2: Vegetation clearing shall take place outside the general avian breeding season (which generally occurs from February through August). Tree removal/trimming shall take place outside the raptor breeding season (which generally occurs from January through August). If vegetation clearing and/or tree removal/trimming cannot occur outside the general avian and raptor breeding seasons, then a pre-construction survey for avian nesting shall be conducted by a qualified biologist within seven calendar days prior to vegetation clearing and tree removal/trimming. If nests are not observed, work may proceed. If nests are found, work may proceed provided that construction activity is: (1) located at least 500 feet from raptor nests; (2) located at least 300 feet from listed bird species' nests; and (3) located at least 100 feet from non-listed bird species' nests. A qualified biologist shall conspicuously mark the buffer so that vegetation clearing does not encroach into the buffer until the nest is no longer active (i.e., the nestlings fledge, the nest fails, or the nest is abandoned, as determined by a qualified biologist).	
Adversely Affect Sensitive Natural Communities	The proposed Project would result in permanent impacts to 168.2 acres of sensitive natural communities; however, desert salt brush scrub is widely distributed and in the proposed Project survey area and does not support highly sensitive species such as the Mohave ground squirrel and desert tortoise.	Less than significant	No mitigation is required.	Less than significant

Table ES-1 (cont.)
ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Issue	Impact	Significance Before Mitigation	Mitigation Measure(s)	Significance After Mitigation
Biological Resources (cont.)				
Adversely Affect Federal Protected Water Quality or Wetland	The proposed Project would not result in impacts to United States Army Corps of Engineers and California Department of Fish and Wildlife jurisdictional areas.	No impact	No mitigation is required.	Less than significant
Interfere With the Movement of Native Wildlife, Wildlife Corridors, or Wildlife Nursery	The proposed Project would not interfere with the movement of wildlife or wildlife corridors.	Less than significant	No mitigation is required.	Less than significant
Conflict with Local Policies or Ordinances Protecting Biological Resources	The proposed Project would not conflict with local policies or ordinances protecting biological resources.	Less than significant	No mitigation is required.	Less than significant
Conflict with an Adopted Habitat Conservation Plan	The proposed Project would not conflict with any regional conservation plans, local ordinance, or policies protecting biological resources.	Less than significant	No mitigation is required.	Less than significant
Cultural Resources				
Impacts to Historic Resources	The proposed Project would not result in significant impacts to the East Branch of the California Aqueduct or other significant historic resources.	Less than significant	No mitigation is required.	Less than significant

Table ES-1 (cont.)
ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Issue	Impact	Significance Before Mitigation	Mitigation Measure(s)	Significance After Mitigation
Cultural Resources (cont.)				
Impacts to Archaeological Resources	The proposed Project has the potential to impact unknown archaeological resources during the proposed Project construction.	Potentially significant	**MM CUL-1:** If potentially significant buried archaeological materials are encountered during construction activities, all work must be halted in the vicinity of the archaeological discovery until a qualified archaeologist can visit the site of discovery and assess the significance of the archaeological resource. If the find is identified as significant, appropriate treatment as determined by the archaeologist shall be implemented prior to the recommencement of ground disturbance in the area. A report documenting the methods and results of the treatment shall be prepared and submitted to PWD and filed with the local repository.	Less than significant
Impacts to Paleontological Resources	The proposed Project has the potential to impact unknown paleontological resources during the proposed Project construction.	Potentially significant	**MM CUL-2:** In the event fossil materials are exposed during ground disturbing activities, work (within 100 feet of the discovery) shall be halted until a qualified paleontologist meeting the criteria established by the Society for Vertebrate Paleontology is retained to assess the find. If the find is identified as significant, appropriate treatment as determined by the paleontologist shall be implemented prior to the recommencement of ground disturbance in the area. A report documenting the methods and results of the treatment shall be prepared and submitted to PWD and filed with the local repository.	Less than significant

Table ES-1 (cont.)
ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Issue	Impact	Significance Before Mitigation	Mitigation Measure(s)	Significance After Mitigation
Cultural Resources (cont.)				
Impacts to Human Remains	The proposed Project has the potential to unearth unknown human remains during the proposed Project construction.	Potentially significant	**MM CUL-3:** In the event that human remains are discovered during construction activities in a location other than a dedicated cemetery, the Los Angeles County Coroner must be notified within 24 hours of the discovery, in accord with Health and Safety Code §7050.5, *State CEQA Guidelines* 15064.5(e), and PRC §5097.98. The Coroner must then determine within two working days of being notified if the remains are subject to his or her authority. If the Coroner recognizes the remains to be Native American, he or she must contact the NAHC by phone within 24 hours, in accordance with PRC §5097.98. The NAHC then designates a Most Likely Descendant with respect to the human remains within 48 hours of notification. The Most Likely Descendant will then have the opportunity to recommend to the proposed Project proponent means for treating or disposing, with appropriate dignity, the human remains and associated grave goods within 24 hours of notification.	Less than significant
Geology and Soils				
Rupture of a Known Earthquake Fault	The proposed Project site and vicinity could encompass currently unknown active or potentially active faults and has not been subject to the proposed Project-specific geotechnical investigation.	Potentially significant	**MM GEO-1:** A site-specific geotechnical investigation shall be completed for the proposed Project prior to final Project design approval. This investigation shall identify appropriate site-specific criteria related to considerations such as grading, excavation, fill, and structure/facility design. Applicable results and recommendations from the geotechnical investigation (including on-the-ground geotechnical observations and testing to be conducted during the proposed Project excavation, grading and construction activities) shall be incorporated into the associated proposed Project design documents to address identified potential geologic and soil hazards.	Less than significant

Table ES-1 (cont.)
ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Issue	Impact	Significance Before Mitigation	Mitigation Measure(s)	Significance After Mitigation
Geology and Soils (cont.)				
			Specifically, this shall include, but is not necessarily limited to, the following potential hazards: ground rupture; ground acceleration (ground shaking); soil liquefaction (and related issues such as dynamic settlement and lateral spreading); landslides; geologic and soil instability (including manufactured slopes, trench excavations, compressible/collapsible soils, subsidence [based on review/verification or, if applicable, modification of the conclusions in the proposed Project updated groundwater model], and corrosive soils); and expansive soils. The final proposed Project design documents shall also encompass applicable standard design and construction practices from sources including the CBC, IBC/Greenbook, and (as appropriate) City/County standards, along with the results and recommendations of plan review by the PWD and on-the-ground geotechnical observations and testing (with related requirements to be included in applicable engineering/design drawings and construction contract specifications). A summary of the types of remedial measures typically associated with identified potential geologic and soil hazards, pursuant to applicable regulatory and industry standards (as noted), is provided below. The remedial measures identified/recommended as part of the described site-specific geotechnical investigation shall take priority over the more general types of standard regulatory/industry measures listed below.	

Table ES-1 (cont.)
ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Issue	Impact	Significance Before Mitigation	Mitigation Measure(s)	Significance After Mitigation
Geology and Soils (cont.)				
			• Ground Rupture: (1) locate (or relocate) applicable facilities away from known active (or potentially active) faults and outside of associated CGS Earthquake Fault Zones; and (2) require appropriate (typically 50-foot) building exclusion buffers on either side of applicable fault traces. • Ground Acceleration (Ground Shaking): (1) incorporate applicable seismic loading factors (e.g., IBC/CBC criteria) into the design of facilities such as structures, pavement, pipelines, manufactured slopes, and drainage facilities; (2) use remedial grading techniques where appropriate (e.g., removing/replacing and/or reconditioning unsuitable soils); and (3) use properly engineered fill per applicable industry/regulatory standards (e.g., IBC/CBC), including criteria such as appropriate fill composition, placement methodology, compaction levels, and moisture content. • Liquefaction and Related Effects: (1) remove unsuitable soils and replace with engineered fill (as previously described), per applicable regulatory/industry standards (e.g., IBC/CBC); (2) employ measures such as deep soil mixing (i.e., introducing cement to consolidate loose soils) or use of subsurface structures (e.g., stone columns or piles) to provide support (i.e., by extending structures into competent underlying units); (3) install subdrains in appropriate areas to avoid or reduce near-surface saturation; and (4) design for potential settlement of liquefiable materials through means such as use of post-tensioned foundations and/or flexible couplings for pipeline connections.	

Table ES-1 (cont.)
ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Issue	Impact	Significance Before Mitigation	Mitigation Measure(s)	Significance After Mitigation
Geology and Soils (cont.)				
			• Landslides: (1) replace susceptible deposits with stabilized fill where appropriate; and (2) incorporate structures such as retaining walls and buttresses where appropriate to provide support. • Geologic and Soil Instability: (1) use standard efforts such as over-excavation and recompaction or replacement of unsuitable soils with engineered fill; (2) employ applicable slope grade and/or height limitations, landscaping/irrigation design, and slope drainage controls per established regulatory/industry standards (e.g., IBC/CBC); (3) limit trench slope grades as appropriate to reflect local conditions (e.g., dry or cohesive soils, and seepage); (4) use appropriate trench shoring per applicable regulatory requirements (CBC, OSHA and/or Cal-OSHA); (5) use engineered fill, subdrains, surcharging (i.e., loading prior to construction to induce settlement) and/or settlement monitoring (e.g., through the use of settlement monuments) in appropriate areas (e.g., areas of identified subsidence potential); (6) implement groundwater withdrawal monitoring/ restrictions per established legal/regulatory/ industry standards (if applicable); and (7) remove unsuitable (corrosive) deposits and replace with non-corrosive fill, use corrosion-resistant construction materials (e.g., corrosion-resistant concrete and coated or non-metallic facilities), and install cathodic protection devices (e.g., use of a more easily corroded "sacrificial metal" to serve as an anode and draw current away from the structure to be protected) per established regulatory/industry standards (e.g., IBC/CBC).	

Table ES-1 (cont.)
ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Issue	Impact	Significance Before Mitigation	Mitigation Measure(s)	Significance After Mitigation
Geology and Soils (cont.)				
			• Expansive Soils: (1) replace and/or mix expansive materials with non-expansive fill; and (2) cap expansive soils in place with an appropriate thickness of non-expansive fill per established regulatory/industry standards (e.g., IBC/CBC).	
Strong Seismic Ground Shaking	The proposed Project site could potentially experience peak ground shaking values of up to approximately 0.7 g in association with large earthquake events along major faults. This level of ground shaking could potentially result in significant impacts to proposed facilities such as structures and pipelines.	Potentially significant	**MM-GEO-1** (identified above)	Less than significant
Seismic Related Ground Failure, Including Liquefaction	Based on the stratigraphic and seismic conditions in the proposed Project site vicinity, as well as the fact that the presence/level of groundwater in much of the site has not been verified, potential impacts from liquefaction and related effects would be potentially significant.	Potentially significant	**MM-GEO-1** (identified above)	Less than significant
Landslides	The proposed Project site and vicinity exhibit primarily level terrain, with the nearest areas of substantial topography located approximately 2 miles to the east	Less than significant	No mitigation is required.	Less than Significant

Table ES-1 (cont.)
ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Issue	Impact	Significance Before Mitigation	Mitigation Measure(s)	Significance After Mitigation
Geology and Soils (cont.)				
Unstable Geologic Unit or Soil	Implementation of the proposed Project could potentially result in impacts associated with geologic and soil instability, including manufactured slopes, trench excavations, compressible/ collapsible soils, subsidence, and corrosive soils.	Potentially significant	**MM-GEO-1** (identified above)	Less than significant
Expansive Soils	While mapped alluvial soils in the proposed Project site and vicinity are generally identified as exhibiting low expansion potential, a number of these materials may locally exhibit higher clay content and related expansion potential.	Potentially significant	**MM-GEO-1** (identified above)	Less than significant
Soils Incapable of Supporting Septic Tanks	The proposed septic system/leach field facilities would not result in significant effects to groundwater quality, based on the small-scale nature of the proposed system, the presence of extensive alluvial deposits in the proposed Project site area (which are anticipated to be suitable for septic system operation), and the anticipated lack of shallow groundwater or bedrock.	Less than significant	No mitigation is required.	Less than Significant

Table ES-1 (cont.)
ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Issue	Impact	Significance Before Mitigation	Mitigation Measure(s)	Significance After Mitigation
Greenhouse Gas (GHG) Emissions				
Generate GHG Emissions that may Result in a Significant Impact	The proposed Project would not generate GHG emissions that would result in a significant impact on the environment.	Less than significant	No mitigation is required.	Less than Significant
Conflict with Plans for Reducing GHG Emissions	The proposed Project would not conflict with applicable plans, policies, or regulations adopted for the purpose of reducing GHG emissions.	Less than significant	No mitigation is required.	Less than significant
Hydrology and Water Quality				
Alter Drainage Patterns or Stormwater Flows	Overall drainage patterns within the site and vicinity are not anticipated to be substantially altered by proposed development; however, the associated site-specific effects to drainage patterns and flow directions within and from the proposed Project site cannot be determined due to lack of a detailed hydrology study.	Potentially significant	**MM HYD-1: Conduct a Site-specific Hydrologic Investigation.** A site-specific hydrologic investigation shall be completed for the proposed Project prior to approval of final design. Applicable results and recommendations from this investigation shall be incorporated into the associated final design documents to address identified potential hydrologic concerns, including, but not necessarily limited to, drainage alteration, runoff rates/amounts and storm water management, and flood hazards. The final proposed Project design documents shall also encompass applicable standard design and construction practices from sources including NPDES and local standards (with related requirements to be included in applicable engineering/design drawings and/or construction contract specifications). A summary of the types of remedial measures typically associated with identified potential hydrologic concerns, pursuant to applicable regulatory and industry standards (as noted), is provided below.	Less than Significant

Table ES-1 (cont.)
ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Issue	Impact	Significance Before Mitigation	Mitigation Measure(s)	Significance After Mitigation
Hydrology and Water Quality (cont.)				
			The remedial measures identified/recommended as part of the described site-specific hydrologic investigation will take priority over the more general types of standard regulatory/industry measures listed below. • Drainage Alteration: (1) locate applicable facilities outside of surface drainage courses and drainage channels; (2) re-route surface drainage around applicable facilities, with such re-routing to be limited to the smallest area feasible and re-routed drainage to be directed back to the original drainage course at the closest feasible location (i.e., the closest location to the point of diversion); and (3) use drainage structures to convey flows within/through development areas and maintain existing drainage patterns, where appropriate and feasible. • Runoff Rates/Amounts and Storm Water Management: (1) minimize the installation of new impervious surfaces (e.g., by surfacing with pervious pavement, gravel or decomposed granite); (2) use flow regulation facilities (e.g., detention/retention basins) and velocity control structures (e.g., riprap dissipation aprons at drainage outlets), to maintain pre-development runoff rates and amounts, if applicable; and (3) utilize additional and/or enlarged drainage facilities to ensure adequate on- and off-site storm drain system capacity, if applicable.	

Table ES-1 (cont.)
ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Issue	Impact	Significance Before Mitigation	Mitigation Measure(s)	Significance After Mitigation
Hydrology and Water Quality (cont.)				
			• Flood Hazards: (1) locate proposed facilities outside of mapped 100-year floodplain boundaries wherever feasible; (2) based on technical analyses such as Hydrologic Engineering Center-River Analysis System (HEC-RAS) studies, restrict facility locations to avoid adverse impacts related to impeding or redirecting flood waters; (3) based on HEC-RAS studies, use measures such as raised fill pads to elevate proposed structures above calculated flood levels, and/or utilize protection/containment structures (e.g., berms, barriers or water-tight doors) to avoid flood damage; and (4) if Project-related activities/facilities result in applicable proposed changes to mapped FEMA floodplains, obtain an approved Conditional Letter of Map Revision (CLOMR) and/or Letter of Map Revision (LOMR) from FEMA, as applicable.	
Create Flow that Would Exceed Capacity of Existing Stormwater Drainage Systems	Potential impacts related to runoff rates/amounts and storm drain capacity from proposed Project development are expected to be less than significant; however, an assessment of pre- and post-development runoff rates is required to evaluate these conditions and pending completion of a detailed site-specific hydrology study, these impacts are conservatively assessed as potentially significant.	Potentially significant	**MM-HYD-1** (identified above)	Less than significant

Table ES-1 (cont.)
ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Issue	Impact	Significance Before Mitigation	Mitigation Measure(s)	Significance After Mitigation
Hydrology and Water Quality (cont.)				
Place Housing in 100-Year Flood Hazard Area	No housing is proposed as part of the proposed Project development, and no associated impacts related to locating such structures within flood hazard areas would result from the proposed Project implementation.	No impact	No mitigation is required.	No impact
Place Structures in 100-Year Flood Hazard Area that Would Impede Flow	Based on the subsurface location of most proposed facilities (i.e., pipelines) and the relatively minor extent of proposed surface development within the noted floodplains, no associated substantial impacts are anticipated in relation to structures impeding or redirecting flood flows. However, because detailed studies have not been conducted, site-specific effects related to flood flow movements and directions from proposed surface facilities are considered potentially significant.	Potentially significant	**MM-HYD-1** (identified above)	Less than Significant
Flood Hazards, from Tsunamis, Seiches, Mudflows, or Dam Inundation	The proposed Project site would not be subject to significant tsunami, seiche, mudflow, or dam inundation impacts.	Less than significant	No mitigation is required.	Less than significant

Table ES-1 (cont.)
ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Issue	Impact	Significance Before Mitigation	Mitigation Measure(s)	Significance After Mitigation
Hydrology and Water Quality (cont.)				
Deplete Groundwater Supplies	No substantial impacts related to groundwater supplies/levels (including aquifer drawdown or mounding effects) are anticipated from implementation of the proposed Project.	Less than significant	No mitigation is required.	Less than Significant
Violate Water Quality Standards or Waste Discharge Requirements	Impacts to groundwater quality are potentially significant due to lack of site-specific water quality modeling and septic system evaluation.	Potentially significant	**MM HYD-2: Conduct a Site-specific Groundwater Quality Investigation.** A site-specific groundwater quality investigation shall be completed for long-term operations associated with the proposed Project, prior to the RWQCB issuing a permit to operate. This investigation shall include detailed, numerical modeling to assess potential proposed Project-related effects to groundwater quality in the proposed Project Recovery Wells and other applicable wells in the site vicinity. Applicable results and recommendations from this investigation shall be incorporated into the associated individual final Project design documents to address identified potential long-term groundwater quality issues related to proposed recharge and recovery efforts, including the use of recycled water. The described modeling/investigative efforts and the final Project design documents shall also encompass applicable regulatory standards from sources including the SWQCB/RWQCB, CCR Titles 17 and 22 (including a Project-specific Title 22 Engineering Report per Article 7, Section 60323), Title 22 Water Code section 13562.5 for Groundwater Replenishment Using Recycled Water, and pertinent local standards, with related requirements to be included in associated engineering/design drawings and construction/operation contract specifications.	Less than significant

Table ES-1 (cont.)
ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Issue	Impact	Significance Before Mitigation	Mitigation Measure(s)	Significance After Mitigation
Hydrology and Water Quality (cont.)				
			Depending on the results of the noted modeling/investigative efforts, standard remedial measures that could potentially be used to address identified concerns may include: (1) reduction (e.g., through blending) or elimination of recycled water as a recharge source; (2) implementation of applicable source water treatment (e.g., to reduce TDS levels) prior to recharge; and (3) modification of the proposed Project elements such as the location and/or configuration of Recovery Wells (e.g., to increase the residence time and/or recovery percentage of recharged water), and/or the location/capacity of recharge basins. The measures identified/recommended as part of the described site-specific groundwater quality investigation shall take priority over the more general types of standard efforts identified above. **MM HYD-3: Conduct a Site-specific Septic System Investigation.** A site-specific septic system investigation shall be completed for the proposed Project, prior to final Project design approval, to assess related potential impacts to groundwater quality. This investigation shall include appropriate analysis of the proposed septic system, pursuant to applicable regulatory requirements from sources including the SWQCB/RWQCB, Los Angeles County, and the City of Palmdale. Specific elements of the septic system analysis may include: (1) system design adequacy (e.g., septic tank/leach field locations and dimensions, and provision of adequate separation from groundwater aquifers); (2) soil/percolation testing; (3) assessment of potential groundwater quality impacts	

Table ES-1 (cont.)
ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Issue	Impact	Significance Before Mitigation	Mitigation Measure(s)	Significance After Mitigation
Hydrology and Water Quality (cont.)				
			from nitrates and other applicable contaminates; and (4) identification of appropriate operation and maintenance requirements to ensure proper system function. Applicable results and recommendations from this investigation shall be incorporated into the final septic system design to address potential groundwater quality issues related to proposed septic system operation. Depending on the results of the noted evaluation, standard remedial measures that could potentially be used to address identified concerns may include: (1) redesign/relocation of proposed septic system facilities; (2) use of alternative septic system design (e.g., disinfection systems); (3) use of alternative waste disposal systems (e.g., composting or incinerator toilets); and (4) connection to a municipal sewer system. The measures identified/ recommended as part of the described septic system investigation shall take priority over the more general types of efforts identified above.	
Noise				
Generate Noise Levels in Excess of Standards	The proposed Project is located within the cities of Palmdale and Lancaster and unincorporated Los Angeles County. The proposed Project would include 24-hour construction activities for the Recovery Well construction, which would extend outside of hours allowed in the cities of Palmdale and Lancaster noise standards; however, associated well sites located at minimum	Less than significant	No mitigation is required.	Less than significant

Table ES-1 (cont.)
ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Issue	Impact	Significance Before Mitigation	Mitigation Measure(s)	Significance After Mitigation
Noise (cont.)				
	distances of 2,500 feet (City of Palmdale) and 5,000 feet (City of Lancaster) from any existing residential uses.[1] Project-related construction activity within the County portion of the proposed Project would include installation of pipelines and Recovery Wells. Pipeline construction would exceed the Los Angeles County standard of 75 dBA for construction noise levels at single-family residential structures; however, the small exceedance and single-day exposure for any one residence would result in less than significant impacts. Nighttime pipeline construction noise would not exceed the Los Angeles County standard of 60 dBA for nighttime mobile construction noise levels at the nearest residences and would be less than significant.			

[1] California Government Code Section 53091 exempts PWD, as a regional public water purveyor and utility, from local zoning and building ordinances, including local noise ordinances in the local zoning or building codes. This exemption applies to Palmdale Regional Groundwater Recharge and Recovery Project as a direct component of PWDs treatment, storage and transmission system. Nonetheless, PWD intends to voluntarily work with the local communities to reduce impacts due to conflicts with the local noise ordinances.

Table ES-1 (cont.)
ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Issue	Impact	Significance Before Mitigation	Mitigation Measure(s)	Significance After Mitigation
Noise (cont.)				
Result in Excessive Ground-borne Vibration or Noise Levels	The proposed Project would result in minor vibration during construction, but the vibration level at a distance of 25 feet would be minor. Operational vibration levels associated with the proposed Project would be limited to pumps at the Recovery Wells, with the level and extent of such vibration effects to be minor.	Less than significant	No mitigation is required.	Less than significant
Permanent Increase in Ambient Noise Levels	Operational noise associated with Recovery Wells within the City of Lancaster and unincorporated Los Angeles County would result in noise levels in excess of the respective standards for each jurisdiction at the nearest property lines.	Potentially significant	**MM NOI-1: Recovery Well Building Design.** If the PWD does not own all of the land within 750 feet of a planned well pump and pump building outside the City of Palmdale limits, the well building shall be designed and built to provide noise control reduction to the less-than-significant level of 45 dBA at 50 feet. Specifically, this could potentially include standard industry measures such as providing appropriately designed noise-control louvers or in-line duct silencers for the well building ventilation to reduce external noise levels.	Less than significant
Temporary Increase in Ambient Noise Levels	Temporary noise increases would occur as a result of construction activities associated with the proposed Project. These impacts would be temporary and less than significant.	Less than significant	No mitigation is required.	Less than significant

Table ES-1 (cont.)
ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Issue	Impact	Significance Before Mitigation	Mitigation Measure(s)	Significance After Mitigation
Noise (cont.)				
Excessive Noise Levels Associated with a Public Airport	Los Angeles/Palmdale Regional Airport is located approximately 3.5 miles to the northwest of the proposed Project, at its closest point (from the 30-inch potable water pipeline alignment). The proposed Project would not be exposed to excessive noise levels from the Los Angeles/ Palmdale Regional Airport or any other airport.	Less than significant	No mitigation is required.	Less than significant
Excessive Noise Levels Associated with a Private Airstrip	The nearest private airstrip is located at a distance of 6.5 mile. The proposed Project would not be exposed to excessive noise levels due to distances from the Project site to private airstrips.	Less than significant	No mitigation is required.	Less than significant

1.0 INTRODUCTION

This Environmental Impact Report (EIR) was prepared by the Palmdale Water District (PWD) for the proposed Palmdale Regional Groundwater Recharge and Recovery Project (proposed Project). The proposed Project involves the construction and operation of a groundwater recharge recovery facility, associated pump station and facilities, and potable and raw water pipelines. This EIR was prepared to evaluate the potential impacts of the proposed Project on the environment and on adjacent communities.

1.1 PURPOSE OF THE EIR

This EIR assesses the potential environmental effects of the proposed Project. This EIR has been prepared in accordance with the California Environmental Quality Act (CEQA) of 1970 (Public Resources Code [PRC] Section 21000 et seq.) and the Guidelines for Implementation of CEQA (State CEQA Guidelines) published by the Public Resources Agency of the state of California (California Code of Regulations [CCR], Title 14, Section 15000 et seq.). PWD is the Lead Agency under CEQA (PRC Section 21067, as amended), is responsible for the preparation of the EIR, and will use this document to objectively review and assess the proposed Project prior to approval or disapproval.

This EIR is intended to: (1) inform decision makers and the public about the potentially significant environmental effects of the proposed activities; (2) identify the ways that significant environmental effects can be avoided or reduced; and (3) prevent significant, avoidable damage to the environment by requiring changes in the proposed Project through the use of alternatives or mitigation measures, to the extent that PWD determines the changes to be feasible (CEQA Guidelines Section 15002; PRC Section 21002.1).

1.2 SCOPE OF THE EIR

On June 19, 2015, PWD circulated a Notice of Preparation (NOP) to responsible agencies and other interested parties (Appendix A). As identified in the NOP, the following issues are discussed in detail in the EIR (Chapter 3.0, *Environmental Impact Analysis*).

1. Air Quality
2. Biological Resources
3. Cultural and Paleontological Resources
4. Geology and Soils
5. Greenhouse Gas Emissions
6. Hydrology and Water Quality
7. Noise

The proposed Project would result in less than significant impacts to the following environmental issue areas; therefore, these issue areas are discussed in Chapter 7.0, *Effects Found Not to be Significant*:

1. Aesthetics
2. Agriculture and Forestry Resources
3. Hazards and Hazardous Materials
4. Land Use and Planning
5. Mineral Resources
6. Population and Housing
7. Public Services
8. Recreation
9. Transportation and Traffic
10. Utilities and Service Systems

1.3 CALIFORNIA ENVIRONMENTAL QUALITY ACT PROCESS

CEQA requires review by public agencies on a proposed project prior to the project's approval in order to identify and address potential environmental effects. Projects that are not exempt from CEQA require preparation of a Negative Declaration or an EIR. An EIR is an informational document that informs public agency decision makers and the public generally of the significant environmental effects of a project, identifies possible ways to minimize the significant effects, and describes reasonable alternatives to the project.

This Draft EIR evaluates a Project proposed by PWD. In addition to being the proposed Project proponent, PWD is also the CEQA Lead Agency as defined in Section 21067 of the PRC and, as such, is the public agency with the primary responsibility for preparing and certifying the EIR as adequate along with approving the proposed Project.

The EIR process facilitates the objective evaluation of potentially significant direct, indirect, and cumulative impacts and proposes mitigation measures to address any such impacts. This document has been prepared in accordance with the requirements of CEQA, and the State CEQA Guidelines.

As discussed previously, the NOP for the proposed Project was released on June 19, 2015, announcing the preparation of a Draft EIR. The NOP was advertised in the *Antelope Valley Press* on June 19, 2015, and in the Spanish language publication *La Prensa* on July 1, 2015. A hard copy of the NOP was also placed at the Palmdale City Library, and an electronic copy was placed on the PWD website.

In response to the NOP, PWD received four phone calls (two from local property owners, one from the California Department of Water Resources [DWR], and one from California Department of Fish and Wildlife [CDFW]; see summary of these phone calls in Appendix A). PWD also received six written responses to the NOP. Four of the six responses were from agencies/organizations, including the CDFW, the DWR, County Sanitation Districts of Los Angeles County, and the Southern California Association of Governments (SCAG). The additional two written comments were submitted by one local resident.

A public scoping meeting was held on July 11, 2015 to provide information on the proposed Project, answer related questions, and solicit written comments. There were 16 attendees at the scoping meeting. One set of written comments was provided during the scoping meeting. The NOP, a memorandum summarizing the phone calls received during the NOP response period, comment letters received on the NOP, and the one comment received during the scoping meeting are included in Appendix A of this document.

This Draft EIR is being circulated for public review to public agencies and interested members of the general public for a period of 45 days. Comments on the adequacy of this Draft EIR must be provided to PWD by the close of the 45-day public review period (January 11, 2016) in order to be addressed in the Final EIR.

During the 45-day public review period, comments on the adequacy of the Draft EIR may be submitted to the lead agency at the following mailing address:

Matthew Knudson, Palmdale Water District
2029 East Avenue Q, Palmdale, California 93550
or by email to mknudson@palmdalewater.org.

1.4 FORMAT OF THE EIR

This EIR is organized as follows:

Executive Summary – The Executive Summary includes a discussion of the proposed Project location, a brief Project description, a discussion of the scope of environmental analysis, areas of controversy known to the Lead Agency, alternatives considered, and a summary of environmental impacts and proposed mitigation measures that would reduce or avoid impacts determined to be significant.

Chapter 1.0*, Introduction* – This chapter describes the purpose and scope of the EIR, provides a brief summary of the CEQA process, and establishes the document format.

Chapter 2.0*, Project Description* – This chapter provides a description of PWD and the proposed Project, including the need for and objectives of the proposed Project, the proposed Project location, the existing setting and land uses of the proposed Project area, and the proposed Project characteristics. In addition, a discussion of discretionary actions required for proposed Project implementation is included in this chapter.

Chapter 3.0*, Environmental Impact Analysis* – This chapter constitutes the main body of the EIR and includes the detailed impact analysis for each identified environmental issue. The topics analyzed in this chapter include: air quality, biological resources, cultural and paleontological resources, geology and soils, greenhouse gas (GHG) emissions, hydrology and water quality, and noise. Under each topic, Chapter 3.0 includes a discussion of existing conditions, the thresholds identified for the determination of significant impacts, and an evaluation of the impacts associated with implementation of the proposed Project. Where the impact analysis demonstrates the potential for the proposed Project to have a significant adverse impact on the environment, mitigation measures are provided which would minimize the significant effects. For each topic, the EIR provides a conclusion regarding the significance level of impacts after implementation of mitigation measures.

Chapter 4.0*, Cumulative Impact Analysis* – This chapter addresses the cumulative impacts due to implementation of the proposed Project in combination with other past, present, and reasonably foreseeable or probable future projects in the area.

Chapter 5.0*, Mandatory CEQA Topics* – This chapter discusses additional topics required by CEQA, including growth inducement, unavoidable adverse impacts, and irreversible environmental changes.

Chapter 6.0, *Alternatives to the Proposed Project* – This chapter provides a description of alternatives to the proposed Project and an evaluation of their potential to reduce or avoid the proposed Project's significant impacts.

Chapter 7.0, *Effects Found Not to be Significant* – This chapter includes a discussion of those environmental issues from the CEQA Environmental Checklist for which no significant environmental impacts are anticipated and for which detailed analysis is not necessary.

Chapter 8.0, *References* – This chapter includes a listing of applicable reference materials.

Chapter 9.0, *List of Preparers* – This chapter includes a list of individuals involved in the preparation of the EIR, including Lead Agency staff and consultants.

2.0 PROJECT DESCRIPTION

This chapter describes the PWD and the proposed Project for the public, reviewing agencies, and decision makers. In conjunction with the description of the proposed Project activities, this chapter includes the need for and objectives of the proposed Project; a description of the proposed Project's location; an overview of the existing setting and adjacent land uses; a description of the proposed Project's characteristics; and a summary of other approvals that may be required for proposed Project implementation.

2.1 ABOUT PALMDALE WATER DISTRICT

PWD provides service to an area of approximately 40 square miles, including the majority of the City of Palmdale, as well as adjacent areas outside of Palmdale City limits. PWD supplies clean, safe drinking water to residents and businesses within its service area using several resources, including the State Water Project (SWP) via the East Branch of the California Aqueduct, Littlerock Reservoir, groundwater wells, and the Leslie O. Carter Water Treatment Plant (LOCWTP). PWD uses an average of 4 billion gallons of California Aqueduct water each year, which is stored in Palmdale Lake and treated at PWD's LOCWTP. Littlerock Reservoir is fed by natural runoff from snow packs in the local mountains and from rainfall. The water is then transferred from Littlerock Reservoir to Palmdale Lake, where it is treated at PWD's LOCWTP before delivery to customers. PWD also has 22 active groundwater wells that pump water from as deep as 550 feet below ground in the Lancaster and Pearland subbasins of the Antelope Valley Groundwater Basin (AVGB). In drought conditions, PWD relies more heavily on groundwater resources to serve customers. The LOCWTP utilizes state of the art processes to produce up to 35 million gallons of clean, safe drinking water every day for PWD residents and businesses.

2.2 PROJECT NEED AND OBJECTIVES

The Project site is located within the AVGB, which is a topographically closed groundwater basin that has primarily been used for agricultural purposes. It is fed by runoff from the surrounding mountains, which run over the many subbasins via three main creeks, including Littlerock Creek. Littlerock Creek provides the majority of recharge to the Antelope Valley and runs through much of the PWD service area.

Due to the extensive agricultural use over the past century, the AVGB has been in an overdraft condition (i.e., pumping greater than natural recharge) since about 1930, leading to rapidly declining groundwater head that caused land subsidence. In 1999, the process to adjudicate groundwater production rights in the AVGB was initiated. In 2011, the adjudication court ruled that the safe yield (equivalent to natural recharge plus return flows) of the AVGB is 110,000 acre-feet per year (AFY) [1]. Although groundwater production has declined significantly from its peak in the 1950s – 60s, it remains above the safe yield of the AVGB. The adjudication process seeks to allocate the declared safe yield to the various groundwater producers in the AVGB. This process will result in groundwater producers having diminished access to groundwater resources in the future.

[1] One acre-foot is the volume of water required to cover an area of 1 acre to a depth of 1 foot, and includes approximately 326,000 gallons.

Based on water supply and growth projections, at the current rate of consumption, the PWD water supply could be running at a deficit by 2021. The Project is needed to meet future water demands by developing groundwater "banking" to store available water underground during normal years, replenish groundwater supplies, and save for future dry periods. Currently, PWD receives water supply from the SWP when it is available. When supply from the SWP is not available, PWD uses water from the Littlerock Reservoir and pump water from groundwater wells. The surface water supply from the SWP is highly variable and, as a result of the drought, has reached a historic 50-year low. With less SWP supply available in recent years, groundwater reserves have been increasingly taxed.

The proposed Project is intended to meet PWD's long-term water needs through a solution that is reliable, sustainable, cost effective, and drought-resistant. The overarching objective of the proposed Project is to develop a groundwater banking, storage, and extraction program, using a combination of raw imported SWP water and locally produced recycled water delivered to new recharge basins located on undeveloped land in northeast Palmdale. Additional objectives of the proposed Project include:

- Help to provide a diversified portfolio of ground and surface water;
- Increase reliability of water supply;
- Replenish groundwater supplies;
- Save for future dry periods; and
- Provide a cost-effective solution for long-term water supply.

2.3 PROJECT LOCATION

The proposed Project site is located generally in the northeastern, undeveloped portion of the City of Palmdale in Los Angeles County and surrounding unincorporated Los Angeles County and City of Lancaster (Figure 2-1, *Regional Location Map*). More specifically, the proposed Project site is situated north of Highway 138, east of Highway 14, south of Edwards Air Force Base, and west of the community of Lake Los Angeles. The Project site is located in portions of the Alpine Butte, Lancaster East, Littlerock, and Palmdale U.S. Geological Survey (USGS) 7.5-minute quadrangle maps (Figure 2-2, *Project Vicinity [USGS Topography]*). The proposed Project consists of several components at different locations, including a Recharge Site, a Distribution Site, a network of Recovery Wells surrounding the Recharge Site, and several associated pipelines. The Recharge Site is located south of East Avenue L, west of 105th Street East, north of Avenue L-8, and east of 100th Street East. The Distribution Site is located approximately 0.5 mile south of the Recharge Site's southern boundary. The Recovery Wells are located along side of East Avenue K-8, 110th Street East, East Avenue M, and 95th Street. The proposed Project also includes alignments for raw, potable, and recycled water supply mains that would be located mostly within existing streets (Figure 2-3, *Proposed Project – Aerial Photograph*). The pipelines are bounded by East Avenue K-8 to the north, the East Branch of the California Aqueduct to the south, 106th Street to the east, and 60th Street East to the west.

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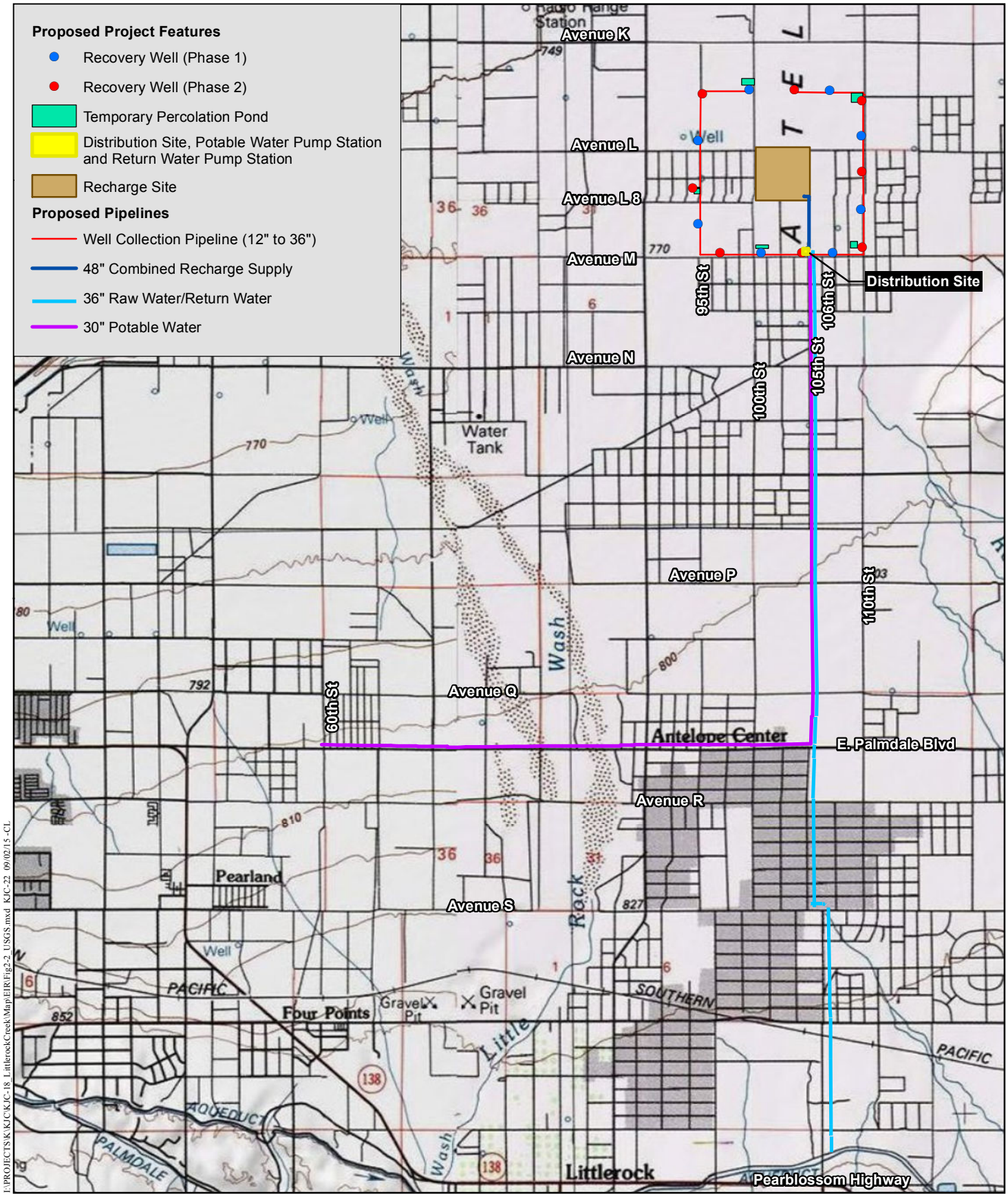
Regional Location Map

PALMDALE REGIONAL GROUNDWATER RECHARGE AND RECOVERY PROJECT

HELIX Environmental Planning

N 0 10 Miles

Figure 2-1



Project Vicinity (USGS Topography)

PALMDALE REGIONAL GROUNDWATER RECHARGE AND RECOVERY PROJECT

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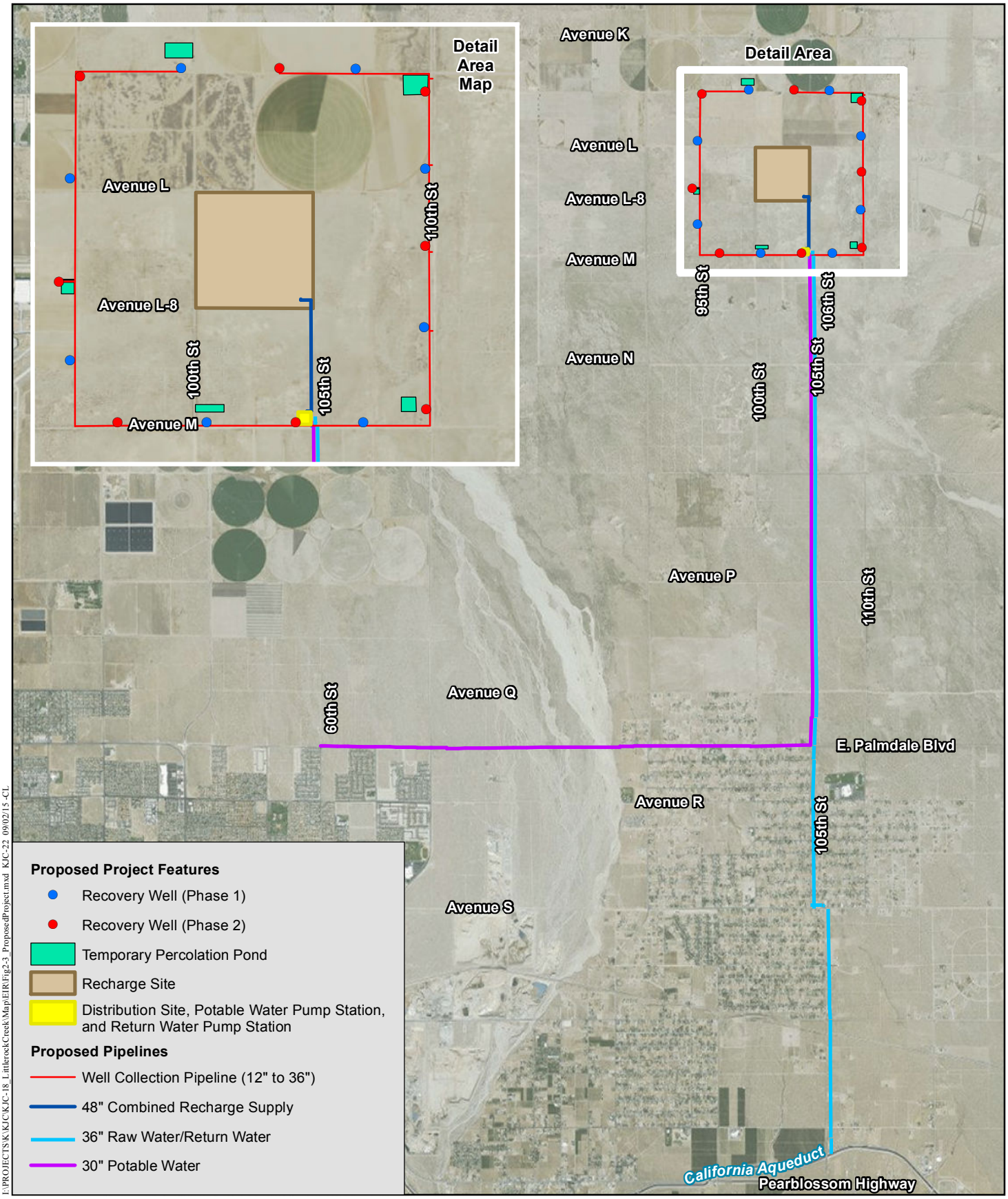
N 0 1.5 Miles

Figure 2-2



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Proposed Project - Aerial Photograph

PALMDALE REGIONAL GROUNDWATER RECHARGE AND RECOVERY PROJECT

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N 0 6,500 Feet

Figure 2-3

Portions of the pipelines, the Recharge Site, the Distribution Site, and some of the Recovery Wells would be located within the City of Palmdale (Figure 2-4, *Proposed Project and Local Jurisdictional Boundaries*). Portions of the proposed Project occurring within the City of Lancaster are limited to the Recovery Wells located north of Avenue L, between 102nd Street East and 107th Street East. Portions of the Project occurring within unincorporated Los Angeles County include the Potable Water and Raw Water/Return Water Pipelines south of East Avenue Q and east of 80th Street East, as well as the Recovery Wells north of East Avenue L outside of the Lancaster city limits.

2.4 EXISTING SETTING AND LAND USES

2.4.1 Existing Environmental Setting

The proposed Project is located within a relatively broad alluvial plain and exhibits a generally level topographic profile. Elevations in the Project area range from approximately 2,900 feet above mean sea level (amsl) near the proposed southern terminus of the Project, to 2,500 feet amsl near the recharge basins proposed at the north end of the Project area. Surface drainage from most of the Project vicinity is via sheet flow and small, un-named intermittent drainages that flow primarily north, as well a larger intermittent drainage, Littlerock Wash.

Soils in the Project area primarily include a variety of sands and sandy loams (U.S. Department of Agriculture Natural Resources Conservation Service [USDA NRCS] 2015). Generalized vegetation in the Project area primarily consists of agricultural land and common desert scrub communities.

2.4.2 Adjacent Land Uses

The northern portion of the proposed Project, which consists of the Recharge Site, Recovery Wells, and associated facilities at the Distribution Site, is located within a relatively undeveloped area, previously used for agricultural uses. Areas immediately adjacent to the proposed Recharge Site and Distribution Site are vacant, although scattered rural residential uses are located in the area. There are two recycled water seasonal storage ponds approximately 0.5 mile east of the proposed Recharge Site. The nearest use to the northern Project components consists of rural residential at a distance of approximately 1,500 feet to the south, at East Avenue M-8.

The proposed pipeline alignments traverse through undeveloped, vacant land north of Palmdale Boulevard. At Palmdale Boulevard, one pipeline traverses west, while the second pipeline traverses south. These pipeline alignments each traverse through both developed and vacant areas. The pipeline alignment along Palmdale Boulevard is adjacent to single-family, rural residential uses and an elementary school, and more concentrated single-family residential uses west of 65th Street East. Residential development occurs along the 105th Street East and 106th Street East pipeline alignment, with a high school and church also located adjacent to the pipeline alignment. There are also solar farms located in the vicinity of East Avenue O and East Avenue P, between 105th Street East and 110th Street East.

2.5 PROJECT CHARACTERISTICS

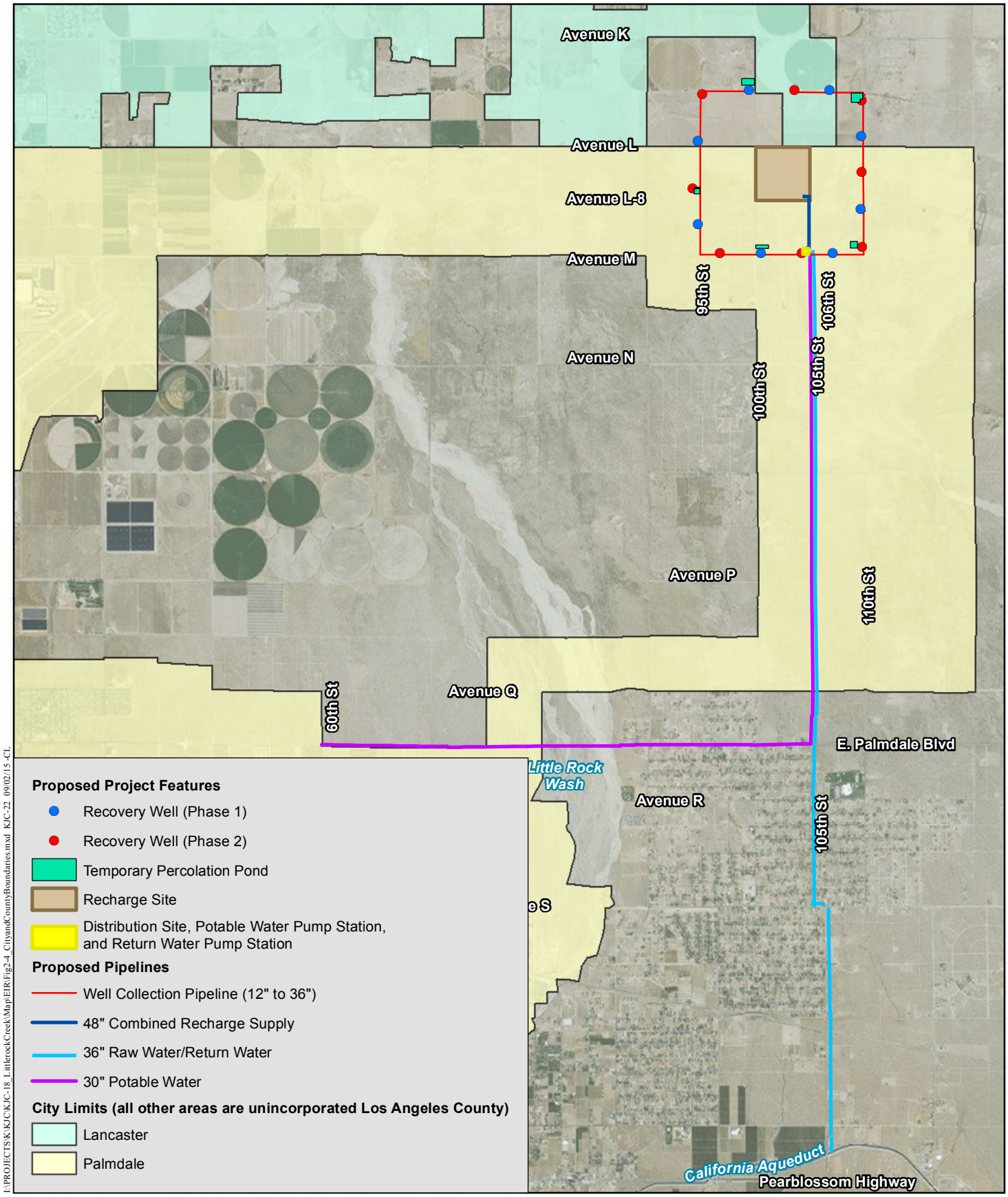
A Feasibility Study was conducted for a number of potential Project design alternatives, including the proposed Project, by Kennedy/Jenks Consultants (KJC; 2015a). The Project description below is based on the analysis and results contained in the Feasibility Study, which is provided as Appendix B of this EIR and the Preliminary Design Report, also prepared by KJC (2015b) and provided as Appendix C of this EIR.

2.5.1 Project Activities

The PWD plans to develop groundwater banking programs with new spreading grounds to recharge imported water and recycled water, as well as recovery facilities to help meet future water demands and improve reliability. Water for groundwater recharge would be obtained from two sources: raw water from the East Branch of the California Aqueduct (State Water Project or SWP water) and recycled water from the Los Angeles County Sanitation District's (LACSD's) Palmdale Water Reclamation Plant. The SWP water would be the blending source for the recharge water. The recharge capacity of the proposed Project is estimated to be approximately 50,000 to 52,000 AFY. For the magnitude of recharge envisioned for the proposed Project, SWP water would need to be recharged nearly year-round during wet years, which is estimated to occur approximately 6 out of every 10 years. During dry years (anticipated to be approximately 4 out of every 10 years), no SWP recharge would occur. Recycled water produced locally also would be included in the recharge (compliant with applicable regulations); this source is anticipated to be available at an approximately constant rate year-round.

The proposed Project would potentially occur in two phases. The first phase is intended to meet the PWD's water demands for the first 22 years of the proposed Project's life, providing a water supply of 14,125 AFY. The second phase is sized to meet PWD's water demand through the 50-year proposed Project evaluation period (through 2067), as well as ultimate buildout, providing a water supply of up to 24,250 AFY. If a partner agency joins PWD, up to 30,000 AFY could be pumped back to the SWP for use by the partner agency. The components of the Project, which are each designed to accommodate the ultimate demand of the Project, are listed below and shown in Figure 2-5, *Process Flow Diagram*:

- **SWP Turnout:** The new 50-cubic foot per second (cfs) Turnout would be located at the intersection of the East Branch of the California Aqueduct and 106th Street East (Figure 2-6, *SWP Turnout Section*). (A turnout at the East Branch of the California Aqueduct is a connection/gate that allows water to leave the Aqueduct.) The Turnout consists of a rectangular cutout of the East Branch of the California Aqueduct concrete canal lining, approximately 25 feet long by 10 feet wide. A trashrack and an algae screen would be installed over the cut-out section to prevent trash and algae from entering the turnout. A 36-inch diameter pipe would enter the side of the East Branch of the California Aqueduct. Water would flow into the pipeline, through a flow meter, then through the Raw Water/Return Water Pipeline to the Recharge Site (both of which are discussed in more detail below). The new Turnout structure would be composed of reinforced concrete. Stop logs and a motor-actuated sluice gate would control the flow entering the pipeline. The East Branch of the California Aqueduct would remain in operation during the construction of the SWP Turnout. A cofferdam would be used to



Proposed Project and Local Jurisdictional Boundaries

PALMDALE REGIONAL GROUNDWATER RECHARGE AND RECOVERY PROJECT

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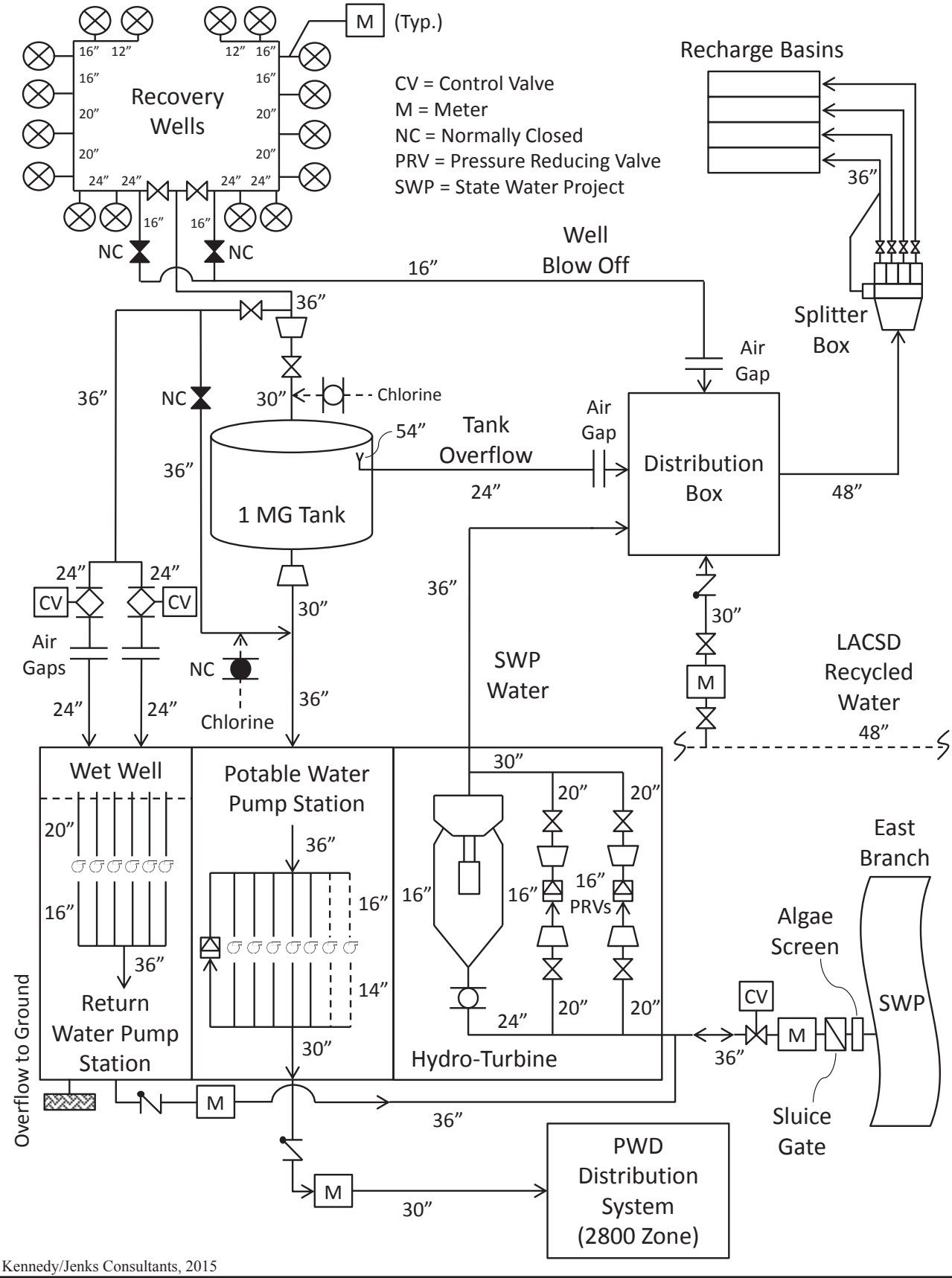
N 0 6,500 Feet

Figure 2-4



Source: Kennedy/Jenks Consultants, 2015

Process Flow Diagram

PALMDALE REGIONAL GROUNDWATER RECHARGE AND RECOVERY PROJECT

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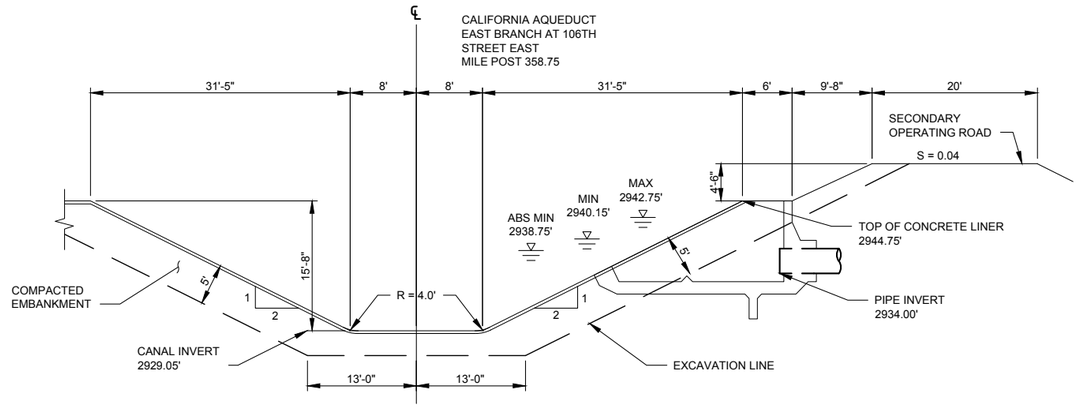
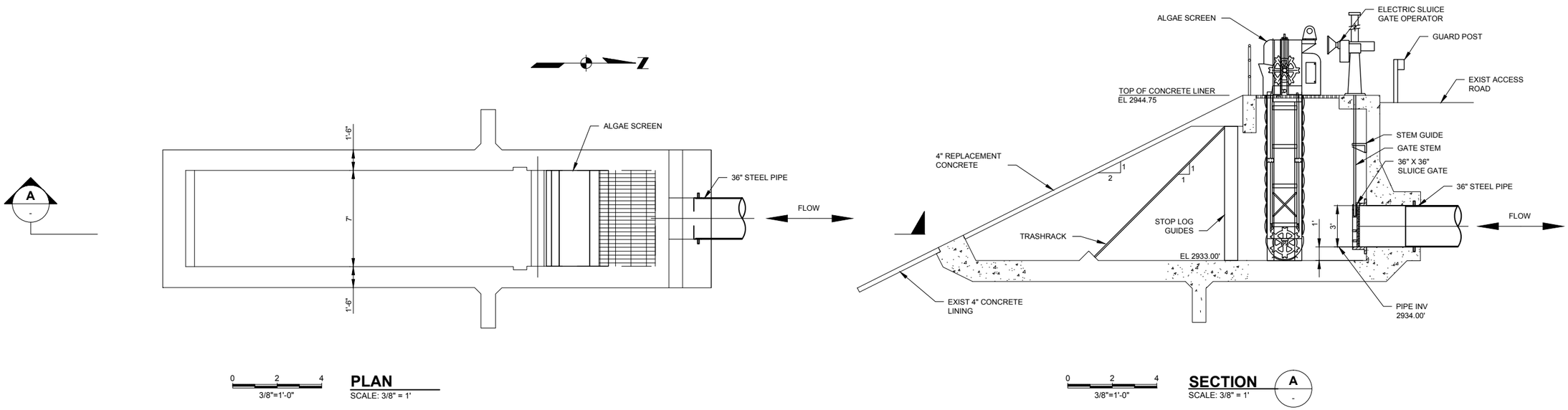
Figure 2-5



0 10 20
1"=10'

TYPICAL PARTIAL AQUEDUCT SECTION

SCALE: 1" = 10'



0 2 4
3/8"=1'-0"

PLAN

SCALE: 3/8" = 1'

0 2 4
3/8"=1'-0"

SECTION A

SCALE: 3/8" = 1'

Source: Kennedy/Jenks Consultants, 2015

SWP TURNOUT PLAN AND SECTION

SWP Turnout Section

PALMDALE REGIONAL GROUNDWATER RECHARGE AND RECOVERY PROJECT

Figure 2-6

HELIX Environmental Planning

provide a dewatered section of the East Branch of the California Aqueduct for construction activities. Water passing the cofferdam would have a slight increase in velocity due to the cross-sectional area restriction; however, this velocity increase should not impact East Branch of the California Aqueduct operations since the bottom and side slopes are lined with four inches of concrete. Once construction is complete, the cofferdam would be removed and water flow in the East Branch of the California Aqueduct would return to normal.

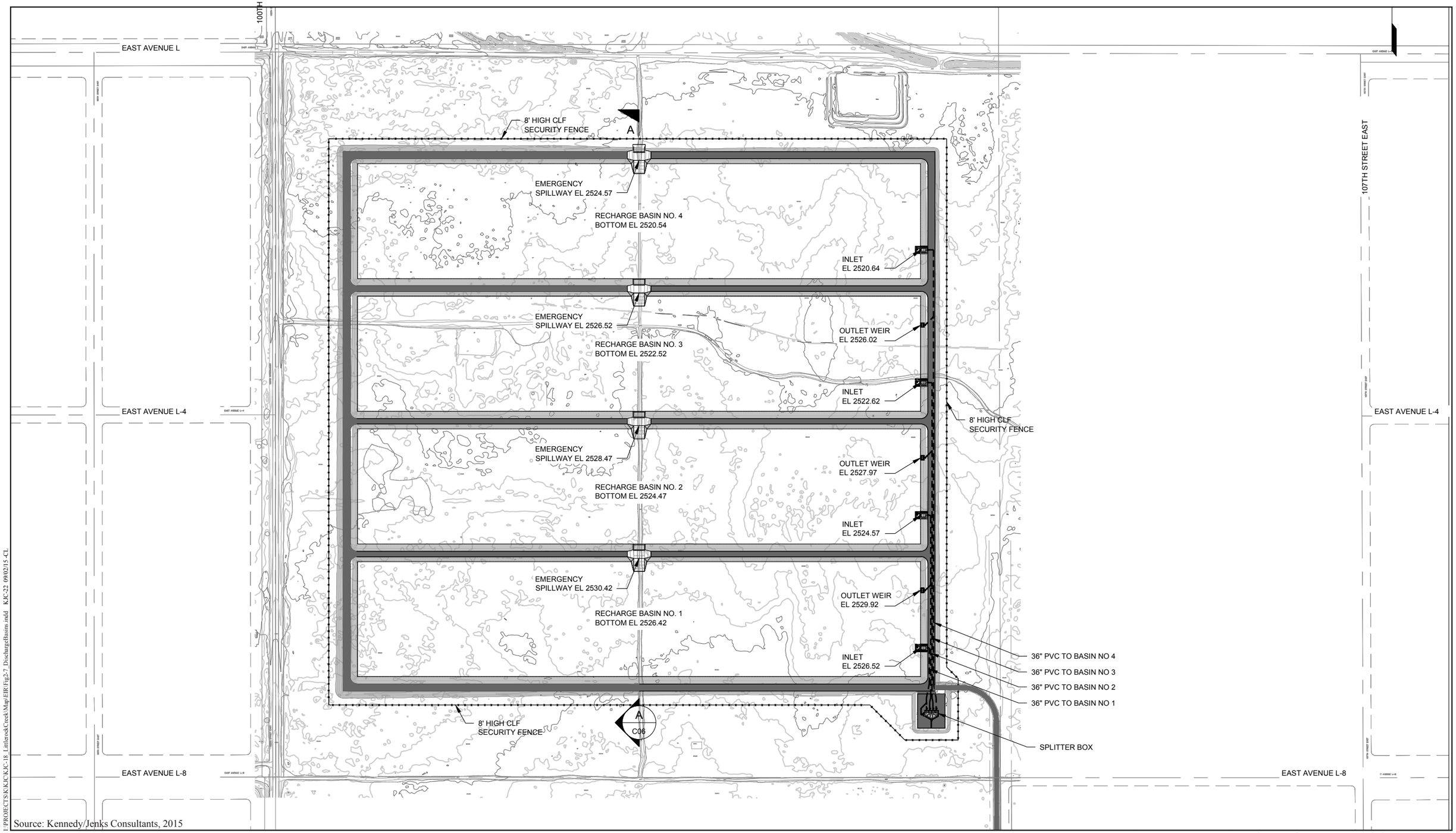
- **Recharge Site:** The Recharge Site is 160 acres and is defined by East Avenue L to the north, East Avenue L-8 to the south, 100th Street East to the west, and 105th Street East to the east. The basins at the Recharge Site would consist of four 20-acre cut-and-fill earth embankment recharge basins with shotcrete interior slopes (Figure 2-7, *Recharge Basins Overall Site Plan*). The basins would occupy approximately 80 acres in the center of the 160-acre Recharge Site and would be surrounded by an eight-foot-high chain-link security fence topped with three-strand barbed wire. The fenced area would include the recharge basins and the sloped berms surrounding the basins, covering approximately 110 acres of the 160-acre site. The side slope of the recharge basin embankments at the Recharge Site would be 3:1, with a maximum height of approximately 8 feet (Figure 2-8, *Recharge Basin [Typical]*). Each basin would have an emergency spillway (Figure 2-9, *Recharge Basin Section*). The entire 80 acres of recharge basins would be surrounded by a 26-foot-wide access road. An access road 20 feet wide would also be located between each basin. The 50 acres outside of the 110-acre fenced area containing the recharge basins would be partially disturbed during construction activities on the inner 110 acres, but the impacts to 40 of the 50 acres would be temporary and would not occur over all 40 acres. The remaining 10 acres of the 50-acre area would be utilized for long-term soil stockpiling associated with basin maintenance (see Section 2.5.3, *Operational Activities* for more details). Following construction of the recharge basins and associated structures, with the exception of the access road from the Distribution Site to the Recharge Site and an approximately 10-acre portion to be utilized for soil stockpiling, the area outside of the fenced recharge basins would be allowed to revegetate naturally and would remain unused. PWD would designate the approximately 40 acres of this unfenced portion of the Recharge Site in a conservation easement, restrictive covenant, or other legal protective mechanism.

- **Raw Water/Return Water Pipeline:** The Raw Water/Return Water Pipeline would be approximately 8.6 miles long and would connect the Distribution Site with the East Branch of the California Aqueduct at the proposed SWP Turnout described above. The 36-inch diameter Raw Water/Return Water Pipeline would travel north along 106th Street East from the SWP turnout for approximately 2.3 miles. It would then traverse west along East Avenue S for approximately 0.1 mile, and then north along 105th Street East for approximately 1.5 miles to the terminus of 105th Street East at East Palmdale Boulevard. The Raw Water/Return Water Pipeline would continue north from the intersection of 105th Street East and East Palmdale Boulevard, along the future 105th Street East alignment through undeveloped land for approximately 4.7 miles to connect with the recharge basins at the Recharge Site.

- **Recycled Water Pipeline:** The Recycled Water Pipeline includes the construction of a 30-inch pipeline that would connect to an existing 48-inch recycled water pipeline at the intersection of 105th Street East and East Avenue M. The proposed 30-inch Recycled Water Pipeline would traverse north and west for approximately 0.1 mile along 105th Street East, paralleling the 36-inch Raw Water/Return Water Pipeline, until reaching the Distribution Box at the Distribution Site (Distribution Site is discussed in more detail below) where the recycled water would flow by gravity through the Combined Recharge Supply Pipeline the last 0.6 mile to the Recharge Site.

- **Recovery Wells:** The Project would include sixteen Recovery Wells potentially occurring in two phases, with all Recovery Wells having an estimated capacity of 1,200 gallons per minute (gpm). The Recovery Wells are intended to be phased one half at a time with eight Recovery Wells installed during the first phase and the additional eight Recovery Wells installed in the second phase. The Recovery Wells would be configured surrounding the Recharge Site, located on an approximately 1.5-mile by 1.5-mile square, centered around the Recharge Site. The wells are set back a minimum of 0.5 mile on each side of the Recharge Site to provide more than one year of travel time, as required by the California Department of Drinking Water, for recycled water traveling from the recharge basins to the Recovery Wells. Four Recovery Wells would be located along 95th Street East, between Avenue M and Avenue K-8; five Recovery Wells would be located along 110th Street East, between Avenue M and Avenue K-8; three Recovery Wells would be located along Avenue K-8, between 95th Street East and 110th Street East; and four Recovery Wells would be located along Avenue M, between 95th Street East and 110th Street East. One of the Recovery Wells located along Avenue M would be within the fenced Distribution Site (discussed in more detail below). All 16 Recovery Wells would be approximately 200 horsepower, housed in buildings, and would operate up to 97 percent of the year (Figure 2-10, *Recovery Well Plan [Typical]*). Approximately 6 miles of Well Collection Pipeline would connect the Recovery Wells to the Potable Water Pump Station (discussed in more detailed below; Figure 2-11, *Recovery Wells and Well Collection Pipeline*). The Well Collection Pipeline for the first phase is sized to deliver water from the Recovery Wells in both phases to the Recharge Site and is located either in existing or future street alignments. The Well Collection Pipeline would vary in size, ranging from 12 inches at the north of the site to 36 inches at the south of the site. The proposed Project would also include five temporary Percolation Ponds on parcels in close proximity to Recovery Wells for water collection and percolation into the groundwater basin during Recovery Well testing. These parcels would be bermed using soil within each parcel and would temporarily store water pumped up during Recovery Well testing. The water would remain on each parcel until it has percolated back into the groundwater basin. The berms on each parcel would then be redistributed around the parcel.

- **Distribution Site:** The one-million-gallon Storage Tank and Pump Station Building (with chlorination facilities) would be located on a two-acre parcel approximately 0.5 mile south of the Recharge Site, at the northwestern corner of the Avenue M and 105th Street East intersection (Figure 2-12, *Distribution Site Plan*). Figures 2-13, *Tank Plan and Section*, and 2-14, *Chlorination Room Plan*, portray the head tank and Chlorination Room plans at the Distribution Site, respectively. A 48-inch Combined



Source: Kennedy/Jenks Consultants, 2015

Recharge Basins Overall Site Plan

PALMDALE REGIONAL GROUNDWATER RECHARGE AND RECOVERY PROJECT

Figure 2-7

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RECHARGE BASIN NO. 2

20'

3:1 (H:V)
SIDE SLOPES
(TYPICAL)

EMERGENCY SPILLWAY
AND ACCESS RAMP
SEE DETAIL ON SHEET C08

RECHARGE BASIN NO. 1

425'

3:1 (H:V)
SIDE SLOPES
(TYPICAL)

26'

3:1 (H:V)
SIDE SLOPES
(TYPICAL)

2080'

3:1 (H:V)
SIDE SLOPES
(TYPICAL)

26'

OUTLET WEIR
SEE DETAIL 2
ON SHEET C07

INLET STRUCTURE
SEE DETAIL ON
SHEET C07

26'

16' ACCESS ROAD
FROM PUMP
STATION BUILDING

SPLITTER BOX
SEE DETAIL 1
ON SHEET C09

16'

N

0 100 200
1"=100'

PLAN
SCALE: 1" = 100'

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Source: Kennedy/Jenks Consultants, 2015

Recharge Basin (Typical)

PALMDALE REGIONAL GROUNDWATER RECHARGE AND RECOVERY PROJECT

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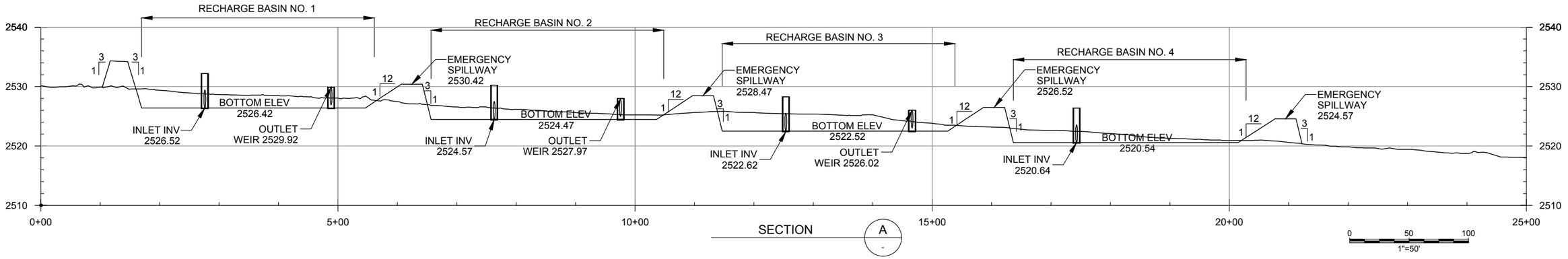
Figure 2-8



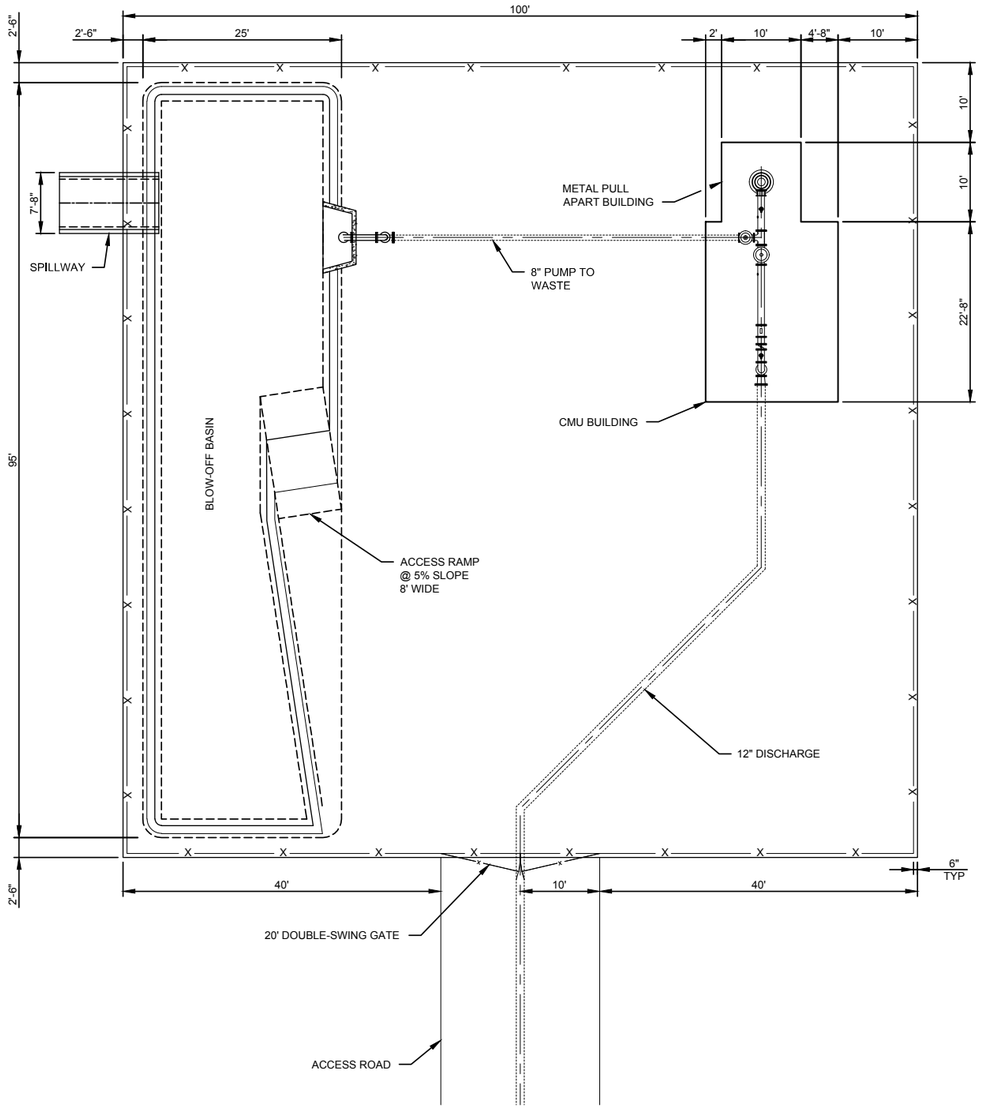
Source: Kennedy/Jenks Consultants, 2015

Recharge Basin Section

PALMDALE REGIONAL GROUNDWATER RECHARGE AND RECOVERY PROJECT

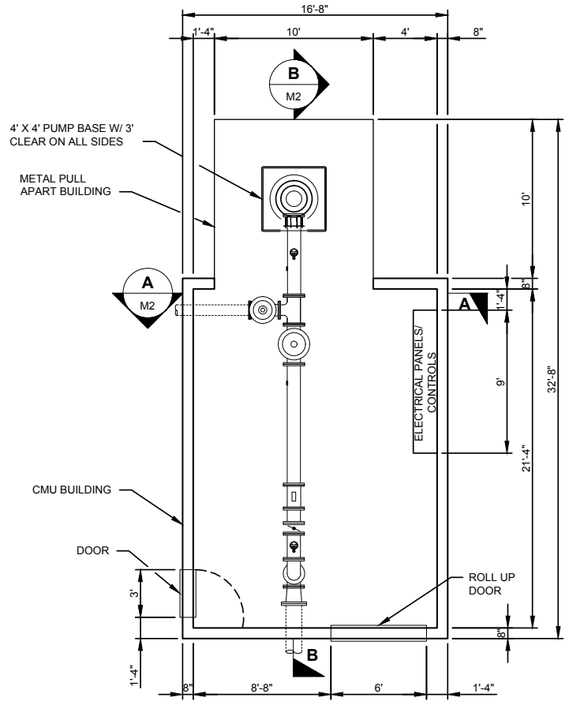
Figure 2-9

HELIX Environmental Planning



0 10 20
1"=10'

RECOVERY WELL SITE PLAN (TYP.)
SCALE: 1" = 10'



0 5 10
1"=5'

RECOVERY WELL BUILDING PLAN (TYP.)
SCALE: 1" = 5'

Source: Kennedy/Jenks Consultants, 2015

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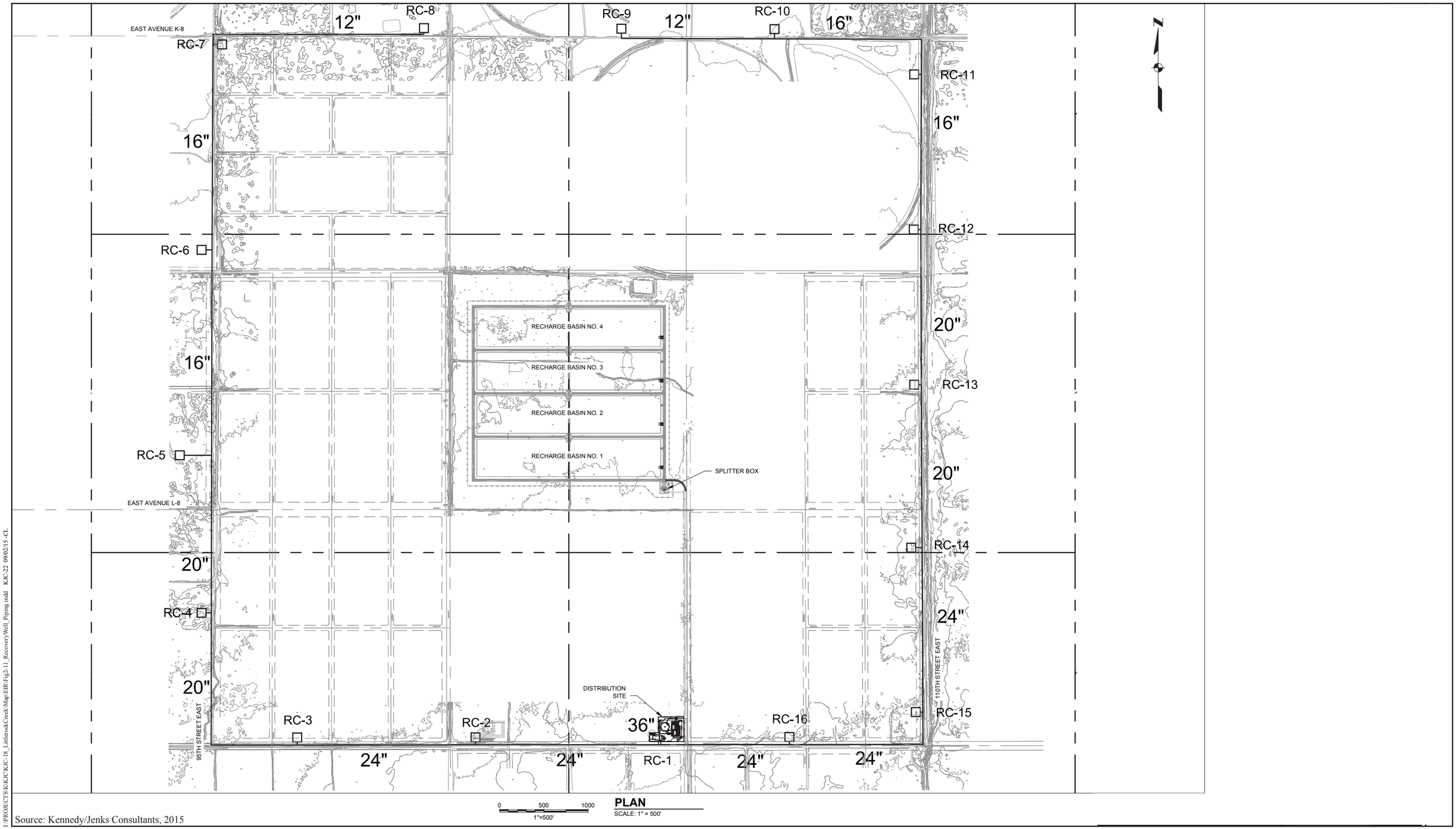
Recovery Well Plan (Typical)

PALMDALE REGIONAL GROUNDWATER RECHARGE AND RECOVERY PROJECT

HELIX Environmental Planning

Figure 2-10



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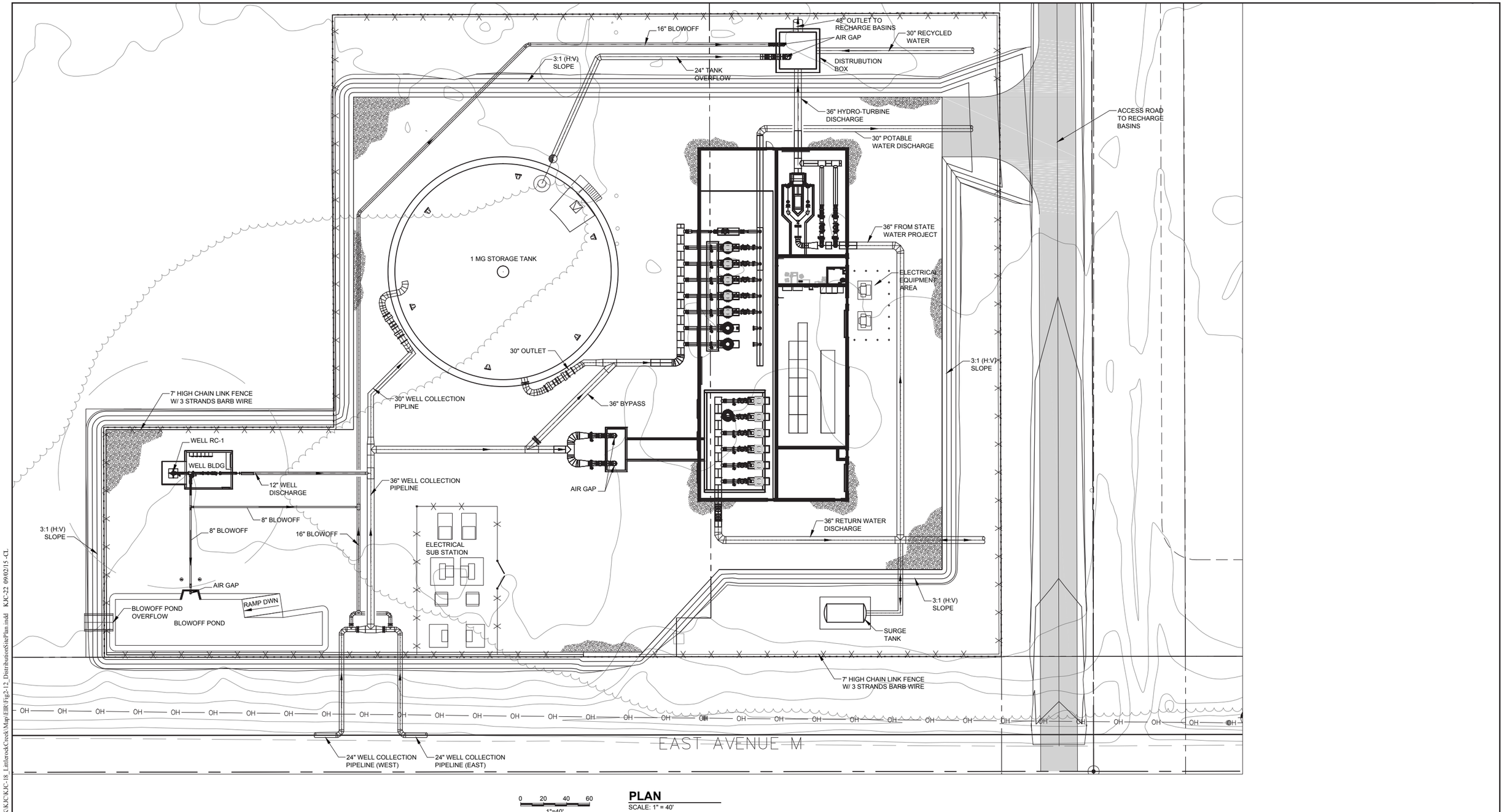
Source: Kennedy/Jenks Consultants, 2015

Recovery Wells and Well Collection Pipeline

PALMDALE REGIONAL GROUNDWATER RECHARGE AND RECOVERY PROJECT

HELIX Environmental Planning

Figure 2-11



0 20 40 60
1"=40'

PLAN
SCALE: 1" = 40'

Source: Kennedy/Jenks Consultants, 2015

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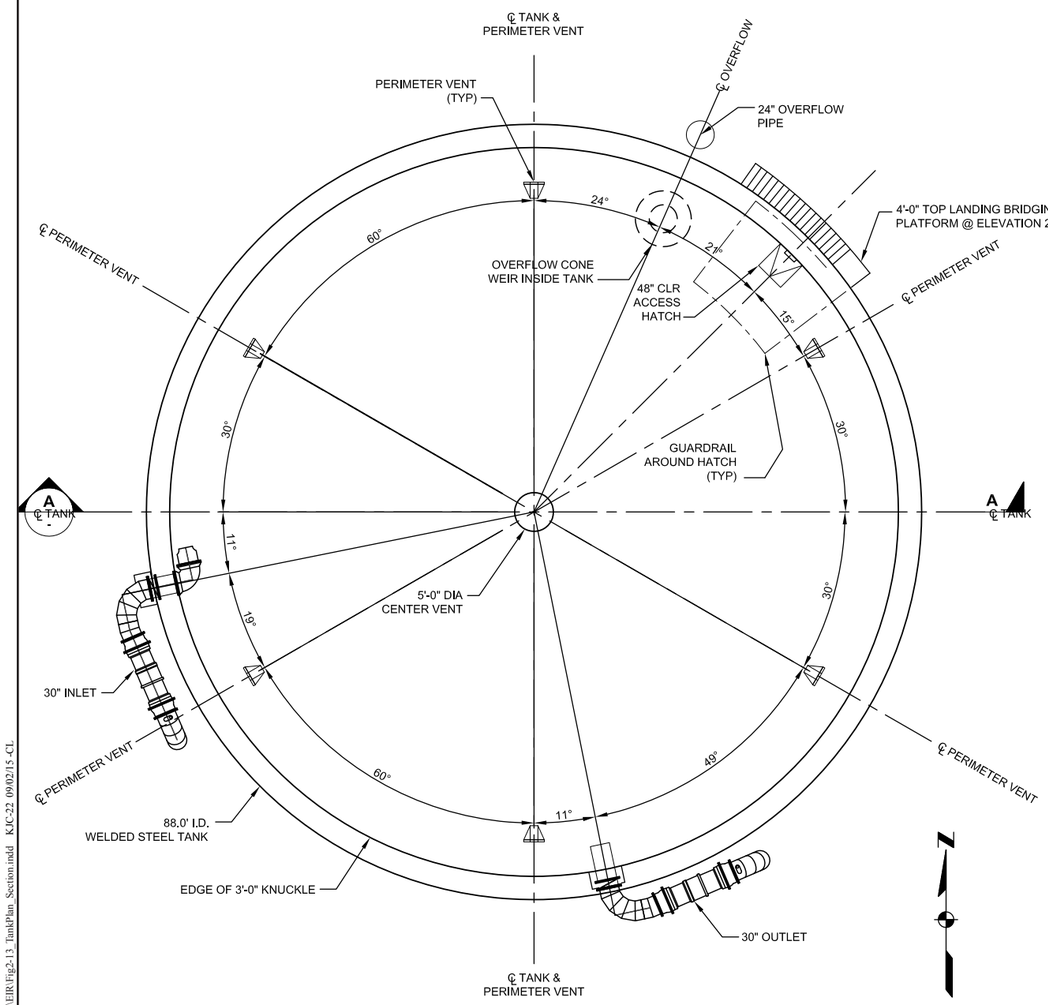
Distribution Site Plan

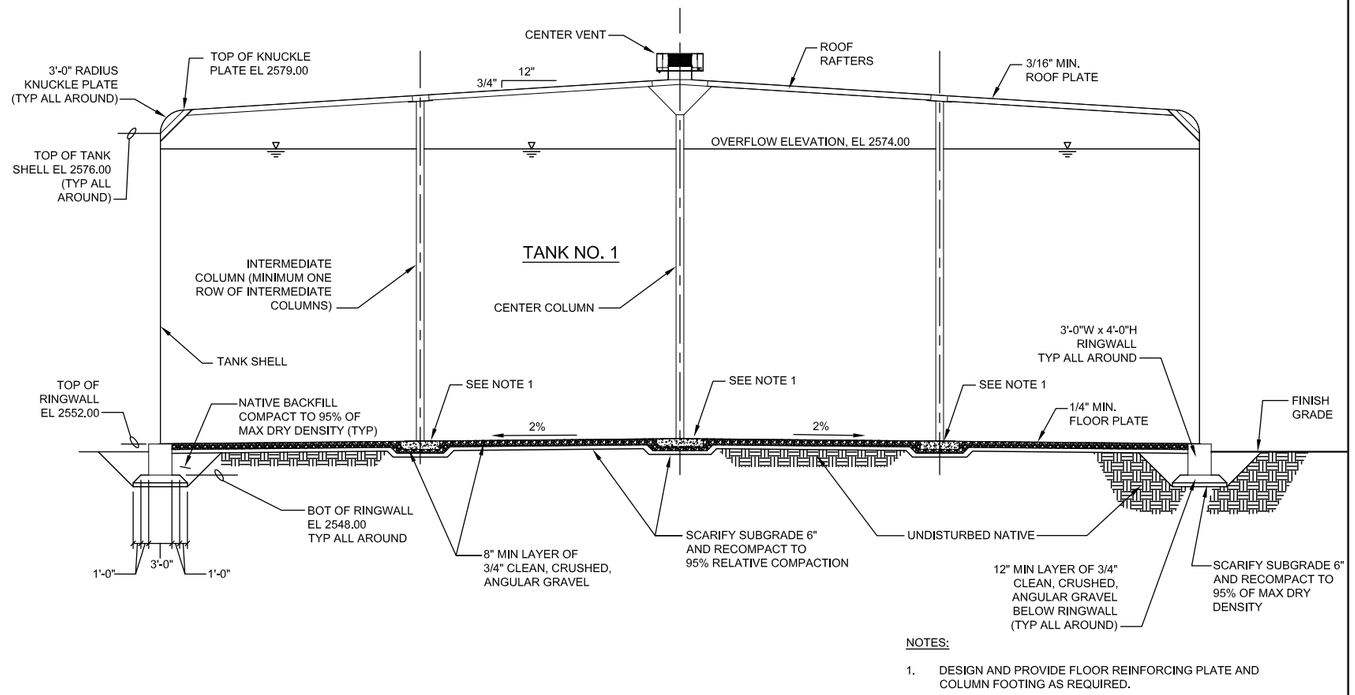
PALMDALE REGIONAL GROUNDWATER RECHARGE AND RECOVERY PROJECT

Figure 2-12

HELIX Environmental Planning



TANK PLAN



TANK SECTION A -

NOTES:

1. DESIGN AND PROVIDE FLOOR REINFORCING PLATE AND COLUMN FOOTING AS REQUIRED.

0 10 20
1"=10'

Source: Kennedy/Jenks Consultants, 2015

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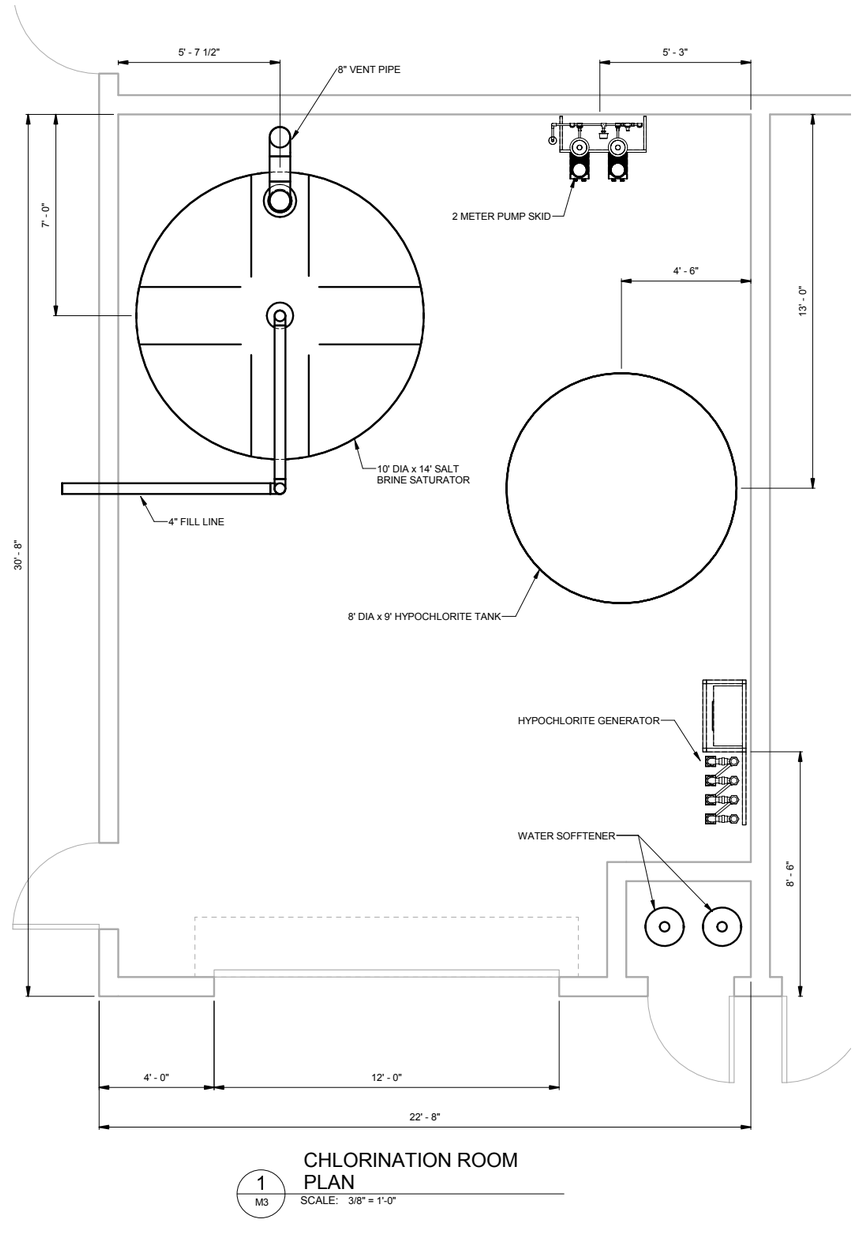
Tank Plan and Section

PALMDALE REGIONAL GROUNDWATER RECHARGE AND RECOVERY PROJECT

Figure 2-13

HELIX Environmental Planning



1 M3 CHLORINATION ROOM PLAN
SCALE: 3/8" = 1'-0"

Source: Kennedy/Jenks Consultants, 2015

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Chlorination Room Plan

PALMDALE REGIONAL GROUNDWATER RECHARGE AND RECOVERY PROJECT

Figure 2-14

HELIX Environmental Planning

Recharge Supply Pipeline would convey water between the Distribution Site and the Recharge Site. This 48-inch Combined Recharge Supply Pipeline would be approximately 0.5 mile in length and would convey water from the Distribution Box at the Potable Water Pump Station to the Splitter Box at the Recharge Site. An access road would connect the Recharge Site and the Distribution Site.

- **Potable Water Pump Station and Potable Water Pipeline:** The Potable Water Pump Station is intended to accommodate the ultimate demand. However, the pumps themselves are to be phased, meaning the four 3,000-gpm, 400-horsepower pumps (plus one additional pump as a spare) are intended to accommodate the 14,125 AFY demand, and the ultimate demand would be supplied through an additional two pumps of the same size and capacity (Figure 2-15, *Pump Station Building Plan*). Although most phasing for the proposed Project is intended to be within two parts, this Potable Water Pump Station is capable of being implemented through multiple phases as demand increases. The Potable Water Pump Station would be located on the same 2-acre parcel as the 1-million-gallon Storage Tank and Chlorination Room. The proposed Project would also include the installation of a 30-inch Potable Water Pipeline that originates at the Potable Water Pump Station and proceeds south along the same alignment as the Raw Water/Return Water Pipeline and then traverses west along East Palmdale Boulevard, until 60th Street East. The Potable Water Pipeline would be approximately 9.2 miles long. The Potable Water Pump Station would operate continuously to meet PWD's potable demands. There would be a bathroom in the control room, which would require an on-site septic tank and leach field.

- **Return Water Pump Station:** The optional Return Water Pump Station is designed to accommodate a water banking partner or partners in order to pump-back to the East Branch of the California Aqueduct. The Return Water Pump Station would be located adjacent to the one-million-gallon Storage Tank and discharge back into the 30-inch diameter Raw Water/Return Water Pipeline. The Pump Station Building would house both the raw water and potable water pumps in a single building. It is not required for the Return Water Pump Station to be implemented until a water banking partnership is achieved. The Return Water Pump Station may be combined with the Potable Water Pump Station, resulting in a six-pump, 3,750-gpm, 600-horsepower pump station, with one additional pump as a spare. The Return Water Pump Station, if it is implemented, would operate the majority of the year for an anticipated 4 out of 10 years, which is the anticipated frequency of dry years.

2.5.2 Project Construction

Project Schedule and Stages

Construction of the proposed Project is expected to commence in May 2017, and would occur over a period of approximately 21 months. The proposed Project would be constructed in two phases to reflect water supply and demand considerations. Specifically, the first phase would include: (1) the SWP turnout; (2) all pipelines; (3) the Potable Water Pump Station (with five of seven pumps and related Distribution Site facilities such as storage tank and chlorination structures); (4) the Recharge Site; and (5) 8 of the 16 Recovery Wells (and associated pipeline

connections to the Potable Water Pump Station). The second phase would generally be limited to adding additional facilities/capacity to the noted Project elements developed in the first phase, such as additional Recovery Wells and associated Well Collection Pipeline sections, the additional two pumps at the Potable Water Pump Station, and the Return Water Pump Station. It is also possible that all of the Recovery Wells and Potable Water Pump Station pumps could be constructed during the first phase, if a partner agency joins PWD in the proposed Project and there is sufficient demand. Construction would occur in five stages, as shown in Table 2-1, *Construction Schedule and Stages*.

Construction Activities

Construction of the proposed Project would occur in five stages: Recovery Well drilling, Recovery Well equipping, pipelines and SWP Turnout, Recharge Site, and Distribution Site.

Table 2-1
CONSTRUCTION SCHEDULE AND STAGES

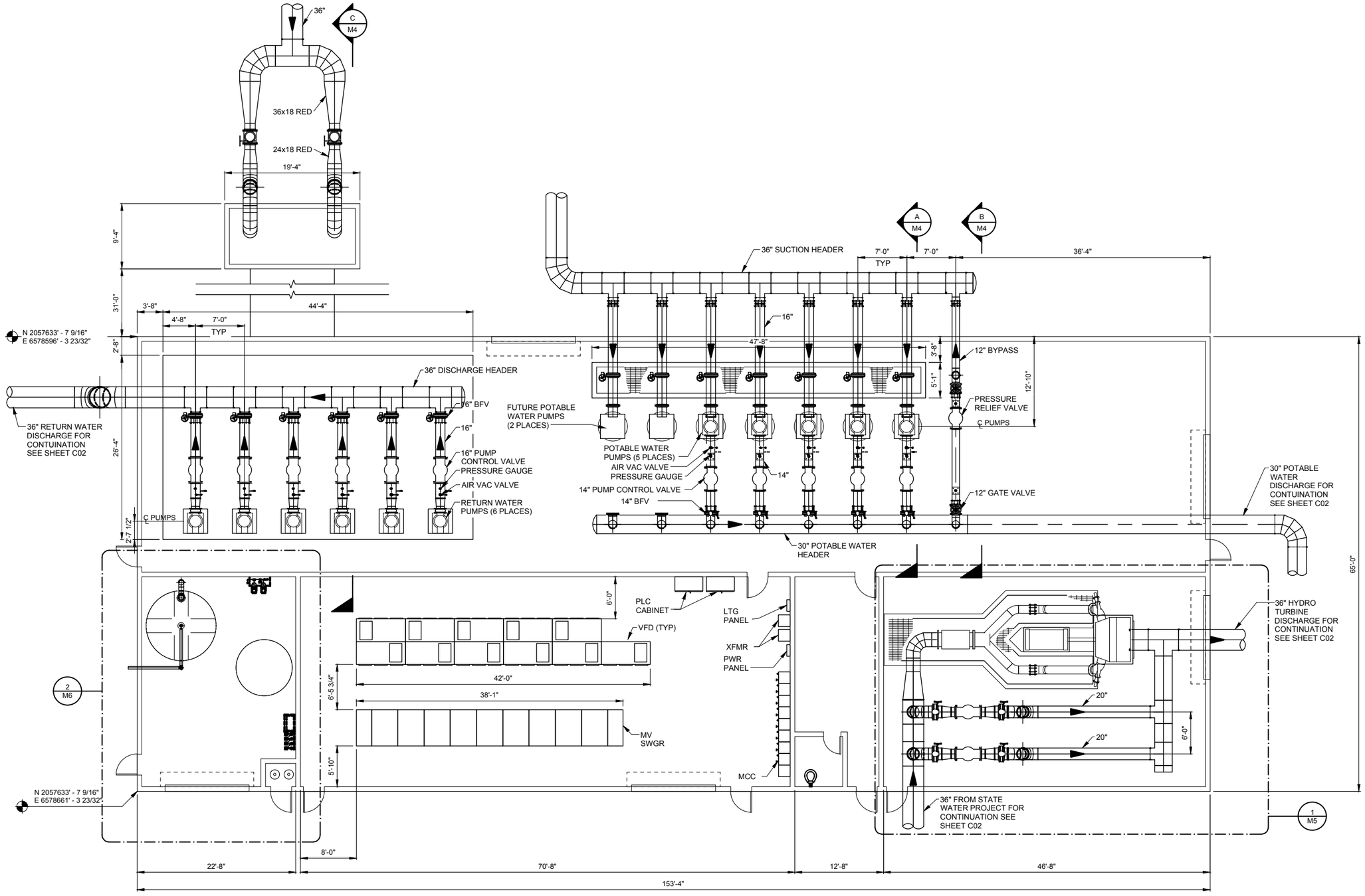
Stage	Project Component	Construction Period	Total Stage Duration
1	Recovery Well Drilling	May 2017 – March 2018	10 months
2	Recovery Well Equipping	February 2018 – February 2019	12 months
3	Pipelines and SWP Turnout	July 2017 – June 2018	11 months
4	Recharge Site	July 2017 – July 2018	12 months
5	Distribution Site	October 2017 – February 2019	16 months

Recovery Well Drilling and Equipping

Recovery Well drilling and equipping would occur within a 150-foot by 150-foot square for each well site, for a total of 22,500 square feet per well, and a total of 360,000 square feet for all 16 wells. No excavation would be required for Recovery Well drilling. Minimal grading (less than 1,000 cubic yards; cy) would occur during the Recovery Well drilling stage. Recovery Well equipping would require approximately 3,000 cy of excavation, approximately 5,000 cy of imported fill, and approximately 7,500 cy of compacted fill. Vehicles accessing the wells from Pearblossom Highway would turn north on 87th Street East, continue onto 90th Street East, turn east on East Avenue M or north to East Avenue L to access the Recovery Well sites. Construction staging and laydown areas would be adjacent to the Recovery Wells.

Pipelines and SWP Turnout

Construction of the SWP Turnout would include a temporary placement of a coffer dam around the turnout area to dewater the local site. Water would continue flowing in the East Branch of the California Aqueduct during construction. The SWP Turnout could be constructed simultaneously with the pipeline construction as the sluice gate would prevent water from entering the pipe upon completion of the SWP Turnout construction. Construction staging and laydown areas would be at the SWP Turnout, located to the northeast of the 106th Street East bridge. The maximum area to be disturbed by construction equipment activity at the



Source: Kennedy/Jenks Consultants, 2015

Pump Station Building Plan

PALMDALE REGIONAL GROUNDWATER RECHARGE AND RECOVERY PROJECT

Figure 2-15

HELIX Environmental Planning

SWP Turnout is approximately 750 square feet. The construction staging and laydown area would be 200 feet by 50 feet, for a total area of 10,000 square feet. Vehicles accessing the SWP Turnout location would proceed north from Pearblossom Highway for approximately 0.25 mile to the East Branch of the California Aqueduct.

The Project includes the construction of steel (cement mortar lined and coated) pipelines, including the 36-inch Raw Water/Return Water Pipeline, the 30-inch Potable Water Pipeline, and a 30-inch Recycled Water Pipeline. Pipeline installation would consist of traditional open-trench construction methods, with the exception of two areas which would be installed using jack-and-bore construction methods. Jack-and-bore construction methods would be used at two locations for installation of the Raw Water/Return Water Pipeline: at the Palmdale Boulevard crossing and along 106th Street East at the railroad crossing. Jack-and-bore construction methods at these two locations would require jacking and receiving pits, which would be located within the road right-of-way. Jack-and-bore activities would occur for approximately two weeks at each location. Pipelines installed with traditional open-trench methods are planned for placement at a depth of approximately 7 feet and would require an open trench approximately 5 feet wide for pipeline placement. Where potable water, raw water, and/or recycled water pipelines parallel each other, the individual pipes would be separated by 10 feet to meet CCR requirements. Total pipeline length for the Project is approximately 24.5 miles, consisting of 8.6 miles for the 36-inch Raw Water/Return Water Pipeline, 9.2 miles for the 30-inch Potable Water Pipeline, 0.1 mile for the 30-inch Recycled Water Pipeline, 0.6 mile (of 48-inch pipe) from Distribution Box at the Distribution Site to Splitter Box at recharge basins, and 6 miles of Well Collection Pipeline. During construction of the pipelines, excavated soil would be placed adjacent the alignment. It is estimated that two crews would install pipe, each with 300 linear feet per day of production, totaling 600 linear feet of pipeline installation per day. Trenches would be backfilled and/or covered at the end of each day. Construction staging areas for the pipelines would be at the Distribution Site, while laydown areas would be adjacent to the open trench along the alignment throughout construction.

Construction vehicles accessing the 36-inch Raw Water/Return Water Pipeline alignment from Pearblossom Highway would turn north on 106th Street East, turn west on East Avenue S, turn north on 105th Street East. Vehicles accessing the 36-inch Raw Water/Return Water Pipeline alignment north of Palmdale Boulevard would use the proposed easement, as well as north on 90th Street East and from West Avenue N. Vehicles accessing the 30-inch Potable Water Pipeline alignment from Pearblossom Highway, would turn north on Fort Tejon Road, continue north on 47th Street East, and turn east on East Palmdale Boulevard, or would use the same access route as for the 36-inch Raw Water/Return Water Pipeline (see above).

Water shutdown (less than 48 hours) would be required during the connection of the 30-inch potable water pipeline at East Palmdale Boulevard and 60th Street East to PWD's distribution system.

Recharge Site

Construction of the Recharge Site would require 250,000 cy of excavation and 200,000 cy of compacted fill with shrinkage (balanced cut and fill). Construction staging and laydown for the recharge basins would occur adjacent to the Recovery Wells and at the Distribution Site.

Vehicles accessing the Recharge Site from Pearblossom Highway would turn north on 87th Street East, continue onto 90th Street East, turn east on East Avenue M, and enter the site on the north.

Distribution Site

Construction at the Distribution Site would require approximately 5,000 cy of excavation and approximately 4,000 cy of compacted fill. Construction staging and laydown would occur within the Distribution Site. Vehicles accessing the Distribution Site from Pearblossom Highway would follow the same route as those accessing the recharge basins.

Personnel, Equipment and Construction Hours

Project construction would require varying levels of personnel and equipment at the Recharge Site and along the pipeline alignments during different phases of construction. Personnel and equipment requirements are identified in Table 2-2, *Equipment, Personnel, and Construction Hours.*

Table 2-2
EQUIPMENT, PERSONNEL, AND CONSTRUCTION HOURS

Subphase	On Site Equipment	On Site Personnel	Hours
Stage 1 – Well Drilling			
Month 1: Submittals and permits	N/A	N/A	N/A
Month 2: Site preparation; auger, set, and grout conductor casings to a depth of 50 feet (all wells)	1 drilling rig	2-person crew	Normal weekday working hours; no weekends
Months 3 through 8: Well drilling, approximately 15 days per well	One well drilling rig	2-person crew	24 hours per day, 7 days per week
Months 4 through 9: Well testing, approximately 10 days per well including mobilization and demobilization	One pump test rig	2-person crew	24 hours per day, 7 days per week
Month 10: Final video; chlorination, sampling, testing	Mobile van Pickup truck	2-person crew	Normal weekday working hours; no weekends
Stage 2 – Well Equipping			
Months 1 through 2: Submittals and equipment orders	N/A	N/A	Normal weekday working hours; no weekends
Months 3 through 5: Equipment fabrication, off-site testing, and delivery	1 delivery truck	1 truck driver	Normal weekday working hours; no weekends

Table 2-2 (cont.)
EQUIPMENT, PERSONNEL, AND CONSTRUCTION HOURS

Subphase	On Site Equipment	On Site Personnel	Hours
Stage 2 – Well Equipping (cont.)			
Months 6 through 12: Site work, well equipping (mechanical and electrical), and fencing. Approximately 6 weeks per well, but overlapping crews progressing from well to well; each well about 3 weeks behind the preceding well	Crew 1 (Site Work) – Elevated water tank, water truck, and backhoe Crew 2 (Mechanical) – Flatbed truck with boom crane Crew 3 (Electrical) – Pickup truck	Crew 1 (Site Work) – 3-person crew Crew 2 (Mechanical) – 2-person crew Crew 3 (Electrical) – 2-person crew	Normal weekday working hours; no weekends
Stage 3 – Pipelines and SWP Turnout			
Months 1 through 5: Submittals, fabrication, and delivery of pipeline	1 delivery truck	1 truck driver	Normal weekday working hours; no weekends
Months 6 through 15: Pipeline trenching, installation, backfill, and paving	Backhoe (Cat 690 or similar), excavator, loader, water truck, small backhoe/loader, welding truck (2), trailer-mounted generator, pick-up trucks.	Two large diameter pipeline (8- to 10-person) crews for the 36" Raw Water/Return Water Pipeline, 30" Potable Water Pipeline, and larger diameter (20" and 24" portions of the Well Collection Pipelines; total 22 miles (2 crews for 10 months each). One small diameter pipeline (4- to 5-person) crew for the 10", 12" and 16" Well Collection Pipelines; total 3 miles (1 crew for 4 months).	Normal weekday working hours; no weekends. May perform night work for pipeline installation on busy roadways, likely Palmdale Boulevard.
Months 15 through 16: Project clean-up (1 or 2 crews)	1 trash bin, 1 front-end loader	2-person crew	Normal weekday working hours; no weekends

Table 2-2 (cont.)
EQUIPMENT, PERSONNEL, AND CONSTRUCTION HOURS

Subphase	On Site Equipment	On Site Personnel	Hours
Stage 4 – Recharge Site			
Month 1: submittals, permits	N/A	N/A	Normal weekday working hours; no weekends
Month 2: clear and grub	Three to four scrappers (Cat 623), grader (Cat 12G), backhoe (Komatsu 450 or similar), water tower, two large water trucks (Water Pull Cat 621B or similar), loader (Cat 652 or similar), generator, welding truck	8- to 10-person crew	Normal weekday working hours; no weekends
Months 3 through 7: rough grading (balanced cut and compacted fill)			
Month 8: fine grading of slopes; excavation for inlet and outlet boxes			
Months 7 through 11: form and cast splitter box, and inlet and outlet concrete boxes; trench, lay, and backfill inlet and outlet pipelines			
Month 12: clean-up and testing			
Stage 5 – Distribution Site			
Months 1 through 2: Submittals and equipment orders	N/A	N/A	N/A
Months 3 through 7: Equipment fabrication, off-site testing, and delivery	1 delivery truck	1 truck driver	Normal weekday working hours; no weekends
Months 6 through 8: Site work, underground (mechanical and electrical), and foundations	Crew 1 (Site Work) - Elevated water tank, water truck, and backhoe Crew 2 (Tank Sub) – 30-ton crane, weld truck Crew 3 (Mechanical) – Flatbed truck with boom crane, 30-ton crane, weld truck Crew 4 (Electrical) – Pickup truck Crew 5 (Specialty Trades) – Short duration such as carpenters, concrete finishing, roofing, etc.	Crew 1 (Site Work) – 3-person crew Crew 2 (Tank Sub) – 4- to 5-person crew Crew 3 (Mechanical) – 4-person crew Crew 4 (Electrical) – 3-person crew Crew 5 (Specialty Trades) – Short duration such as carpenters, concrete finishing, roofing, etc.	Normal weekday working hours; no weekends

Table 2-2 (cont.)
EQUIPMENT, PERSONNEL, AND CONSTRUCTION HOURS

Subphase	On Site Equipment	On Site Personnel	Hours
Stage 5 – Distribution Site (cont.)			
Months 8 through 12: Steel tank construction, surface preparation, priming, and coating; hydrostatic test; disinfection and testing	30-ton crane, weld truck	4- to 5-person crew	Normal weekday working hours; no weekends
Months 9 through 15: Building construction including wet wells, pump cans, piping, mechanical, electrical, bridge crane, roofing, and associated building trades	Crews 1-5 as identified for months 6 through 8 above	Crews 1-5 as identified for months 6 through 8 above	Normal weekday working hours; no weekends
Month 16: Clean-up and final acceptance	1 trash bin, 1 front-end loader	Superintendent (1 person)	Normal weekday working hours; no weekends

2.5.3 Operational Activities

Long-term activities for the proposed Project would consist of maintenance. An operator would visit the Recharge Site and Distribution Site on a daily basis. Removal of debris in Recovery Well site blow-offs would occur on a quarterly basis, while removal of accumulated sediment would occur on an annual basis. Recovery Well pumps would be pulled from the bottom of each Recovery Well approximately every 7 to 8 years for maintenance or replacement. The recharge basins would be tilled/scarified every two years, on average. Soils removed from the recharge basins would be stockpiled on an approximately 10-acre portion of the Recharge Site, outside of the fenced 110-acre portion of the site and would be subject to standard measures to control dust. The basins would normally always receive at least some recycled water; therefore, at least one basin of the four would receive recharge water and be partially or completely full (depending on the recharge rates). At the relatively low recharge rates of recycled water only, PWD would have the option to keep one basin relatively full (bottom covered with water) or two basins partially full. At higher flow rates, the basins are designed to have two basins in service and two basins in a drying cycle and to rotate roughly every three months. At low flows, they may not rotate until approximately 6 months. Basins with recharge water in them would maintain a depth of 3 to 4 feet, which dramatically reduces growing grasses in the bottom of the recharge basins. Basins that are in drying cycles would drain the bottom approximately one foot of water to the next lower basin to accelerate the drying and maintenance process. These operational procedures may change seasonally from wet winter months to dry summer months with shorter drying cycles required during hot summer months.

The proposed pumps would be housed inside the Pump Station Building, requiring minimal maintenance. The tank would require re-painting the outside and re-coating the inside approximately every 15 years. No ongoing, long-term chemical deliveries would be required for the Project. Sodium hyprochlorite would be produced at the Distribution Site, in the Pump Station Building, from an on-site generator using salt, soft water, and electricity. The sodium hypochlorite would be stored at a concentration of 0.8 percent, which is considered

non-hazardous. During intermittent sodium hypochlorite generation, the system would vent hydrogen gas to the atmosphere. One truck of salt would be delivered to the Distribution Site approximately every 4 months. The water softener cylinders (regenerated at the supplier's facilities off-site) will be delivered and changed-out about every one to two weeks. Oil for pump motors and generators would be replaced occasionally, and would potentially be stored on-site. The pumps are electric and, therefore, would not require fuel usage or storage.

The Raw Water/Return Water and Recycled Water Pipelines would have little to no maintenance. PWD would perform a valve-turning program that would cycle each major valve approximately once every three years.

Outdoor site lighting would be provided for the Project for use during occasional maintenance activities. Lighting would be provided at the SWP Turnout, Distribution Site, each of the recharge basins (one on each inlet and outlet for a total of eight), the Splitter Box, and each of the 16 Recovery Well sites. These lights would not normally be on; they would be turned on when needed for maintenance activities and would potentially have lockable light switches.

2.5.4 Project Design Measures

Construction

1. Open trench at any one time shall be limited to 600 feet along road right-of-way. Trench shall be backfilled and compacted or covered with steel plates at the conclusion of construction activities each day.

2. During construction of the Project, the Project shall comply with the requirement of Antelope Valley Air Quality Management District's (AVAQMD's) Rule 403, Fugitive Dust, to prepare a Dust Control Plan for controlling fugitive dust and avoiding nuisance. Compliance with this rule would result in a reduction in short term particulate pollutant emissions. The PWD shall confirm this requirement is included as notes on the Contractor Specifications. The Contractor's compliance with this requirement shall be performed to the satisfaction of the PWD. The Dust Control Plan shall include fugitive dust control strategies to be implemented before, during, and after dust-generating activities. These strategies may include, but are not limited to:

    - Construction Scheduling: Grading activities shall be temporarily halted and/or site watering would be increased during wind speeds that exceed 25 miles per hour (mph) if there is evidence of visible wind-driven fugitive dust.

    - Water Application: The Project shall apply water to the construction site as necessary to control fugitive dust.

    - Soil Binders/Wood Mulch: Soil binders and wood mulch shall be applied as necessary.

    - Stock Piles Stabilization: All soil stockpiles not currently in use shall be stabilized from erosion through the use of watering, soil binders, or protected with a plastic or geo-textile mat.

3. During Project construction activities at the Recharge Site, Distribution Site and Recovery Wells, limits of the Project impact footprint shall be clearly delineated with staking, orange construction fencing, and/or silt fencing, as appropriate, to avoid unauthorized impacts.

4. Monitoring shall be provided by a qualified biologist approved by PWD to ensure that all impacts occur within designated limits for work occurring at undeveloped portions of the Project site (Recharge and Distribution Sites and Recovery Wells). Monitoring entails communicating with contractors, taking daily notes, and ensuring that the requirements of the mitigation measures are being met by being present during construction activities including all initial grubbing and clearing of vegetation.

5. The qualified biologist shall perform periodic inspections of construction (after grubbing and clearing of vegetation) once or twice per week depending on the sensitivity of the adjacent biological resources. The qualified biologist shall send monthly monitoring reports to PWD. At the end of construction of each stage, the biologist shall prepare a post-construction report for PWD that documents the as-built impacts of construction so that mitigation requirements can be revised accordingly, if necessary.

6. Contractors, subcontractors, and their respective personnel shall refer environmental issues including wildlife relocation, sick or dead wildlife, or questions about environmental impacts to the qualified biologist. Experts in wildlife handling may need to be brought in by the qualified biologist for assistance with wildlife relocations.

7. All Project lighting shall be of the lowest illumination possible for safety and security and shall be selectively placed, shielded, and directed away from adjacent sensitive vegetation outside the Project impact area.

8. Construction traffic and operational vehicular activity on unpaved access roads shall not exceed a speed of 15 mph.

Operation

1. Following construction of the recharge basins and associated structures, with the exception of the access road from the Distribution Site to the Recharge Site, the 50 acres outside of the fenced recharge basins would be allowed to revegetate naturally and would remain unused. PWD would designate the 50-acre, unfenced portion of the Recharge Site in a conservation easement, restrictive covenant, or other legal protective mechanism.

2. Vegetation would not be allowed to grow on the basin floors and would be controlled through periodic disking.

3. All Project lighting shall be of the lowest illumination possible for safety and security and shall be selectively placed, shielded, and directed away from adjacent sensitive vegetation outside the Project impact area.

4. All soil stockpiles associated with basin maintenance shall be stabilized from erosion through the use of watering, soil binders, or protected with a plastic or geo-textile mat.

2.6 OTHER REQUIRED PROJECT APPROVALS

California Government Code Section 53091 exempts PWD, as a regional public water purveyor and utility, from local zoning and building ordinances. This exemption applies to the proposed Project, which would be a direct component of PWD's treatment, storage, and transmission system. Nonetheless, Project implementation is anticipated to require traffic control plan from the City of Palmdale. Project components also occur within the boundaries of the City of Lancaster. These cities may have discretionary authority over some aspects of the Project and may use this EIR when considering the Project or issuing permits.

Other permits or approvals that could be required include:

1. A DWR Encroachment Permit and Turnout Agreement for work within the DWR right-of-way;

2. A permit from the Regional Water Quality Control Board (RWQCB), Lahontan Region, and approval from the State Water Resources Control Board (SWRCB) for the use of recycled water for the proposed Project;

3. Conformance with applicable SWRCB National Pollutant Discharge Elimination System (NPDES) and/or Municipal Separate Storm Sewer Systems (MS4) requirements;

4. An encroachment permit from Union Pacific Railroad;

5. Los Angeles County permits for well drilling and operation; and

6. An encroachment permit from Los Angeles County.

3.0 ENVIRONMENTAL IMPACT ANALYSIS

As outlined in Section 2.0 of this EIR, *Project Description*, the proposed Project would potentially be constructed in two phases to reflect water supply and demand considerations. Specifically, the first phase would include: (1) the SWP turnout; (2) all pipelines; (3) the Potable Water Pump Station (with five of seven pumps and related Distribution Site facilities such as storage tank and chlorination structures); (4) the Recharge Site; and (5) 8 of the 16 Recovery Wells (and associated pipeline connections to the Potable Water Pump Station). The second phase would generally be limited to adding additional facilities/capacity to the noted Project elements developed in the first phase, such as additional Recovery Wells and associated Well Collection Pipeline sections, the additional two pumps at the Potable Water Pump Station, and the Return Water Pump Station. It is also possible that all of the Recovery Wells and Potable Water Pump Station pumps could be constructed during the first phase, if a partner agency joins PWD in the proposed Project and there is sufficient demand. As a result, the analysis contained in each of the subchapters in Chapter 3.0, *Environmental Impact Analysis*, includes all elements of the proposed Project in both development phases.

3.1 AIR QUALITY

This section identifies and evaluates the proposed Project's potential to have adverse effects related to air quality during construction and operation.

3.1.1 Existing Conditions

The proposed Project site is located in the Mojave Desert Air Basin (MDAB), which includes parts of Kern, Los Angeles, Riverside, and San Bernardino Counties. Air quality management within the MDAB is divided among several air districts, which each have primary authority for air quality in their jurisdiction; the Project site lies in the southwestern area of the MDAB and within the boundaries of the AVAQMD. Both the State and federal governments have established health-based Ambient Air Quality Standards (AAQS) for seven air pollutants, which are known as criteria pollutants. These pollutants include ozone (O_3), carbon monoxide (CO), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), inhalable particulate matter with a diameter of 10 microns or less (PM_{10}), fine particulate matter with a diameter of 2.5 microns or less ($PM_{2.5}$), and lead (Pb). The AAQS are designed to protect the health and welfare of the populace within a reasonable margin of safety. Federal and State standards for pollutants that are addressed in this analysis are shown in Table 3.1-1, *Ambient Air Quality Standards*.

Regional air quality is defined by whether the area has attained or not attained State and federal standards, as determined by monitoring. Areas that are in non-attainment are required to prepare plans and implement measures that would bring the region into attainment. When an area has been reclassified from non-attainment to attainment for a federal standard, the status is identified as "maintenance," and there must be a plan and measures established that would keep the region in attainment for the following ten years. Table 3.1-2, *Designations of Criteria Pollutants in the Antelope Valley Portion of the MDAB*, lists the current attainment designations for the proposed Project area.

Table 3.1-1
AMBIENT AIR QUALITY STANDARDS

Pollutant	Averaging Time	California Standards	Federal Standards	
			Primary[a]	Secondary[b]
Ozone (O_3)	1 Hour	0.09 ppm (180 µg/m^3)	–	–
	8 Hour	0.070 ppm (137 µg/m^3)	0.075 ppm (147 µg/m^3)	Same as Primary
PM_{10}	24 Hour	50 µg/m^3	150 µg/m^3	Same as Primary
	AAM	20 µg/m^3	–	Same as Primary
$PM_{2.5}$	24 Hour	–	35 µg/m^3	Same as Primary
	AAM	12 µg/m^3	12.0 µg/m^3	Same as Primary
CO	1 Hour	20 ppm (23 mg/m^3)	35 ppm (40 mg/m^3)	–
	8 Hour	9.0 ppm (10 mg/m^3)	9 ppm (10 mg/m^3)	–
	8 Hour (Lake Tahoe)	6 ppm (7 mg/m^3)	–	–
NO_2	AAM	0.030 ppm (57 µg/m^3)	0.053 ppm (100 µg/m^3)	Same as Primary
	1 Hour	0.18 ppm (339 µg/m^3)	0.100 ppm (188 µg/m^3)	–
SO_2	24 Hour	0.04 ppm (105 µg/m^3)	–	–
	3 Hour	–	–	0.5 ppm (1,300 µg/m^3)
	1 Hour	0.25 ppm (655 µg/m^3)	0.075 ppm (196 µg/m^3)	–
Lead	30-day Avg.	1.5 µg/m^3	–	–
	Calendar Quarter	–	1.5 µg/m^3	Same as Primary
	Rolling 3-month Avg.	–	0.15 µg/m^3	

Source: CARB 2013
O_3: ozone; ppm: parts per million; µg/m^3: micrograms per cubic meter; PM_{10}: large particulate matter;
AAM: Annual Arithmetic Mean; $PM_{2.5}$: fine particulate matter; CO: carbon monoxide; mg/m^3: milligrams per cubic meter;
NO_2: nitrogen dioxide; SO_2: sulfur dioxide; –: No Standard.

[a] National Primary Standards: The levels of air quality necessary, within an adequate margin of safety, to protect the public health.

[b] National Secondary Standards: The levels of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant.

Note: More detailed information in the data presented in this table can be found at the CARB website (www.arb.ca.gov).

Table 3.1-2
DESIGNATIONS OF CRITERIA POLLUTANTS IN THE ANTELOPE VALLEY PORTION OF THE MDAB

Ambient Air Quality Standard	Attainment Status
8-hour ozone (Federal)	Nonattainment; classified Severe 17
Ozone (State)	Nonattainment; classified Extreme
PM_{10} (Federal)	Unclassifiable
PM_{10} (State)	Nonattainment
$PM_{2.5}$ (Federal)	Unclassifiable/Attainment
$PM_{2.5}$ (State)	Unclassified
CO (State and Federal)	Attainment
NO_2 (State and Federal)	Attainment/Unclassified
SO_2 (State and Federal)	Attainment/Unclassified
Lead (State and Federal)	Attainment
Particulate Sulfate (State)	Unclassified
Hydrogen Sulfide (State)	Unclassified
Visibility Reducing Particles (State)	Unclassified

Source: AVAQMD 2015

The U.S. Environmental Protection Agency (USEPA) designates an area as "Unclassifiable" if, based on available information, it cannot be classified as either meeting or not meeting the national primary or secondary ambient air quality standard for the pollutant. For the California Air Resources Board (CARB), an "Unclassified" designation indicates that the air quality data for the area are incomplete and do not support a designation of attainment or nonattainment.

Table 3.1-2 above shows that the USEPA has designated the AVAQMD portion of the MDAB as being in Nonattainment for ambient ozone standard. Pursuant to the approved 2008 Federal Ozone Attainment Plan and given the Severe-17 Nonattainment designation, the AVAQMD has 17 years from the plan approval date (2004) to achieve attainment (i.e., 2021). The State has designated the AVAQMD portion of the MDAB as being in Extreme Nonattainment for ozone. The Extreme status allows the use of undefined reductions based on the anticipated development of new control technologies or improvement of existing technologies in the Attainment Plan; this status could extend the attainment date by three years to 2024. To be designated as an Attainment area by the State, the AVAQMD portion of the MDAB would need to achieve both the 1-hour and 8-hour ozone standards (AVAQMD 2004).

In 2007, the USEPA revoked the annual PM_{10} standard as research indicated that there are no considerable health effects associated with long-term exposure to PM_{10}. With this change, the basin is technically in Attainment for the federal PM_{10} standards, although the redesignation process has not yet begun. The USEPA has designated the AVAQMD portion of the MDAB as being an Unclassified area for PM_{10}. The State has designated the AVAQMD portion of the MDAB as being in Nonattainment for the State PM_{10} standard, which is more restrictive than the federal standard.

Standard Conditions

SC 3.1-1. During construction of the proposed Project, the proposed Project shall comply with the requirement of AVAQMD's Rule 403, Fugitive Dust, to prepare a Dust Control Plan for controlling fugitive dust and avoiding nuisance. Compliance with this rule would result in a reduction in short term particulate pollutant emissions. The PWD shall confirm this requirement is included as notes on the Contractor Specifications. The Contractor's compliance with this requirement shall be performed to the satisfaction of the PWD. The Dust Control Plan shall include fugitive dust control strategies to be implemented before, during, and after dust-generating activities. These strategies may include, but are not limited to:

- Construction Scheduling: Grading activities would be temporarily halted and/or site watering would be increased during wind speeds that exceed 25 mph if there is evidence of visible wind-driven fugitive dust.

- Water Application: The proposed Project shall apply water to the construction site as necessary to control fugitive dust.

- Soil Binders/Wood Mulch: Soil binders and wood mulch shall be applied as necessary.

- Stock Piles Stabilization: All soil stockpiles not currently in use shall be stabilized from erosion through the use of watering, soil binders, or protected with a plastic or geo-textile mat.

3.1.2 Significance Thresholds

According to Appendix G of the CEQA Guidelines, a project would normally have a significant adverse environmental impact on air quality if it would:

- Conflict with or obstruct implementation of the applicable air quality plan.

- Violate any air quality standard or contribute substantially to an existing or projected air quality violation.

- Result in a cumulatively considerable net increase of any criteria pollutant for which the Project region is in non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors).

- Expose sensitive receptors to substantial pollutant concentrations.

- Create objectionable odors affecting a substantial number of people.

The AVAQMD's *CEQA and Federal Conformity Guidelines* (AVAQMD 2011) establish significance thresholds to assess the regional impact of Project-related air pollutant emissions in the AVAQMD. Table 3.1-3, *AVAQMD Criteria Pollutant Significance Emissions Thresholds*, summarizes the AVAQMD's mass emissions thresholds, which are presented as annual values for long-term operational and short-term construction emissions. A project with emission rates

below these thresholds is considered to have a less than significant effect on regional air quality throughout the AVAQMD portion of the MDAB.

Table 3.1-3
AVAQMD CRITERIA POLLUTANT SIGNIFICANCE EMISSIONS THRESHOLDS

Criteria Pollutant	Annual Threshold (tons)
Carbon Monoxide (CO)	100
Oxides of Nitrogen (NO_X)*	25
Volatile Organic Compounds (VOC)*	25
Sulfur Oxides (SO_X)	25
Particulate Matter (PM_{10})	15
Particulate Matter ($PM_{2.5}$)	15
Hydrogen Sulfide (H_2S)	10
Lead	0.6

Source: AVAQMD 2011
*These gases are precursors to the formation of ozone.

3.1.3 Impact Analysis

Applicable Air Quality Plan Consistency

The AVAQMD's current air quality planning documentation, pursuant to State Implementation Plan (SIP) and California Clean Air Act (CCAA) requirements applicable to the Project site, includes four separate documents: (1) the *AVAQMD 2004 Ozone Attainment Plan* (State and federal); (2) the *AVAQMD List and Implementation Schedule for District Measures to Reduce PM Pursuant to Health & Safety Code §39614(d)*; (3) the *8-Hour Reasonably Available Control Technology – State Implementation Plan Analysis*; and (4) the *AVAQMD Federal 8-Hour Ozone Attainment Plan (Western Mojave Desert Non-attainment Area).*

A project is considered non-conforming if it conflicts with or delays implementation of any applicable attainment or maintenance plan. A project is conforming if it complies with all applicable AVAQMD rules and regulations; complies with all proposed control measures that are not yet adopted from the applicable plan(s); and is consistent with the growth forecasts in the applicable plan(s) (or is directly included in the applicable plan). Conformity with growth forecasts can be established by demonstrating that the project is consistent with the land use plan that was used to generate the growth forecast. An example of a non-conforming project would be one that increases the gross number of dwelling units; increases the number of trips; and/or increases the overall vehicle miles traveled in an affected area (relative to the applicable land use plan) (AVAQMD 2011).

The proposed Project would result in construction criteria pollutant emissions below the CEQA significance thresholds established by the AVAQMD, as shown in Table 3.1-4 below and, therefore, would not conflict with or delay implementation of any applicable attainment or

maintenance plan. The proposed Project would not conflict with the applicable land use plan because there would be negligible long-term emissions of criteria pollutants, as shown in Table 3.1-5 below, and the proposed Project would not generate new growth. No impacts would occur, and no mitigation is required.

Conformance with Air Quality Standards

Criteria pollutant and ozone precursor emissions from Project construction and operation are assessed using the California Emission Estimator Model (CalEEMod), Version 2013.2.2 (South Coast Air Quality Management District [SCAQMD]; 2013). CalEEMod is a computer model developed by SCAQMD with the input of several air quality management and pollution control districts to estimate criteria air pollutant emissions from various urban land uses (SCAQMD 2013). CalEEMod has the ability to calculate both mobile (i.e., vehicular) and area source or stationary source emissions. CalEEMod allows land use selections that include project land use types, sizes, and metric specifics.

Construction

Construction of the proposed Project would result in emissions of volatile organic compounds (VOCs), nitrogen oxides (NO_X), CO, sulfur oxides (SO_X), PM_{10}, and $PM_{2.5}$. Emissions from construction would result from fuel combustion and exhaust from construction equipment and vehicle traffic (i.e., worker commute and delivery truck trips) and, for fugitive dust, grading and site work. Emissions estimates and assumptions are detailed in Appendix D.

For modeling purposes, it was assumed construction of the Project would commence in the summer of 2017 and require approximately 21 months to complete. It was also assumed construction activities would occur during normal working hours Monday through Friday with the exception of Recovery Well drilling and testing activities, which would occur 24 hours per day, 7 days per week from July 2017 through January 2018. As described in Section 2.0, *Project Description*, construction of the proposed project would occur in five phases: Recovery Well drilling, Recovery Well equipping, pipelines and SWP Turnout, Recharge Site, and Distribution Site. The proposed Project construction emissions were estimated using the assumptions provided in Table 2-2.

Although there would be no significant impacts related to this issue, the proposed Project would be required to comply with AVAQMD Rule 403, Fugitive Dust, as a standard condition (SC 3.1-1), which requires implementation of a Dust Control Plan. The Dust Control Plan includes strategies such as minimal grading, regular watering, application of soil binders and wood mulch, and control of track-out from the site. Therefore, dust control measures are included in the emissions calculations. The CalEEMod output showing equipment assumptions and detailed emissions are included in Appendix D. The results of the modeling are shown in Table 3.1-4, *Annual Construction Emissions (Tons)*, and indicate that Project related emissions would be less than the construction mass emissions CEQA thresholds established by AVAQMD.

Table 3.1-4
ANNUAL CONSTRUCTION EMISSIONS (Tons)

Year	VOC	NO_X	CO	SO_X	PM_{10}	$PM_{2.5}$
2017	0.7	7.2	5.0	<0.05	0.6	0.4
2018	0.7	6.5	4.7	<0.05	0.5	0.3
2019	<0.05	0.2	0.2	<0.05	<0.05	<0.05
Maximum Annual Emissions	0.7	7.2	5.0	<0.05	0.6	0.4
AVAQMD Annual Thresholds	*25*	*25*	*100*	*25*	*15*	*15*
Exceeds AVAQMD Thresholds?	No	No	No	No	No	No

Source: AVAQMD 2011 (thresholds). See Appendix D for calculations.
VOC: volatile organic compound(s); NO_X: nitrogen oxides; CO: carbon monoxide; SO_X: sulfur oxides;
PM_{10}: respirable particulate matter with a diameter of 10 microns or less;
$PM_{2.5}$: fine particulate matter with a diameter of 2.5 microns or less.

Therefore, short-term construction emissions, with dust-control measures required in accordance with SC 3.1-1, would not violate any air quality standard or contribute substantially to an existing or projected air quality violation. Impacts would be less than significant, and no mitigation is required.

Operations

Long-term activities for the proposed Project would consist of maintenance. Operational emissions were estimated using CalEEMod. The primary source of operational emissions is mobile sources (vehicle trips). An operator would visit the Recharge Site and Distribution Site on a daily basis. Removal of debris in Recovery Well site blow-offs would occur on a quarterly basis, while removal of accumulated sediment would occur on an annual basis. The proposed pumps would be housed inside the Pump Station Building at the Distribution Site, requiring minimal maintenance. Weekly water softener cylinders would be changed by an outside vendor. Salt would be delivered (via one 10- to 14-ton truck) on a quarterly basis and blown into the on-site combination brine saturator and salt storage tank. The emissions from mobile sources were calculated using CalEEMod default trip lengths and emission factors from EMFAC2011.

As shown in Table 3.1-5, *Annual Operational Emissions (Tons)*, long-term operational emissions would be below the AVAQMD regional thresholds of significance. Therefore, impacts would be less than significant, and no mitigation is required.

Table 3.1-5
ANNUAL OPERATIONAL EMISSIONS (Tons)

	VOC	NO_X	CO	SO_X	PM_{10}	$PM_{2.5}$
Maximum Annual Emissions	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
AVAQMD Annual Thresholds	*25*	*25*	*100*	*25*	*15*	*15*
Exceeds AVAQMD Thresholds?	No	No	No	No	No	No

Source: AVAQMD 2011 (thresholds). See Appendix D for calculations.
VOC: volatile organic compound(s); NO_X: nitrogen oxides; CO: carbon monoxide; SO_X: sulfur oxides;
PM_{10}: respirable particulate matter with a diameter of 10 microns or less;
$PM_{2.5}$: fine particulate matter with a diameter of 2.5 microns or less.

Cumulatively Considerable Increase in Criteria Pollutants

The region is a federal and/or State nonattainment area for ozone and PM_{10}. The proposed Project would contribute particulates and the ozone precursors VOC and NO_X to the area during short term Project construction. As described in above, regional emissions during construction would not violate any air quality standard or contribute substantially to an existing or projected air quality violation. Construction emissions would be less than the AVAQMD CEQA significance thresholds (Table 3.1-4). Therefore, regional construction emissions would not be cumulatively considerable, and the impact would be less than significant.

With respect to local impacts, cumulative construction particulate impacts are considered when projects may be within a few hundred yards of each other. As shown in Figure 4-1 and discussed in Section 4.0, most of the cumulative projects occurring in the area are not within a few hundred yards of the proposed Project. The construction schedule for the other cumulative projects occurring in the area is unknown and, although it is unlikely that they would all be under construction at the same time as the proposed Project, they are conservatively assumed to overlap for the purposes of this analysis. As shown in Table 3.1-4 and Table 3.1-5, implementation of the standard conditions during construction would ensure construction and operational emissions would be below AVAQMD thresholds. Because these thresholds have been developed for the specific purpose of addressing cumulative impacts, the proposed Project would not contribute significantly to cumulative impacts regarding local pollutant emissions. Therefore, local construction emissions and long-term emissions would not be cumulatively considerable, and the impact would be less than significant.

Exposure of Sensitive Receptors to Pollutants

Sensitive receptors include residences, schools, hospitals, and other areas where people live and/or sleep. The northern portion of the proposed Project site (which encompasses the Recharge and Distribution Sites and Recovery Wells) does not contain air-pollution-sensitive receptors. The nearest residences to these portions of the proposed Project site are located more than 1,500 feet to the south at East Avenue M-8.

The nearest residential areas to the proposed pipeline alignment construction (beyond those residences near the Project site along East Avenue M-8, identified above) start about 4.25 miles south of the site at the intersection of Palmdale Boulevard and 105th Street East. The pipeline alignments would split at this location: the Potable Water Pipeline would travel west along East Palmdale Avenue, and the Raw Water/Return Water Pipeline would continue to the south (with a small jog west at East Avenue S to 106th Street East) to the East Branch of the California Aqueduct. There are several separate residential community areas along these portions of the pipeline routes with houses as close as 30 feet to the edge of the roadway. Other sensitive locations include Daisy Gibson Elementary School on East Palmdale Avenue, Littlerock High School (to the east of 105th Street East), a church at north side of East Avenue S and 106th Street East.

Exposure of sensitive receptors is addressed for two situations: CO hotspots and diesel exhaust emissions. A CO hotspot is an area of localized CO pollution that is caused by severe vehicle congestion on major roadways, typically at signalized intersections. As described above, vehicle

trip generation from the operation of the proposed Project would be negligible. Because existing traffic volumes in the area are low and the proposed Project would not generate significant traffic volumes, it would not create or contribute to a CO hotspot and, therefore no analysis is necessary.

CARB identified particulate exhaust emissions from diesel-fueled engines (which is known as diesel particulate matter; DPM) as Toxic Air Contaminants (TACs) in 1998. Construction of the proposed Project would result in the generation of DPM emissions from the use of on-site, heavy-duty, and off-road diesel equipment that is required for construction activities, and from on-road diesel equipment used to bring materials to and from the proposed Project site. Exposure is a combination of the emissions rate and the length of time exposed, with exposures calculated over periods of 9 to 70 years. The proposed Project would utilize relatively limited diesel equipment and the construction period would be relatively short. Combined with the highly dispersive properties of DPM and additional reductions in exhaust emissions from improved equipment, Project generated or construction-related emissions of TACs would not expose sensitive receptors to substantial emissions of TACs. The impact would be less than significant.

Although not a direct air pollutant, valley fever (coccidioidomycosis) fungal spore infections develop through inhalation of airborne fungal spores contained in windblown dust, and is recognized to be endemic in areas with dry, alkaline soil conditions. In order to prevent exacerbating the existing windblown dust issues in the proposed Project area, all construction activity for the proposed Project would be conducted under a rigorous Dust Control Plan prepared in accordance with AVAQMD Rule 403 (SC 3.1-1). Adherence to the Dust Control Plan would prevent the proposed Project from substantially increasing windblown dust concentrations compared to background levels. Therefore, this impact would be less than significant.

Odors

The proposed Project would not handle trash; generate or treat sewage; use or generate chemicals; or engage in other activities that would generate odors. Diesel exhaust fumes would be generated by equipment during site-preparation and construction activities. Diesel fumes would result in odors that may be perceptible to occupants of facilities in the immediate vicinity of the Project site. Diesel odors would occur for short periods and would dissipate within a short distance from the Project site. The odors would not be objectionable because of the relatively small magnitude and short duration. Operation of the proposed Project would not cause objectionable odors. Therefore, this proposed Project would have no odor impact, and no mitigation is necessary.

3.1.4 Mitigation Measures

The proposed Project would not result in a significant impact to air quality. Therefore, no mitigation measures are required.

3.1.5 Conclusions

The proposed Project would not conflict with the applicable land use plan. Project emissions of criteria pollutants during construction and operations would remain below AVAQMD regional emissions thresholds. The proposed Project would not result in a cumulatively considerable contribution to a cumulative air quality impact, expose sensitive receptors to substantial pollutant concentrations, or generate objectionable odors affecting a substantial number of people.

3.2 BIOLOGICAL RESOURCES

This section describes the existing biological conditions within the Project site and applicable off-site areas, identifies pertinent regulatory requirements associated with biological-related issues, evaluates potential biological impacts, and identifies mitigation measures related to implementation of the proposed Project (as applicable). A Biological Technical Report has been prepared for the proposed Project by HELIX Environmental Planning (HELIX; 2015a), with this study summarized in the following analysis. The complete report is included as Appendix E of this EIR.

A number of different surveys have been conducted to document biological resources present in the Project area including focused surveys for sensitive species. The surveys addressed in Biological Technical Report were conducted by HELIX in 2014 and 2015 (refer to Appendix E for detailed information regarding the survey dates and details).

3.2.1 Existing Conditions

Vegetation Communities

A total of 10 vegetation communities/land uses were mapped in the proposed Project impact area (Table 3.2-1, *Existing Vegetation Communities/Land Uses in the Project Impact Area*; refer to Appendix E for figures of vegetation mapping). Two of the communities are considered sensitive (vulnerable) by the California Department of Fish and Wildlife (CDFW; 2010): desert salt brush scrub and desert salt brush scrub-disturbed.

Table 3.2-1
EXISTING VEGETATION COMMUNITIES/LAND USES
IN THE PROJECT IMPACT AREA

Vegetation Community/Land Use[1]	Rarity Ranking[2]	Acreage
Mojave creosote bush scrub (34100)	S4	19.4
Mojave creosote bush scrub-disturbed (34100)	S4	3.5
Desert salt bush scrub (36110)	S3.2	142.2
Desert salt bush scrub-disturbed (36110)	S3.2	26.0
Non-native grassland (42200)	S4	1.0
Non-vegetated channel (--)	--	0.1
Agriculture (inactive/fallow; --)	--	11.0
Agriculture (active; --)	--	10.5
Disturbed habitat (--)	--	44.6
Developed (--)	--	52.9
TOTAL	**--**	**311.2**

Source: HELIX 2015a
[1] Numbers in parentheses are Holland (1986) codes.
[2] Communities with a rarity rating of S3.2 are considered sensitive.

Mojave Creosote Bush Scrub (including -disturbed)

This vegetation community is dominated by widely spaced, medium to large shrubs, growing on sandy, well-drained soils. The ground between shrubs is usually bare, with ephemeral annuals in spring following winter rains. Mojave creosote bush scrub is the most common habitat for Mohave ground squirrel. Mojave creosote bush scrub that has been disturbed exhibits lower shrub cover and higher cover of non-native, herbaceous species than the undisturbed community. Disturbance could have been caused by previous vegetation clearing or agricultural uses, for example. Some of the non-native species that are present in the proposed Project impact area include cheatgrass and Mediterranean grass.

Desert Salt Bush Scrub (including -disturbed)

This community in the proposed Project impact area is dominated by allscale, usually at low density with much bare ground, with subdominants including shad scale, creosote, rubber rabbitbrush, and valley lessingia. Desert salt bush scrub is the dominant community on the Recharge Site.

Non-native Grassland

Non-native grassland is a dense to sparse cover of annual grasses, which may be associated with showy-flowered, native, annual forbs. Characteristic species in this community in the proposed Project impact area include red brome, Italian ryegrass, foxtail barley, filaree, and black mustard. Most of the annual, introduced species that comprise the majority of species and biomass within non-native grassland originated from the Mediterranean region, an area with a long history of agriculture and a climate similar to California.

Non-vegetated Channel

Non-vegetated channel includes sandy, gravelly, or rocky fringes of waterways or flood channels. It is unvegetated on a relatively permanent basis, although some weedy species may grow along the outer edges channel and exhibit less than 10 percent total cover.

Agriculture (Inactive/Fallow)

This community in the Project impact area includes agricultural fields that are not actively cultivated, but instead are mowed or otherwise managed.

Agriculture (Active)

Active agriculture in the proposed Project impact area includes agricultural fields that are actively cultivated.

Disturbed Habitat

Disturbed habitat is highly disturbed ground that retains a soil substrate. If it is vegetated at all, it supports an assemblage of almost exclusively non-native, weedy, upland species that colonize after human disturbance. There is no recognizable native or naturalized vegetation association,

and characteristic species vary considerably depending on local colonization potential. Disturbed habitat within the proposed Project impact area is heavily dominated by several species of Russian thistle and shows signs of past human disturbance such as grading or agriculture.

Developed

Developed land has been built upon or physically altered to the point that it no longer naturally supports vegetation. Developed land can also include maintained landscaping. Developed land in the proposed Project impact area includes paved roads.

Plant Species

A total of 74 plant species were observed in the proposed Project impact area and 50-meter buffer. (These plants are listed in Appendix C of the Biological Technical Report.) Sensitive plant species include species that are: listed as threatened or endangered by the U.S. Fish and Wildlife Service (USFWS); listed as threatened, endangered, or rare by the CDFW; or included in the California Native Plant Society (CNPS) Inventory of Rare and Endangered Plants. Sensitive plant species that were determined to have potential to occur are listed in Appendix D of the Biological Technical Report. None of these species was observed during field surveys of the proposed Project site.

Animal Species

A total of 40 animal species were observed or detected in the proposed Project impact area and 50-meter buffer. (These animals are listed in Appendix B of the Biological Technical Report.) Sensitive animal species include those that have been afforded special status and/or recognition by federal and State resource agencies. Sensitive animal species that were determined to have potential to occur in the Project area are listed in Appendix E of the Biological Technical Report. Focused surveys were conducted for three species: desert tortoise, Mohave ground squirrel, and burrowing owl. No desert tortoise or Mohave ground squirrel, or their respective signs, were observed during field surveys. Five additional sensitive status species were observed during field surveys: northern harrier, California horned lark, loggerhead shrike, Le Conte's thrasher, and burrowing owl. No Critical Habitat for federal listed species occurs in or adjacent to the proposed Project impact area.

Wetlands, Waters of the U.S., and Waters of the State

The National Wetlands Inventory (NWI; USFWS 2015) indicates that Littlerock Wash in the proposed Project survey area is classified as Riverine. Littlerock Wash contains potential Waters of the U.S. and Waters of the State regulated by the United States Army Corps of Engineers (USACE) and CDFW, respectively. Other NWI Riverine areas pass east of two of the Recovery Well sites and occur in the East Branch of the California Aqueduct. While freshwater pond is included in the NWI adjacent to the proposed Project impact area, there are no ponds or signs of ponding present.

Regulatory Framework

Activities affecting the biological resources determined to exist or have the potential to exist within the study area are subject to the federal, State, and local regulations discussed below. The standards and regulations most relevant to the proposed Project are summarized below, with additional detail provided in the proposed Project's Biological Technical Report (Appendix E).

Federal

Endangered Species Act

The federal Endangered Species Act (FESA) designates threatened and endangered animals and plants and provides measures for their protection and recovery. "Take" of federal listed animal species and of federal listed plant species in areas under federal jurisdiction is prohibited without obtaining a federal permit. Take is defined as "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt to engage in any such conduct." Harm includes any act that actually kills or injures fish or wildlife, including significant habitat modification or degradation that significantly impairs essential behavioral patterns of fish or wildlife. Activities that damage the habitat of (i.e., harm) listed wildlife species require approval from the USFWS for terrestrial species. The FESA also generally requires determination of critical habitat for listed species. If a project would involve a federal action potentially affecting critical habitat, the federal agency would be required to consult with the USFWS.

FESA Section 7 and Section 10 provide two pathways for obtaining authority to take federal listed species. Under Section 7 of the FESA, a federal agency that authorizes, funds, or carries out a project that "may affect" a listed species or its critical habitat must consult with the USFWS. Under Section 10 of the FESA, private parties with no federal nexus (i.e., no federal agency will authorize, fund, or carry out a project) may obtain an Incidental Take Permit to harm listed species incidental to the lawful operation of a project.

Migratory Bird Treaty Act

The Migratory Bird Treaty Act (MBTA; 16 U.S. Code Sections 703–711) includes provisions for protection of migratory birds, including the non-permitted take of migratory birds. The MBTA regulates or prohibits taking, killing, possession of, or harm to migratory bird species listed in Title 50 Code of Federal Regulations (CFR) Section 10.13. Migratory birds include geese, ducks, shorebirds, raptors, songbirds, and many others. Disturbance that causes nest abandonment and/or loss of reproductive effort (killing or abandonment of eggs or young) is considered a "take." The MBTA is an international treaty for the conservation and management of bird species that migrate through more than one country and is enforced in the United States by the USFWS. The MBTA was amended in 1972 to include protection for migratory birds of prey (raptors).

Clean Water Act (Section 404)

Under Section 404 of the Clean Water Act (CWA), the USACE is charged with regulating the discharge of dredge and fill materials into jurisdictional Waters of the U.S. The terms "Waters of the U.S." and "jurisdictional waters" have a broad meaning that includes special aquatic sites,

such as wetlands. Waters of the U.S., as defined by regulation and refined by case law include: (1) the territorial seas; (2) coastal and inland waters, lakes, rivers, and streams that are navigable Waters of the U.S., including their adjacent wetlands; (3) tributaries to navigable Waters of the U.S., including adjacent wetlands; and (4) interstate waters and their tributaries, including adjacent isolated wetlands and lakes, intermittent and ephemeral streams, prairie potholes, and other waters that are not a part of a tributary system to interstate waters or navigable Waters of the U.S., the degradation or destruction of which could affect interstate commerce.

Section 401 of the CWA requires that any applicant for a federal license or permit to conduct any activity that may result in a discharge to Waters of the U.S. must obtain a Water Quality Certification, or a waiver thereof, from the State in which the discharge originates. In California, the RWQCB issues Water Quality Certifications.

State

California Endangered Species Act

The California Endangered Species Act (CESA) established that it is State policy to conserve, protect, restore, and enhance State endangered species and their habitats. Under State law, plant and animal species may be formally designated rare, threatened, or endangered by official listing by the California Fish and Game Commission. CESA authorizes that private entities may "take" plant or wildlife species listed as endangered or threatened under the FESA and CESA, pursuant to a federal Incidental Take Permit if the CDFW certifies that the incidental take is consistent with CESA (Fish and Game Code Section 2080.1[a]). For State-only listed species, Section 2081 of the CESA authorizes the CDFW to issue an Incidental Take Permit for State listed threatened and endangered species if specific criteria are met.

Native Plant Protection Act

Sections 1900–1913 of the California Fish and Game Code (Native Plant Protection Act; NPPA) direct the CDFW to carry out the State Legislature's intent to "…preserve, protect and enhance endangered or rare native plants of this State." The NPPA gives the California Fish and Game Commission the power to designate native plants as "endangered" or "rare" and protect endangered and rare plants from take.

California Desert Native Plants Act

The California Desert Native Plants Act (Division 23 of the California Food and Agriculture Code) was established to protect California desert native plants from unlawful harvesting on both public and private lands. The act also provides information necessary to legally harvest native plants so as to ultimately transplant those plants with the greatest possible chance of survival. The Act further encourages public participation in implementing the safeguards established by this division and in evaluating the effectiveness and desirability of the safeguards.

California Fish and Game Code

California Fish and Game Code provides specific protection and listing for several types of biological resources. Section 1600 of Fish and Game Code requires a Streambed Alteration

Agreement (SAA) for any activity that would alter the flow, change or use any material from the bed, channel, or bank of any perennial, intermittent, or ephemeral river, stream, and/or lake (i.e., Waters of the State). Typical activities that require an SAA include excavation or fill placed within a channel, vegetation clearing, structures for diversion of water, installation of culverts and bridge supports, cofferdams for construction dewatering, and bank reinforcement. Notification is required prior to any such activities, and CDFW will issue an SAA with any necessary mitigation to ensure protection of the State's fish and wildlife resources.

Pursuant to California Fish and Game Code Section 3503, it is unlawful to take, possess, or needlessly destroy the nest or eggs of any bird, except as otherwise provided by this code or any regulation made pursuant thereto. Raptors and owls and their active nests are protected by California Fish and Game Code Section 3503.5, which states that it is unlawful to take, possess, or destroy any birds of prey or to take, possess, or destroy the nest or eggs of any such bird unless authorized by the CDFW. Section 3513 states that it is unlawful to take or possess any migratory non-game bird as designated in the MBTA (see Section 3.1.2). These regulations could require that construction activities (particularly vegetation removal or construction near nests) be reduced or eliminated during critical phases of the nesting cycle unless surveys by a qualified biologist demonstrate that nests, eggs, or nesting birds will not be disturbed, subject to approval by CDFW and/or USFWS.

Porter-Cologne Water Quality Control Act of 1970

The Porter-Cologne Water Quality Control Act of 1970 grants the State Water Resource Control Board (SWRCB) and its regional offices power to protect water quality and is the primary vehicle for implementation of the State's responsibilities under Section 401 of the CWA (see Section 3.1.3). The Porter-Cologne Act grants the SWRCB authority and responsibility to adopt plans and policies, regulate discharges to surface and groundwater, regulate waste disposal sites, and require cleanup of discharges of hazardous materials and other pollutants. Typically, the SWRCB and RWQCB act in concert with the USACE under Section 401 of the CWA in relation to permitting fill of federal jurisdictional waters.

3.2.2 Significance Thresholds

The PWD utilizes CEQA Guidelines Appendix G for criteria to determine significant impacts. Accordingly, the following significance thresholds are used.

The proposed Project would typically result in a significant or potentially significant impact if it would:

- Have a substantial adverse effect, either directly, or through habitat modifications on any species identified as a candidate, sensitive, or special status[1] in local or regional plans, policies, or regulations, or by the CDFW or the USFWS.

[1] Specifically for plant species, impacts would be significant for those that are: (1) State or federal listed and/or (2) CNPS Rare Plant Rank 1 or 2 species.

- Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, or regulations, or by the CDFW or USFWS.

- Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the CWA through direct removal, filling, hydrological interruption, or other means.

- Interfere substantially with the movement of native resident or migratory fish or wildlife species, wildlife corridors, or wildlife nursery sites.

- Conflict with any local policies or ordinances protecting biological resources, such as a native plant preservation policy or ordinance.

- Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or State habitat conservation plan.

3.2.3 Impact Analysis

Direct Impacts

Candidate, Sensitive, and Special-Status Species

Eight sensitive plant species were evaluated for their potential to occur in the proposed Project impact area, and all have either low potential to occur or no potential to occur (Appendix D of the Biological Technical Report). None of these species was observed during Project surveys, nor were any other sensitive plant species. Therefore, no sensitive plant species would be impacted by the proposed Project, and no mitigation would be required.

The proposed Project has the potential to cause direct, adverse effects to sensitive animal species during construction. These impacts would occur primarily from vegetation removal and grading activities, which would cause loss of habitat and potentially cause direct injury or mortality to individuals. Twelve sensitive animal species were evaluated for their potential to occur in the proposed Project impact area (Appendix E of the Biological Technical Report). Five of these species were observed in the proposed Project impact area: loggerhead shrike, northern harrier, California horned lark, Le Conte's thrasher, and burrowing owl. Two species not observed but with moderate potential to occur include coast horned lizard and prairie falcon (i.e., moderate potential to forage; no nesting habitat present). The other five species have low potential to occur or are not expected to occur. Direct injury or mortality to the loggerhead shrike, northern harrier, California horned lark, Le Conte's thrasher, and prairie falcon is not anticipated as these species can move out of harm's way. The loss of habitats for these species (desert salt bush scrub and Mojave creosote bush scrub) would be less than significant due to the widespread nature of these communities and the species' lower levels of sensitivity. Direct injury or mortality to the coast horned lizard if it was to be present (it has moderate potential to occur) and the loss of its potential habitats would also be less than significant for the reasons stated above

(widespread habitats and low level of sensitivity). In summary, direct impacts to these sensitive animal species would be less than significant.

The proposed Project site is located within an area requiring Mohave ground squirrel focused surveys. The CDFW requires a trapping survey for the Mohave ground squirrel for projects that propose impacts to habitat with potential to support the species and are within or adjacent to the species' known range. Mohave ground squirrel biologist, Mike McGovern, Ph.D., conducted a visual survey of the Recharge Site to assess the habitat on that site and to look for Mohave ground squirrels. He determined that the Recharge Site contained potentially suitable habitat for the species and recommended trapping. He conducted a trapping survey on April 15 through April 19, May 6 through May 10, and July 3 through July 7, 2015 (refer to the Biological Technical Report for additional surveys regarding the surveys). The trapping survey was performed over a representative grid covering potential habitat within the Recharge Site, in accordance with the most current protocol prescribed by the CDFW.

Mohave ground squirrels are found in a variety of habitats in the western Mojave Desert but appear to prefer habitat with a variety of species of shrubs. The Recharge Site is, primarily, a monoculture of salt bush with lesser and isolated components of annual vegetation and shrubby perennials. The Recharge Site, therefore, appears to be poor habitat for the species. Even the usually common antelope ground squirrel is scarce. The Recharge Site is significantly disturbed and has been used as a place to deposit refuse and for agricultural purposes, as well for off-road vehicles.

It is reasonable to conclude that the Mohave ground squirrel is not present on the Recharge Site based on: (1) negative survey results; (2) paucity of other small mammals; (3) poor habitat quality; (4) the site's level of disturbance; and (5) the fact that there have been no Mohave ground squirrels observed in the general area in the past 26 years.

Additionally, a visual survey of the pipeline alignments and the distribution site was conducted by Dr. McGovern to assess habitat suitability for the Mohave ground squirrel. The distribution site was surveyed on foot. The pipeline routes were surveyed by driving the routes and stopping at various locations. In areas where there were no roads, the routes were surveyed on foot. In all incidences, notes of the soils and vegetation were taken, as well as photographs. It was determined that the habitats in these areas were not suitable to support the Mohave ground squirrel; therefore, trapping was not warranted over these portions of the Project impact area.

The habitat at the Distribution Site and along the 30-, 36-, and 48-inch pipeline alignments was deemed not suitable to support the Mohave ground squirrel, so they were not trapped. Similarly, the habitat at the proposed Recovery Well locations and Well Collection Pipeline between recovery wells and at the temporary Percolation Pond parcels was deemed not suitable to support the Mohave ground squirrel and was not trapped. The habitat was not suitable because it: (1) consisted of dirt and/or paved roads in developed areas; (2) consisted of sparsely vegetated and disturbed desert vegetation dominated by creosote bush (a variety of shrub species is preferred); (3) was significantly disturbed due to past agricultural activities and only supports annual plant species; and/or (4) is significantly disturbed and has been used as a place to deposit refuse.

A burrowing owl and an occupied burrow (a concrete pipe in the ground) were found along the Potable Water and Raw Water/Return Water Pipeline alignments. Other, similar concrete pipes were found in the immediate vicinity that may be connected to the occupied pipe and form a burrow complex. Additionally, other burrows with potential to support the burrowing owl are present in the proposed Project impact area. The following types of activities have potential to impact the burrowing owl, its nests or eggs, and destroy or degrade its habitat during construction: grading, earthmoving, burrow blockage, and heavy equipment or vehicles compacting and crushing burrow tunnels (CDFW 2012). If burrowing owls occupy burrows in the proposed Project impact area, or within 500 feet of the proposed Project impact area, prior to construction, the proposed Project has potential to have a substantial adverse effect on this sensitive species, resulting in a significant impact. Mitigation would be required. Implementation of the mitigation listed in Section 3.2.4 would reduce the impacts to less than significant.

Potential direct impacts to nesting birds protected by the MBTA and California Fish and Game Code could result if clearing of vegetation or construction occurs during the breeding season (generally February through August and, for raptors, January through August). Clearing of vegetation or construction activities could cause destruction or abandonment of active nests or mortality of adults, young, or eggs. Impacts to nesting birds would be considered a significant impact, and mitigation would be required. Implementation of the mitigation listed in Section 3.2.4 would reduce the impacts to less than significant.

Sensitive Natural Communities

The proposed Project would impact a total of 311.2 acres of vegetation communities/land uses (as presented in Table 3.2-1). Of the total 311.2 acres, 168.2 acres represent permanent impacts to sensitive natural communities, and specifically, desert salt bush scrub, which has a statewide rarity ranking of S3.5. Impacts to this community are also expected on portions of the Recharge Site that are outside of the 110-acre fenced area, including permanent impacts to 10 acres for soil stockpiling and minor temporary impacts to portions of the remaining area. The temporary impacts are not anticipated to be extensive and would likely consist of some equipment access in order to construct the recharge basins, as well as disturbance from installing the fence.

The proposed Project would conserve approximately 40 of the 50 acres outside of the fenced area on the Recharge Site. Approximately 97 percent (48.4 acres) of the 50-acre area outside of the 110-acre fenced portion of the Recharge Site consists of desert salt bush scrub. The 50 acres is within PWD ownership and approximately 40 acres of the land would remain in open space, in perpetuity. The land would be placed in a conservation easement, restrictive covenant, or other legal protective mechanism as part of the proposed Project, as explained in Section 2.0.

The proposed Project's unavoidable impacts are limited to relatively low quality desert salt bush scrub habitat that is widespread in the Mojave Desert and elsewhere, and was found to not support sensitive species. Due to the low severity of impacts to desert salt bush scrub and PWD's commitment to conserving approximately 40 acres of this habitat as a fundamental part of the proposed Project, impacts are considered less than significant, as explained in further detail below.

Table 3.2-2
PERMANENT IMPACTS AND POTENTIAL CONSERVATION AREA VEGETATION COMMUNITIES/LAND USES

Vegetation Community/Land Use*	Rarity Ranking	Acreage Impacted	Acreage of Potential Conservation Area[1]
Mojave creosote bush scrub (34100)	S4	19.4	--
Mojave creosote bush scrub-disturbed (34100)	S4	3.5	--
Desert salt bush scrub (36110)	S3.2	142.2	42.3
Desert salt bush scrub-disturbed (36110)	S3.2	26.0	6.1
Non-native grassland (42200)	S4	1.0	--
Non-vegetated channel (--)	--	0.1	--
Agriculture (inactive/fallow; --)	--	11.0	--
Agriculture (active; --)	--	10.5	--
Disturbed habitat (--)	--	44.6	1.6
Developed (--)	--	52.9	--
TOTAL	**--**	**311.2**	**50.0**

Source: HELIX 2015a
[1] The proposed Project would include conservation of approximately 40 of the 50 acres located outside of the fenced portion of the Recharge Site. The location of the 10 acres that would be used for soil stockpiling is undetermined at this time, therefore, the entire 50 acres is shown as the potential conservation area.

Desert salt bush scrub has a rarity ranking of S3, which is considered to be highly imperiled; therefore, the community is considered a High Priority Vegetation Type by the CDFW. However, CDFW, in Addressing High Priority Vegetation Types, further assesses priority according to vegetation community quality and the quantity impacted. High quality communities include, for example, those that lack invasive, exotic species and have no evidence of human-caused disturbance. Desert salt bush scrub in the proposed Project impact area, which is almost entirely on the Recharge Site, is significantly disturbed (by humans) as the Recharge Site has been used as a place to deposit refuse and for agricultural purposes, as well for off-road vehicles. Desert salt bush scrub-disturbed in the proposed Project impact area has also been disturbed by humans and has been invaded by exotic plant species such as Russian thistle, tall tumble mustard, Mediterranean grass, and red-stem filaree. Neither desert salt bush scrub nor desert salt bush scrub-disturbed was found to support highly sensitive species such as Mohave ground squirrel and desert tortoise.

Desert salt bush scrub is widely scattered on the margins of dry lakebeds in the Colorado, Mojave, and Great Basin deserts (that are located in parts of California, Arizona, New Mexico, Nevada, Utah, Oregon, Washington, Wyoming and Idaho) at elevations from below sea level to more than 5,900 feet amsl. The Desert Renewable Energy Conservation Plan (DRECP) Area encompasses 22,585,000 acres of southeastern California north, east, and southeast of the proposed Project impact area. The DRECP Area spans the Mojave and Colorado/Sonoran deserts and a small portion of the Great Basin Desert. The vast DRECP Area is bounded by Baja California, Mexico to the south; Arizona and Nevada to the east; the Sierra Nevada and Tehachapi mountain ranges to the north and northwest; and the Peninsular and Transverse mountain ranges to the west. Approximately 361,909 acres of desert salt bush scrub have been

mapped in the DRECP Area alone. The proposed Project would impact less than 0.001 percent (0.00046 percent) of the total amount of desert saltbush scrub mapped in the DRECP Area.

The proposed Project's impacts to lower quality desert salt bush scrub (142.2 acres) and desert salt bush scrub-disturbed (26.0 acres) that do not support highly sensitive species and are small in area compared to the overall coverage of desert salt bush scrub in just the DRECP Area (361,909 acres) would, therefore, be less than significant in accordance with the CDFW guidelines for addressing High Priority Vegetation Types. PWD also is conserving a 40-acre portion of the Recharge Site as open space following construction. Impacts would be less than significant, and no mitigation would be required.

Impacts to non-sensitive vegetation communities and land uses, such as agriculture, would be less than significant, and no mitigation would be required.

Wetlands, Waters of the U.S., and Waters of the State

The 30-inch Potable Water Pipeline along East Palmdale Boulevard has been designed to be constructed within the right-of-way of the road. Additionally, the Recovery Wells, Well Collection Pipeline, and temporary Percolation Pond parcels along 110th Street (east of the Recharge Site) have been located west of the street to avoid the potential jurisdictional areas located east of the street.

With the proposed Project design, there would be no impacts to Waters of the U.S. and Waters of the State, and no mitigation or permitting would be required.

Wildlife Corridors and Wildlife Nursery Sites

The proposed Project impact area is not in a specific route used by wildlife to move between habitat areas; nor is it a specific linkage that connects to other habitat areas. Therefore, the proposed Project would not interfere with the movement of wildlife or wildlife corridors, and no mitigation would be required.

While some species may use the impact area for breeding or nesting, no wildlife nursery sites are known or expected to occur there. A wildlife nursery site is a specific, established location often used repeatedly for breeding purposes, such as a heron rookery or bat maternal colony roost. Therefore, the proposed Project would not interfere with wildlife nursery sites, and no mitigation would be required.

Local Policies, Ordinances, and Adopted Plans

PWD is a special district; therefore, the regional and local plans and policies do not apply to the proposed Project. Therefore, the proposed Project would not conflict with any regional conservation plans, local ordinance, or policies protecting biological resources, and no mitigation would be required.

Indirect Impacts

Fugitive Dust

Fugitive dust produced by construction could disperse onto adjacent native vegetation. A continual cover of dust may reduce the overall vigor of individual plants by reducing their photosynthetic capabilities and increasing their susceptibility to pests or disease. This, in turn, could affect animals dependent on these plants (e.g., seed-eating rodents). Fugitive dust also may make plants unsuitable as habitat for insects and birds. Implementation of Project Design Measures, identified in Section 2.5.4 of this EIR to reduce dust generation, would ensure impacts associated with fugitive dust remain less than significant.

Noise

Noise resulting from construction including grubbing, grading, and vehicular traffic would be a temporary impact to local, sensitive wildlife. Due to its temporary nature, the impact would be adverse but not substantial, and no mitigation would be required.

Water Quality

Water quality can be adversely affected by potential surface runoff and sedimentation during construction. The use of petroleum products (fuels, oils, and/or lubricants) and erosion of cleared land during construction could potentially contaminate surface waters and drainages such as Littlerock Wash. Decreased water quality may adversely affect vegetation and wildlife. However, the proposed Project's requirements with the NPDES (discussed in more detail in Section 3.6, *Hydrology and Water Quality*) would ensure water quality impacts associated with surface runoff and sedimentation remain less than significant.

Invasive Plant Species

Many non-native plant species are highly invasive and can, among other things, displace native vegetation and reduce native species diversity, change ground and surface water levels, and adversely affect native wildlife that is dependent on the native plant species.

Construction and ground disturbance activities can spread non-native plant species from developed or disturbed areas to areas of native vegetation. However, the proposed Project lies within an area that has already experienced high levels of disturbance from previous agricultural activities and land clearing, and non-native plant species are already present inside and outside the proposed Project impact area. Therefore the proposed Project is not expected to have a substantial adverse effect on sensitive species or sensitive vegetation communities due to invasive plant species, and no mitigation would be required. Impacts would be less than significant.

Nuisance Animal Species

The introduction of artificial water sources into arid environments can result in the spread of already-present exotic ants such as the Argentine ant. The Argentine ant was observed during Project surveys. The Argentine ant likely became established in the Project impact area due to

agriculture and residential development and its associated irrigation. Argentine ants out-compete native ants that are the primary prey item for the sensitive coast horned lizard, adversely affecting that species. The optimal environment for Argentine ants is characterized by moderate temperatures and moisture levels, and moisture gradients regulate invasiveness of this species. Argentine ants generally penetrate farther into moist habitats than into dry and sparse habitats. Since the area surrounding the Recharge Site supports dry, sparse habitat, it is anticipated that if Argentine ants are on the Recharge Site that they would not spread far beyond it into the drier habitat of the coast horned lizard; they would more likely spread toward irrigated agricultural land. Therefore, the proposed Project would not be anticipated to have a substantial adverse effect on a sensitive species from the Argentine ant, and no mitigation would be required. Impacts would be less than significant.

Water sources can also increase numbers of predators such as common raven and coyote, both observed or detected during Project surveys, which are known to prey on desert tortoise and other native species. The Recharge Site would, however, be surrounded by an 8-foot-high chain link fence (topped with three-strand barbed wire), which would exclude the coyote. Therefore, the number of coyotes would not increase due to the new water source at the recharge basins and impacts would be less than significant.

The common raven gets its water primarily through the food it eats, but if this is not sufficient, it will drink water. While the new water source associated with the recharge basins could attract (more) ravens to the area of the Recharge Site, a potential increase in numbers is not expected to have a substantial effect on sensitive species because the primary potential prey species, which are also the most sensitive, the State and/or federal listed desert tortoise and Mohave ground squirrel, are not present. Therefore, a potential increase in common raven numbers would be less than significant and would not require mitigation.

Avian botulism is a paralytic disease caused by ingestion of a toxin produced by the bacterium, *Clostridium botulinum*. This bacterium is widespread in soil and requires warm temperatures, a protein source, and an anaerobic environment to become active and produce toxin. Decomposing vegetation and invertebrates combined with warm temperatures can provide ideal conditions for the bacterium (USGS 2013). Birds either ingest the toxin directly or eat invertebrates containing the toxin. PWD would prevent/control the growth of vegetation in the bottom of the recharge basins by disking, as necessary, and the interior slopes of the basins would be shotcrete that would prevent the growth of vegetation surrounding the water in the recharge basins. The prevention/control of vegetative growth would reduce or eliminate invertebrates dependent on such vegetation and would eliminate the potential for decomposing vegetation in the basins. Therefore, PWD's vegetation management activity would prevent the production of the ideal conditions for the bacterium, and the potential for avian botulism would be significantly reduced. Consequently, the proposed Project would not have a substantial adverse effect on sensitive species or non-sensitive species related to avian botulism, and no mitigation would be required.

Night Lighting

Night lighting exposes wildlife to an unnatural light regime that may adversely affect foraging patterns, increase predation risk, cause biological clock disruptions, and disrupt wildlife movement.

With the exception of well drilling and testing, and perhaps pipeline installation on busy roadways, Project construction activities would occur during the daytime. Night lighting is proposed for use during construction associated with well drilling and testing and potentially some small portions of pipeline installation. Implementation of Project Design Measures, identified in Section 2.5.4 of this EIR, would ensure impacts associated with construction nighttime lighting remain less than significant.

Proposed Project operation would include night lighting. Outdoor night lighting is intended for occasional maintenance activities and would be provided at the following locations: SWP Turnout, Distribution Site, each of the recharge basins (one on each inlet and outlet; total eight), the Splitter Box, and at each of the Recovery Well sites (potentially above each well building door and general site lighting). These lights would not be expected to be normally on and would potentially have lockable light switches. Night lighting has the potential to be bright and be directed such that it could have a substantial adverse effect on sensitive species in adjacent sensitive vegetation; however, implementation of Project Design Measures, identified in Section 2.5.4 of this EIR, would ensure impacts associated with operational nighttime lighting remain less than significant.

Human Activity

Increases in human activity in an area can result in the degradation of sensitive vegetation/wildlife habitat outside a project impact area through, for example, the creation of unauthorized trails. However, implementation of Project Design Measures, identified in Section 2.5.4 of this EIR, would ensure impacts associated with human activity remain less than significant.

Increases in vehicular activity due to a project can cause increases in road-killed wildlife. Use of unpaved Project access roads could result in an increase in road kill, which could have a substantial adverse effect on sensitive species (e.g., coast horned lizard should it be present). However, implementation of Project Design Measures, identified in Section 2.5.4 of this EIR, would ensure impacts associated with vehicular activity remain less than significant.

3.2.4 Mitigation Measures

Burrowing Owl

MM BIO-1: A pre-construction take avoidance survey shall be conducted for each phase of construction at the Recharge and Distribution Sites, Recovery Wells, Well Collection Pipeline, temporary Percolation Pond parcels, and the undeveloped portion of 105th Street East. The survey shall be completed no more than 14 days prior to ground-disturbing activities and shall cover the proposed Project impact area and all potential burrowing owl habitat within 500 feet, as feasible. More specifically, the survey shall cover all Project features except: (1) where the

30-inch Potable Water Pipeline would occur in East Palmdale Boulevard and (2) where the 36-inch Raw Water/Return Water Pipeline would be constructed between East Avenue R2 in the north and East Avenue S in the south. If there is no sign of burrowing owl occupation (as defined in CDFW 2012), then no further mitigation is required. If sign of occupation is present, the following measures shall be implemented.

- Direct impacts to occupied burrowing owl burrows shall be avoided during the breeding period from February 1 through August 31 (CDFW 2012). "Occupied" is defined as a burrow that shows sign of burrowing owl occupancy within the last three years.

- Direct impacts to occupied burrows shall also be avoided during the non-breeding season. If present, burrowing owls may be excluded from their burrows. Burrow exclusion is a technique of installing one-way doors in burrow openings during the non-breeding season to temporarily exclude burrowing owl, or permanently exclude burrowing owl and close burrows after verifying burrows are empty by site monitoring and scoping. Eviction of burrowing owl during the non-breeding season would require prior CDFW approval of a Burrowing Owl Exclusion Plan (CDFW 2012).

- The burrowing owl and its habitat adjacent to, but outside of, Project impact areas, if present, shall be protected in place, and disturbance impacts shall be minimized through the use of buffer zones, visual screens, or other measures (CDFW 2012) as deemed necessary by a qualified biologist.

- Mitigation for direct, permanent impacts to nesting, occupied, and satellite burrows and/or burrowing owl habitat shall be required such that the habitat acreage and number of burrows and burrowing owls impacted are replaced based on the burrowing owl life history information provided in Appendix A of the Staff Report on Burrowing Owl Mitigation (CDFW 2012), site-specific analysis, and consultation with the CDFW. A Burrowing Owl Mitigation Plan shall be prepared and submitted to the CDFW for approval prior to impacts to the burrowing owl and/or its habitat.

Nesting Birds

MM BIO-2: Vegetation clearing shall take place outside the general avian breeding season (which generally occurs from February through August). Tree removal/trimming shall take place outside the raptor breeding season (which generally occurs from January through August). If vegetation clearing and/or tree removal/trimming cannot occur outside the general avian and raptor breeding seasons, then a pre-construction survey for avian nesting shall be conducted by a qualified biologist within 7 calendar days prior to vegetation clearing and tree removal/trimming. If nests are not observed, work may proceed. If nests are found, work may proceed provided that construction activity is: (1) located at least 500 feet from raptor nests; (2) located at least 300 feet from listed bird species' nests; and (3) located at least 100 feet from non-listed bird species' nests. A qualified biologist shall conspicuously mark the buffer so that vegetation clearing does not encroach into the buffer until the nest is no longer active (i.e., the nestlings fledge, the nest fails, or the nest is abandoned, as determined by a qualified biologist).

3.2.5 Conclusions

Based on the implementation of the mitigation described in Section 3.2.4, all identified Project-related impacts associated with biological resources would be avoided or reduced below a level of significance, with no significant unavoidable adverse impacts.

3.3 CULTURAL AND PALEONTOLOGICAL RESOURCES

This section describes the existing site conditions, identifies applicable regulatory requirements, and evaluates potential impacts and applicable mitigation measures associated with cultural and paleontological resources for the proposed Project. Applied Earthworks, Inc. (*Æ*) prepared a cultural resources survey report for the proposed Project (*Æ* 2015), which is summarized in this section and contained in Appendix F of this EIR.

3.3.1 Existing Conditions

The proposed Project study area for the cultural resources survey report included a total of approximately 601 acres. The Area of Potential Effect (APE) for this report includes the entire Project cultural resources study area.

Twenty cultural resources have been previously recorded within a one-quarter mile radius of the APE, seven of which are located within the proposed Project's cultural resources study area. A cultural resources survey discovered the presence of 11 additional cultural resources within the Project cultural resources study area, increasing the total number of resources within the APE to 18. The East Branch of the California Aqueduct is located within the proposed Project area and is National Register of Historic Places (NRHP) and California Register of Historical Resources (CRHR) eligible. None of the remaining onsite resources have been previously evaluated for the NRHP or the CRHR.

Survey Methodology

A Phase I archaeological survey of the APE was conducted in June and September 2015. A file search of the California Historical Resources Information System (CHRIS) located at the South Central Coastal Information Center (SCCIC) at California State University, Fullerton was conducted in preparation for the survey. The Phase I survey entailed an intensive pedestrian survey of the 601-acre APE. Following the survey, archival research was conducted and historical maps were examined to determine land ownership within the proposed Project area and to supplement archaeological results with historical documentation.

The results of the file search indicate that eleven previous investigations have been conducted on portions of the Project site, and seven cultural resources were found within the APE. Of these, five are historic-period archaeological refuse scatters (P-19-004323, *Æ*-2829-17H, *Æ*-2829-18H, *Æ*-2829-19H, and *Æ*-2829-20H), one is an isolated historical well head (P-19-100581), and one is the historic East Branch of the California Aqueduct (P-19-004154).

The Phase I pedestrian survey was conducted between June 3 and 9, 2015 and on September 22, 2015 by two *Æ* archaeologists and included the 160-acre Recharge Site, five 2.5-acre temporary percolation pond parcels, the approximately 2-acre Distribution Site, 16 Recovery Well sites and associated Well Collection Pipeline, and the pipeline alignments for the Potable Water and Raw Water/Return Water Pipelines. Altogether, this encompassed the entire 601 acres of the APE. The Recharge and Distribution Sites, the temporary percolation ponds, and the majority of the Recovery Well sites were located in undeveloped land, some of which was formerly used for agriculture. These were intensively surveyed by walking 10- to 15-meter parallel transects. Some Recovery Well locations were in densely vegetated and flooded agriculture fields that

were not surveyed due to their inaccessibility and the low potential for intact cultural resources. Approximately 50 percent of the pipeline alignments were located in the right-of-way for existing paved roads; these were surveyed by reconnaissance driving along the alignment. The remaining portions of pipeline alignment were walked in transects.

Unusual landforms were investigated for cultural constituents. Artificial landscape contours, such as road cuts, natural features, such as rodent burrows and drainages, and abrupt changes in soil or vegetation type were carefully examined to ensure that visible cultural resources were identified and documented.

Located historical resources were documented using standard State of California Department of Parks and Recreation Archaeological Site Forms (DPR 523 [1995]). Resources identified included the 7 previously recorded and 11 newly recorded resources. Previously recorded resources were examined and updated as necessary if the site record was deemed inadequate or incorrect. Newly identified resources were photographed and recorded by size, concentration, and cultural features. Locations were plotted on the appropriate USGS quadrangle maps using a Trimble GeoXH handheld global positioning system (GPS) unit. No artifacts were collected during the survey.

Newly recorded resources consisted of nine historic-period archaeological sites, one historic-period isolated artifact, and one prehistoric isolated artifact. The historic sites consisted of refuse deposits and scatters containing cans and glass containers dating to the first half of the 20th century and a historic period farmstead. The historic isolate consisted of a steel wellhead with no associated artifacts and no known date. The prehistoric isolate consisted of one secondary-stage reduction flake of chalcedony (a translucent variety of quartz of various colors and waxy luster) that is not local to the area. It did not have any visible edge wear or modification.

Archival research was conducted by examining records from the General Land Office (GLO) available from the Bureau of Land Management (BLM), the Los Angeles County Assessor's Office, the U.S. Census, the U.S. Cities Directories, and the California Death Index available from Ancestry.com. Historical USGS Quadrangle maps were also consulted. Fifteen-minute USGS Quadrangle maps were available for the Alpine Butte, CA (1945) and Lancaster, CA (1933, 1958) quadrangles. Seven-and-a-half-minute USGS Quadrangle maps were available for the Alpine Butte, CA (1957), Lancaster East, CA (1958), Littlerock, CA (1930, 1957), and Palmdale, CA (1958) quadrangles.

Native American Consultation

The Native American Heritage Commission (NAHC) was contacted on May 8, 2014; July 7, 2014; and November 10, 2014 for a review of the Sacred Lands File (SLF) for the proposed Project. The purpose of the review was to determine if any known Native American cultural properties are present within or adjacent to the proposed Project. The NAHC responses were received on May 19, 2014; July 15, 2014; and November 21, 2014, respectively. They stated that no known cultural properties exist within the area and provided a list of Native American contacts representing tribes associated with the location to consult for further information or concerns regarding the proposed Project's impact to cultural resources. These representatives

were contacted by email or letter on July 23, 2014 and with follow-up telephone calls on July 29, 2014. A sample letter and a table showing the contacts and their responses is located in Appendix A of the cultural resources survey report (Appendix F of this EIR).

Three responses were received from the nine representative groups or individuals contacted. Beverly Salazar Folkes, an individual of Chumash, Tataviam, and Fernandeño descent, suggested the presence of an archaeological and Native American monitor for ground disturbance in intact native soil, citing that Littlerock was a drawing area for Native people. Robert Robinson, a representative of the Kern Valley Indian Community, recommended the presence of a culturally affiliated Native American monitor for all ground disturbing activity due to the continuous history of Native occupancy in the area. Lastly, Kimia Fatehi, the Fernandeño Tataviam Band of Mission Indians' Tribal Historic and Cultural Preservation Representative, requested more information and stated that the proposed Project is located within an area of cultural sensitivity to the tribe. She provided a map of the tribe's culturally sensitive areas that, upon inspection, revealed the proposed Project to be outside of these areas.

Prehistoric, Ethnographic, and Historic Setting

Detailed prehistoric, ethnographic, and historic settings for the proposed Project vicinity are provided in the cultural resources survey report (Appendix F). Prehistoric archaeological sites in California are places where Native Americans lived or carried out activities during the prehistoric period before 1769 A.D. These sites contain artifacts and subsistence remains, and they may contain human burials. Artifacts are objects made by people and include tools (such as projectile points, scrapers, and grinding implements), waste products from making flaked stone tools (debitage), and non-utilitarian artifacts (beads, ornaments, ceremonial items, and rock art). Subsistence remains include the inedible portions of foods, such as animal bone and shell, and edible parts that were lost and not consumed, such as charred seeds. The ethnographic setting provides information regarding ethnohistoric inhabitants and groups in the region. Historic settings detailed in the cultural resources survey report (Appendix F) include those for Los Angeles County, the Antelope Valley, the City of Palmdale, and the East Branch of the California Aqueduct.

Paleontological Setting

According to the City of Palmdale General Plan (City of Palmdale 1993), twelve rock units were identified within the City and have been categorized into three classifications for paleontological sensitivity: high sensitivity/potential, unknown sensitivity/potential, and low sensitivity/ potential. The City of Palmdale General Plan describes the three classifications as follows:

> High Potential: The Palmdale Planning Area encompasses five sedimentary rock units ranging in age from 12 million to 10,000 years. These rock units have produced significant non-renewable plant and vertebrate paleontologic resources and have a high potential to produce future resources. These units include, chronologically, the Punchbowl, Ana Verde, Harold Formations, the Nadeau Gravels/Pleistocene Old Alluvium, and pleistocene Lacustrine and Fluvial Sediments.

Unknown Potential: There are two rock units in Palmdale which have an unknown potential for producing paleontological resources, the Vasquez Formation and the Pleistocene Alluvium. The Vasquez Formation is approximately 38 to 22.5 million years old dating it back to the Oligocene Age. The Pleistocene alluvium which is of high potential is covered by a thin layer of recent alluvium. This layer has an unknown potential for producing paleontologic resources.

Low Potential: There are five igneous and metamorphic rock units in Palmdale which have a low potential to produce significant paleontologic resources. These units include: Precambrian Pelona Schist, mesozoic metavolcanics, Mesozoic granite, quartz monzonite, and diorits.

The entire portion of the proposed Project within the City of Palmdale boundaries is located within an area designated as unknown sensitivity/potential (Exhibit 3-56, City of Palmdale 1992).

Vertebrate paleontological localities have been recorded between the intersection of Pearblossom Highway and the East Branch of the California Aqueduct (approximately 1.2 miles west of the proposed Project's SWP turnout location) and Littlerock Wash. Fossil horse teeth, mammoth tooth fragments, and rabbit, bird, carnivore and rodent teeth and bone fragments were uncovered at these sites (City of Palmdale 1993).

With the exception of the southwest corner, the City of Lancaster Planning Area contains gentle sloping alluvial sediments with finer soils that have developed over time, possibly burying hard organic materials that were deposited there and preserving fossils (City of Lancaster 2006). Thus, the majority of the Lancaster Planning Area, including the southeastern corner of the city limits, in which portions of the proposed Project are located, is designated with a moderate to high potential sensitivity for paleontological resources (Figure 5b, City of Lancaster 2006).

The Antelope Valley Area Plan EIR (Los Angeles County 2014a) indicates that fossil localities are found throughout the Antelope Valley, including in southeast Palmdale. These fossil specimens vary in type and species (Los Angeles County 2014a).

Regulatory Framework

The proposed Project is subject to federal and state regulatory requirements related to potential cultural resources issues. Specific regulatory requirements are summarized below.

National Historic Preservation Act of 1996

The National Historic Preservation Act (NHPA) of 1966 was enacted to "Establish a Program for the Preservation of Additional Historic Properties throughout the Nation and for Other Purposes" (16 U.S. Code [USC] 470). The NHPA authorized the creation of a NRHP. The NRHP is the nation's official list of cultural resources worthy of preservation. It is part of a national program to coordinate and support public and private efforts to identify, evaluate, and protect our historic and archaeological resources. The NRHP is administered by the National Park Service, which is part of the U.S. Department of the Interior.

Criteria for Determination of Federal Historic Designation and Listing

Federal criteria for nomination of a resource to listing on the NRHP are similar to the state criteria and include (1) consideration of the quality of significance in American history, architecture, archeology, engineering and culture present in districts, sites, buildings, structures and objects that possess integrity of location, design, setting, materials, workmanship, feeling and association and (2) that a resource meets one or more of the following criteria:

1. Is associated with events that have made a significant contribution to the broad patterns of our history;

2. Is associated with the lives of persons significant in our past;

3. Embodies the distinctive characteristics of a type, period or method of construction or that represent the work of a master or that possess high artistic values or that represent a significant and distinguishable entity whose components may lack individual distinction and/or

4. Yields, or may be likely to yield, information important in prehistory or history.

California Public Resources Code (Division 5, Chapter 1)

Division 5, Chapter 1 of the Public Resources Code established regulations for the protection of historic resources in the state of California. It established the CRHR, an authoritative guide to California's significant historical and archeological resources. The CRHR is to be used by state and local agencies, private groups, and citizens in identifying the existing historical resources of the state and to indicate which resources deserve to be protected, to the extent prudent and feasible, from substantial adverse change. The California Office of Historic Preservation (OHP) administers the CRHR.

Criteria for Determination of State Historic Designation and Listing

The state has established select criteria for listing a resource on the CRHR. Specifically, the resource must:

1. Be associated with events that have made a significant contribution to the broad patterns of local or regional history or the cultural heritage of California or the U.S.;

2. Be associated with the lives of persons important to local, California or national history;

3. Embody the distinctive characteristics of a type, period, region or method of construction or represents the work of a master or possesses high artistic values and/or

4. Yield, or have the potential to yield, information important to the prehistory or history of the local area, California or the nation.

Public Resources Code Section 5097 et seq.

State law addresses the disposition of Native American burials in archaeological sites and protects such remains from disturbance, vandalism or inadvertent destruction; establishes procedures to be implemented if Native American skeletal remains are discovered during construction of a project; and designates the NAHC to resolve disputes regarding the disposition of such remains. In addition, the Native American Historic Resource Protection Act makes it a misdemeanor punishable by up to a year in jail to deface or destroy an Indian historic or cultural site that is listed or may be eligible for listing in the CRHR.

3.3.2 Significance Thresholds

Project-related impacts to cultural resources would be significant if the proposed project would:

- Cause a substantial adverse change in the significance of a historical resource as defined in Section 15064.5 of the State CEQA Guidelines.
- Cause a substantial adverse change in the significance of an archaeological resource pursuant to Section 15064.5 of the State CEQA Guidelines.
- Directly or indirectly destroy a unique paleontological resource on site or unique geologic feature.
- Disturb any human remains, including those interred outside of formal cemeteries.

The identified significance thresholds are based on criteria provided in Appendix G of the State CEQA Guidelines. The thresholds are intended to ensure conformance with existing regulatory requirements and protect cultural resources.

3.3.3 Impact Analysis

Historical Resources

The East Branch of the California Aqueduct was built to bring water to the Southern California region and its customers. This resource has previously been determined eligible for the NRHP and the CRHR under Criteria A/1 and C/3 for its association with an important historic event and its engineering merits. The proposed Project proposes to construct a new SWP turnout in the vicinity of 106th Street East. The turnout would connect to the side of the East Branch of the California Aqueduct in order to draw water from the aqueduct to the proposed recharge water supply line. When originally planned, designed, and engineered, the aqueduct system was expected to undergo this type of alteration over time to meet future growth and demand. Given this, the construction and operation of ancillary features, such as the proposed turnout, is consistent with the long-term plan and design of the East Branch of the California Aqueduct. As the proposed work to the California Aqueduct would be implemented in a manner keeping with the function and character of the canal and its associated features, the addition of a new turnout would not substantially alter any of the seven aspects of historical integrity, including location, design, setting, materials, workmanship, feeling, and association that relate to the aqueduct's historical significance. Because the proposed modifications would not alter the characteristics

that qualify the East Branch of the California Aqueduct for the NRHP and CRHR, proposed Project impacts to historical resources would be less than significant.

Archaeological Resources

Fourteen archaeological sites and three archaeological isolates are located within the proposed Project APE. Site CA-LAN-4323H/P-19-004323 was an historical refuse deposit that was largely destroyed and displaced during the construction of a solar farm. Given its lack of integrity, CA-LAN-4323H is not eligible for listing on the NRHP or the CRHR.

Sites *Æ*-2829-17H, *Æ*-2829-18H, *Æ*-2829-19H, *Æ*-2829-20H, *Æ*-2829-JS-1H, *Æ*-2829-JS-3H, *Æ*-2829-JS-4H, *Æ*-2829-JS-6H, *Æ*-2829-JS-7H, *Æ*-2829-JS-8H, and *Æ*-2829-JS-10H consist of historical refuse scatters dating from the early to mid-twentieth century. The artifacts composing these scatters appear to be of mainstream American origin, reflecting well documented consumer practices typical of ranching and rural communities of the era. Archival research could not associate any of these deposits to events that have made significant contributions to the broad patterns of our history (Criterion A/1), nor can they be associated with events or the lives of persons significant in our past (Criterion B/2). The sites do not embody the distinctive characteristics of a type, period, or method of construction, and thus are not recommended eligible under Criterion C/3. Furthermore, most of the sites appear to lack the potential to contain substantial subsurface cultural deposits that could yield important historical information. As such, these sites are not considered significant to the study of the local or regional history and settlement of this part of the Mojave Desert (Criterion D/4).

Site *Æ*-2829-JS-9H represents the remains of a small 1950s-era farmstead containing a well, pump, residential slab foundation, fence posts, piles of discarded lumber, ancillary slab foundations, and a light scatter of domestic household refuse. Archival information suggests that the farmstead may have initially been established on the property by Louis J. and Marion P. Koenig in the early 1950s. Tax records indicate that the farmstead was occupied until the early 1960s, at which time the property fell into disuse. The farmstead was demolished sometime thereafter with *Æ*-2829-JS-9H representing the remnants of the historical buildings and associated structures. The artifactual and architectural constituents of the site were not found to be associated with any events or individuals of historical significance (Criteria A/1 and B/2), nor do they exhibit any significant architectural or engineering merits (Criterion C/3). Furthermore, the site appears to have little potential to contain subsurface cultural deposits that could yield important historical information. As such, *Æ*-2829-JS-9H is not considered significant to the study of the local or regional history and settlement of this part of the Mojave Desert (Criterion D/4).

Site *Æ*-2829-JS-11H represents the remains of a small mid- to late-twentieth-century farmstead that contains a well casing, perimeter footing for a pump house, remnants of perimeter and slab foundations for ancillary buildings, irrigation standpipes, piles of discarded lumber, and a scatter of broken concrete nails and glass as well as walnut and peach trees. Archival information suggests that a single building of unknown function may have been present on the property as early as 1930, but the farmstead does not appear to have been established until around 1933 under the ownership of Sheman and Rosie Simon. Tax records indicate that the farmstead continued to prosper through the mid-twentieth century, but appears to have suffered a decline

once Sheman Simon died in 1965. The farmstead was demolished sometime thereafter with Æ-2829-JS-11H representing the remnants of the historical buildings and associated structures. No information has been found to suggest that the mid- to late-twentieth-century farmstead remains found at AE-2829-JS-11H are directly associated with events or persons that are significant in local, state, or national history (Criteria A/1 and B/2). The site does not exhibit any architectural or engineering merits that would qualify it as significant under Criterion C/3. Æ-2829-JS-11H is not considered significant to the study of the local or regional history and settlement of this part of the Mojave Desert (Criterion D/4).

Isolate P-19-100581 consists of a historic-period wellhead with two associated concrete pads, and isolate Æ-2829-JS-ISO-2H consists of a historic-period wellhead with no other associated features. Because these resources are not directly associated with historically significant events or persons, they are not considered significant under Criteria A/ or B/2. Moreover, the wellheads are of standard design and construction and do not exhibit any significant architectural or engineering merits (Criterion C/3). Finally, these types of ancillary remnant features are common to abandoned rural farmstead parcels across the nation, the state, and the region. As such, the resources lack the potential to provide any information that would be considered significant to the study of the local or regional history and settlement of this part of the Mojave Desert (Criterion D/4).

Isolate Æ-2829-JS-ISO-5 is a prehistoric chalcedony flake with no associated artifacts, features, or context. It is not unique, unusual, rare, or otherwise exceptional. It has no archaeological or scientific value, does not meet any NRHP or CRHR criteria, and therefore, is not a significant resource under the NHPA or CEQA.

None of the archaeological sites or isolates within the proposed Project APE are eligible for listing on the NRHP or the CRHR. As such, the proposed Project would not result in significant impacts to these resources. However, there is potential for impacts to unknown archaeological resources during Project construction. This potential is considered a significant impact, requiring mitigation. Mitigation measure CUL-1 would reduce impacts associated with unknown archeological resources to a less-than-significant level.

Paleontological Resources

The proposed Project portion within the City of Palmdale is located within an area designated as unknown potential/sensitivity for paleontological resources. The portion of the proposed Project site north of Avenue L within the City of Lancaster, which includes two Recovery Wells, is located within an area identified by as having moderate to high potential for paleontological resources (City of Lancaster 2006). The Antelope Valley Area Plan EIR (Los Angeles County 2014a) indicates that fossil localities are found throughout the Antelope Valley, including in southeast Palmdale. Based on the potential for fossil localities to be located within the proposed Project area, and the potential for impacts to unknown paleontological resources during proposed Project construction activities, the proposed Project would result in a potentially significant impact to paleontological resources, requiring mitigation. Mitigation measure CUL-2 would reduce impacts associated with unknown paleontological resources to a less-than-significant level.

Human Remains

There is no record of previously recorded human remains in the proposed Project APE and no human remains were observed during the cultural survey. All of the archaeological sites are surface refuse scatters with little potential for subsurface deposits and the archaeological isolates are either architectural in nature or lacking context. None of the archaeological resources are expected to contain subsurface human remains. However, the potential for unearthing unknown human remains is a potentially significant impact, requiring mitigation. In the unlikely event that human remains are encountered, mitigation measure CUL-3 would reduce impacts to a less-than-significant level.

3.3.4 Mitigation Measures

The findings of this study indicate that of the 17 identified cultural resources, the East Branch of the California Aqueduct is the only historic property/historic resource located within the proposed Project APE. No further management is recommended for the 16 cultural resources that do not meet criteria for listing on the NRHP or the CRHR. Moreover, an assessment of effects indicates that the proposed Project would not have an adverse effect or impact on the significance of the East Branch of the California Aqueduct. Therefore, no further management of this cultural resource is recommended. The following measures are to be observed in the unlikely event that subsurface archaeological resources or human remains are encountered or if proposed Project modifications and expansions have the potential to impact resources.

MM CUL-1 If potentially significant buried archaeological materials are encountered during construction activities, all work must be halted in the vicinity of the archaeological discovery until a qualified archaeologist can visit the site of discovery and assess the significance of the archaeological resource. If the find is identified as significant, appropriate treatment as determined by the archaeologist shall be implemented prior to the recommencement of ground disturbance in the area. A report documenting the methods and results of the treatment shall be prepared and submitted to PWD and filed with the local repository.

MM CUL-2 In the event fossil materials are exposed during ground disturbing activities, work (within 100 feet of the discovery) shall be halted until a qualified paleontologist meeting the criteria established by the Society for Vertebrate Paleontology is retained to assess the find. If the find is identified as significant, appropriate treatment as determined by the paleontologist shall be implemented prior to the recommencement of ground disturbance in the area. A report documenting the methods and results of the treatment shall be prepared and submitted to PWD and filed with the local repository.

MM CUL-3 In the event that human remains are discovered during construction activities in a location other than a dedicated cemetery, the Los Angeles County Coroner must be notified within 24 hours of the discovery, in accord with Health and Safety Code §7050.5, *State CEQA Guidelines* 15064.5(e), and PRC §5097.98. The Coroner must then determine within two working days of being notified if the remains are subject to his or her authority. If the Coroner recognizes the remains

to be Native American, he or she must contact the NAHC by phone within 24 hours, in accordance with PRC §5097.98. The NAHC then designates a Most Likely Descendant (MLD) with respect to the human remains within 48 hours of notification. The MLD will then have the opportunity to recommend to the proposed Project proponent means for treating or disposing, with appropriate dignity, the human remains and associated grave goods within 24 hours of notification.

3.3.5 Conclusions

With implementation of the mitigation measures detailed in Section 3.3.4, Project impacts associated with the archaeological and paleontological resources in the proposed Project vicinity would be reduced to less than significant.

3.4 GEOLOGY AND SOILS

This section describes and analyzes geologic/geotechnical conditions, issues and related design and/or mitigation measures to address potential impacts associated with development of the proposed Project. A number of technical analyses that encompass geology and soils issues have been prepared for the proposed Project by KJC, including: (1) a Feasibility Study to evaluate several potential Project design alternatives, including an alternative essentially the same as the proposed Project (KJC 2015a); (2) a Preliminary Design Report (PDR), which provides design, cost and related information (e.g., permit/easement requirements) for the proposed Project (KJC 2015b); and (3) a Project-specific groundwater model to update preliminary modeling conducted as part of the Feasibility Study (KJC 2015c). The Feasibility Study includes descriptions of regional/local geologic conditions and a preliminary assessment of potential subsidence issues. The PDR includes an evaluation of potential corrosive soil issues, while the updated groundwater model provides a related assessment of potential subsidence from the proposed Project. Applicable information from the referenced studies (and other pertinent sources) is included in the following analysis, with the Project Feasibility Study, PDR, and groundwater model included in Appendices B, C, and G, respectively, of this EIR. While this section is focused predominantly on geologic/soil conditions and related geotechnical concerns within and adjacent to the areas proposed for development, portions of the analysis necessarily include a broader scope (e.g., regional fault/seismicity descriptions).

3.4.1 Existing Conditions

Regional Geologic Setting

The proposed Project site is located in the Mojave Desert Geomorphic Province, just north of the boundary with the Transverse Ranges Province (with these provinces representing 2 of 11 such geomorphic designations within the state). The Mojave Desert Province is a generally triangular-shaped area, bordered on the west and south by the San Andreas Fault/Transverse Ranges, on the north by the Garlock Fault, and on the east by the Colorado River/state line. This area is characterized by isolated and generally low mountain ranges, separated by broad areas of desert plains with deep alluvial deposits and internal drainage. The Transverse Ranges Province is a generally linear-shaped, east-west trending area that extends between the San Bernardino Mountains on the east and several offshore islands west of the Los Angeles Basin. This region is characterized by steep, east-west trending mountain ranges and intervening valleys (including the San Gabriel Mountains south of the Project site), and exhibits complex geologic structure associated with tectonic plate boundary conditions along the San Andreas Fault System.

Site Geology/Topography

The proposed Project site and adjacent areas are located within a relatively broad alluvial plain, formed by deposition within a structural depression related to local tectonic activity. Associated Holocene (less than approximately 11,000 years old) and Pleistocene (between approximately 11,000 and 2 million years old) alluvial soils are derived primarily from erosion of the nearby San Gabriel Mountains to the south and the Tehachapi Mountains to the west. Additional surficial materials present within the site and vicinity include historic artificial fill associated with development such as structures and roads, Holocene fluvial deposits along active drainage

channels (e.g., Littlerock Creek), and Pleistocene lacustrine (lake) deposits associated with an ancient lake incorporating portions of the site (KJC 2015a). Geologic exposures in surrounding areas include Cretaceous (between approximately 65 and 135 million years old) granitic rocks in the nearby mountains and other minor local structures such as Alpine Butte to the east (with similar materials underlying the proposed Project site and vicinity at depth), Holocene lacustrine deposits at the Rosamond and Rogers dry lake beds to the north, and minor exposures of Tertiary (between approximately 2 and 65 million years old) sedimentary rocks in various locations (California Geological Survey [CGS], 2003). Additional descriptions of surficial and underlying deposits within and adjacent to the Project site are provided below under the discussion of stratigraphy.

The proposed Project site and adjacent areas exhibit a generally level topographic profile associated with an alluvial plain structure as previously noted, with a minor grade to the north. On-site elevations range from approximately 2,900 feet amsl near the proposed SWP Turnout, to 2,500 feet amsl in the vicinity of the proposed Recharge Site. Surface drainage from most of the proposed Project site is via sheet flow and small unnamed intermittent drainages that flow primarily north, as well as larger intermittent drainages including Littlerock and Big Rock washes (refer to Figure 2-2, *Project Vicinity (USGS Topography*). Drainage within the proposed Project site vicinity (and the Mojave Desert Province) is predominantly internal, with most local flows continuing north and terminating at several dry lakes (e.g., Rosamond Lake).

Stratigraphy

Surficial and geologic exposures within or underlying the proposed Project site and adjacent areas are described below in order of increasing age.

Historic Artificial Fill

Artificial fill deposits are present at numerous locations within the site and vicinity in association with previous or current uses such as roadways, urban development and the East Branch of the California Aqueduct. These materials are likely derived from local sources, and typically consist of dry and loose (unconsolidated), fine- to coarse-grained silty sands with variable amounts of gravel, pebbles and cobbles.

Late Holocene Fluvial Deposits

Fluvial deposits within and adjacent to the proposed Project site are associated with active drainages such as Littlerock Wash. These materials are typically unconsolidated and consist of coarse- to very coarse-grained sandy deposits with no soil development and variable mounts of gravel, pebbles, cobbles and boulders.

Holocene to Pleistocene Alluvial Soils

Alluvial materials within and adjacent to the site consist of poorly sorted gravel, sand, silt and clay deposits that are unconsolidated to moderately consolidated, with consolidation typically increasing with depth. These materials were deposited as alluvial fans derived from erosion of the surrounding mountains, and extend to depths of several hundred feet locally (KJC 2015a). The alluvial deposits typically exhibit soil development characteristics (soil profiles), and are

mapped as the Hesperia-Rosamond-Cajon and Arizo soil associations in the Project site and vicinity. The Hesperia-Rosamond-Cajon Soil Association is characterized by well- to excessively drained, very deep soils with a loamy sand to silty clay surface layer, while the Arizo Soil Association includes excessively-drained, very deep soils with a loamy fine sand or gravelly loamy sand surface layer (USDA/Soil Conservation Service [SCS] 1970).

Pleistocene Lacustrine Deposits

The lacustrine materials were deposited in an ancient lake that slowly migrated north over time, and are present within or adjacent to the northern portion of the Project site (KJC 2015a). These materials are finer-grained than the described alluvial deposits, encompassing greater amounts of silt- and clay-size grains. Where present, the lacustrine deposits provide a confining layer between individual aquifers within the AVGB, with additional information provided below under the discussion of groundwater.

Cretaceous Granitic Rocks

As previously noted, Cretaceous granitic rocks are exposed in the San Gabriel Mountains to the south of the Project site, as well as in a number of local structural features such as Alpine Butte (approximately two miles east of the proposed Project site). These materials are generally mapped as undifferentiated granitic rocks with some localized metamorphic units, and are associated with a batholith (a large igneous intrusive body) that extends across the western Mojave Desert (KJC 2015a). As described above, the Project site and vicinity include a deep sequence of alluvial deposits, with geophysical exploration conducted in areas to the west (along 70th Street East) identifying granitic basement rocks at depths of between approximately 430 and 600 feet below ground surface (bgs) (KJC 2015a).

Groundwater

The proposed Project site and vicinity are located within the AVGB. The AVGB includes a number of subbasins, with the proposed Project site located in portions of the Pearland, Buttes, and Lancaster subbasins (Figure 3.4-1, *Hydrogeologic Setting and Historical Subsidence in the Antelope Valley Groundwater Basin*). There are three primary aquifers associated with the AVGB, the upper, middle and lower aquifers, which are separated locally by a confining (low permeability) unit consisting of the previously described lacustrine deposits. The upper (primary) aquifer extends locally from the ground surface to a depth of several hundred feet, and is associated predominantly with alluvial deposits. Historic groundwater levels in the proposed Project site vicinity were recorded at depths of approximately 175 to 350 feet bgs between 1943 and 2013 (KJC 2015a and 2015c). The AVGB has been in an overdraft condition (i.e., withdrawals exceeding recharge) since the 1930s, with associated reductions in groundwater levels. Three exploratory borings were conducted in the vicinity of the proposed Recharge Site as part of the proposed Project percolation testing program. These borings extended to maximum depths of 21.5 feet below the surface and no groundwater was encountered, although it is noted that local groundwater levels "…could vary depending upon the seasonal precipitation and possible groundwater pumping activity in the site vicinity…" (KJC 2015a). Additional description of local groundwater conditions and characteristics is provided in Section 3.6, *Hydrology and Water Quality*.

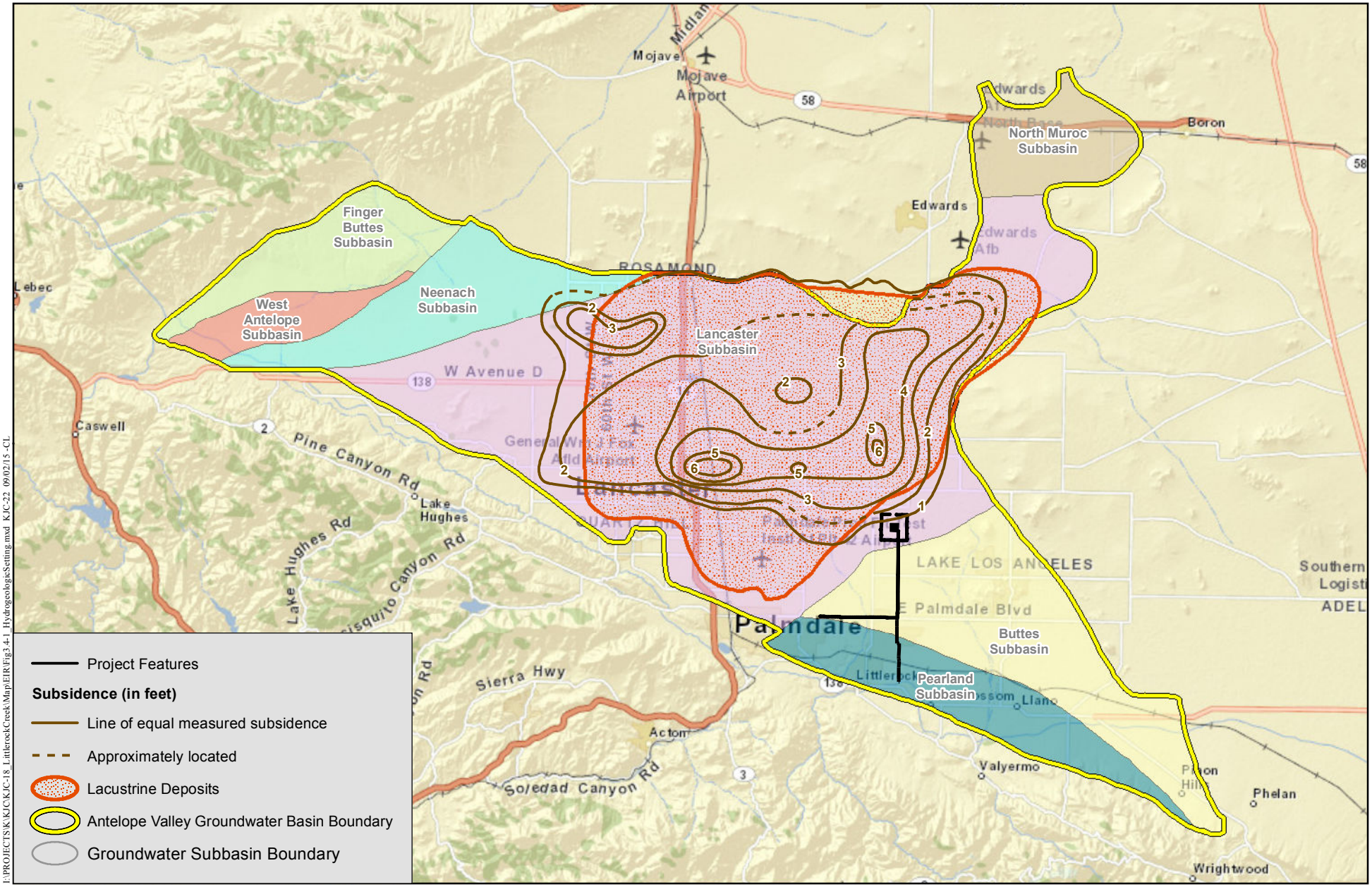
Regional Structure/Seismicity

The proposed Project site is within a broad, seismically active region dominated structurally by the San Andreas Fault Zone and related faults (Figure 3.4-2, *Regional Fault Map*). No active or potentially active faults, or CGS Earthquake Fault Zones, are mapped or known to occur within or adjacent to the proposed Project site and vicinity (CGS 2010, 2007). Active faults are defined as those exhibiting historic seismicity or displacement of Holocene materials, while potentially active faults have no historic seismicity and displace Pleistocene but not Holocene strata. The principal active fault in the proposed Project vicinity is the Mojave Segment of the San Andreas Fault, located approximately three miles to the south at its closest point. This segment of the San Andreas Fault ruptured during the 1857 Fort Tejon earthquake, and is considered the predominant source of potential future earthquake activity in the proposed Project vicinity (CGS 2003). The described CGS fault zone designations are generally intended to "…regulate development near active faults so as to mitigate the hazard of surface fault rupture…" (CGS 2007). The closest CGS Earthquake Fault Zone designations to the proposed Project site are located along the described nearby segments of the San Andreas Fault Zone approximately three miles to the south. Additional active and potentially active faults in the general proposed Project site vicinity include: (1) the Llano Fault, approximately 6 miles to the east; (2) the Mirage Valley Fault, approximately 14 miles to the northeast; (3) the Blake Ranch Fault, approximately 17 miles to the northeast; (4) the San Gabriel Fault, approximately 18 miles to the south; (5) the Garlock Fault, approximately 32 miles to the northwest; and (6) the Helendale Fault, approximately 40 miles to the east (CGS 2010).

The proposed Project site, like much of southern California, is located within a Seismic Zone 4 designation. Seismic Zone 4 is the highest risk category of the four nationwide seismic zones, and generally reflects locations with a 10 percent chance of experiencing an earthquake-generated peak ground acceleration (PGA), or ground shaking, level of 0.4g within the next 50 years (where g equals the acceleration due to gravity). For comparison purposes, Seismic Zone 1 (the lowest risk category) exhibits a 10 percent chance of experiencing an earthquake-generated PGA of 0.1g within the next 50 years. Based on modeling conducted by the CGS for a magnitude 7.8 earthquake along proximal segments of the San Andreas Fault Zone, estimated on-site PGA levels a with a 10 percent chance of being exceeded within the next 50 years are summarized as follows: (1) approximately 0.35g to 0.65g for firm rock conditions; (2) approximately 0.38g to 0.71g for soft rock conditions; and (3) approximately 0.42g to 0.68g for alluvial conditions (CGS 2003). Additional discussion of potential hazards associated with on-site ground shaking levels is provided below in Section 3.4.3.

Regulatory Setting

Development of the proposed Project is subject to a number of regulatory requirements and industry standards related to potential geologic hazards. These requirements and standards typically involve measures to evaluate risk and mitigate potential hazards through design and construction techniques. Specific guidelines encompassing geologic criteria that may be applicable to the design and construction of the proposed Project include: (1) the International Code Council, Inc. (ICC) International Building Code (IBC, most recent update), and the related California Building Code (CBC) (CCR, Title 24, Part 2, most recent update); (2) the Greenbook Committee of Standard Specifications for Public Works Projects (most recent update);



I:\PROJECTS\KJC\KJC-18_LittlerockCreek\Map\EIR\Fig3.4-1_HydrogeologicSetting.mxd KJC-22 09/02/15 -CL

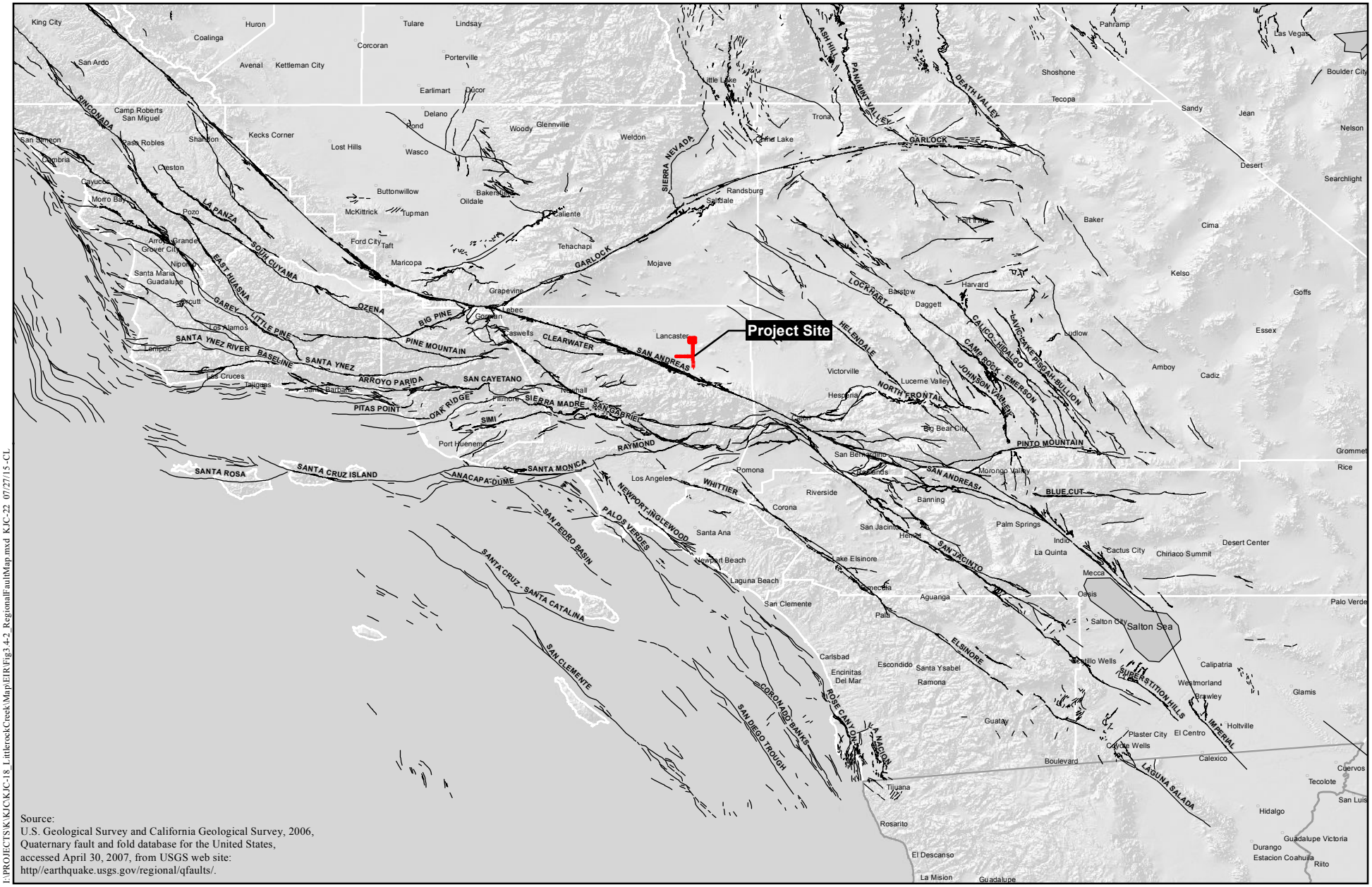
Source: Kennedy/Jenks 2015

Hydrogeologic Setting and Historical Subsidence in the Antelope Valley Groundwater Basin

PALMDALE REGIONAL GROUNDWATER RECHARGE AND RECOVERY PROJECT

HELIX Environmental Planning

Figure 3.4-1



Source:
U.S. Geological Survey and California Geological Survey, 2006,
Quaternary fault and fold database for the United States,
accessed April 30, 2007, from USGS web site:
http//earthquake.usgs.gov/regional/qfaults/.

I:\PROJECTS\K\KJC\KJC-18_Litterock Creek\Map\EIR\Fig3.4-2_RegionalFaultMap.mxd KJC-22 07/27/15-CL

Regional Fault Map

PALMDALE REGIONAL GROUNDWATER RECHARGE AND RECOVERY PROJECT

HELIX Environmental Planning

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Figure 3.4-2

(3) the California Seismic Hazards Mapping Act (PRC; Division 2, Chapter 7.8, Section 2690 et seq.); (4) the Alquist-Priolo Act (PRC Section 2621 et seq.); and (5) local standards, as applicable. Regulatory requirements related to potential erosion and sedimentation effects (i.e., under the NPDES) are discussed in Section 3.6 of this EIR, due to their relationship to water quality issues. Summary descriptions of the listed geologic standards are provided below, with specific elements applicable to the proposed Project discussed in Section 3.4.3.

International Building Code and Greenbook

The IBC (which encompasses the former Uniform Building Code [UBC]) is produced by the ICC (formerly the International Conference of Building Officials) to provide standard specifications for engineering and construction activities. Publication of the *Greenbook, the Standard Plans for Public Works Construction*, is under the oversight of Public Works Standards, Inc. (PWSI), a nonprofit mutual benefit corporation whose members include the American Public Works Association, Associated General Contractors of California and Engineering Contractors Association. The IBC and Greenbook provide standard specifications for engineering and construction activities, including measures to address geologic and soil concerns. Specifically, these measures encompass issues such as seismic loading (e.g., classifying seismic zones and faults), ground motion, engineered fill specifications (e.g., compaction and moisture content), expansive soil characteristics and pavement design. The referenced guidelines, while not comprising formal regulatory requirements per se, are widely accepted by regulatory authorities and are routinely included in related standards such as local grading codes. The IBC and Greenbook guidelines are regularly updated to reflect current industry standards and practices, including criteria such as the American Society of Civil Engineers (ASCE) and ASTM International (formerly the American Society for Testing and Materials [ASTM]).

State

California Building Code

The CBC encompasses a number of requirements related to geologic issues. Specifically, these include general provisions (Chapter 1); structural design, including soil and seismic loading (Chapters 16/16A); structural tests and special inspections, including seismic resistance (Chapters 17/17A); soils and foundations (Chapters 18/18A); concrete (Chapters 19/19A); masonry (Chapters 21/21A); wood, including consideration of seismic design categories (Chapter 23); construction safeguards (Chapter 33); and grading, including excavation, fill, drainage and erosion control criteria (CBC Appendix J). The CBC encompasses standards from other applicable sources, including the IBC and ASTM International, with appropriate amendments and modifications to reflect site-specific conditions and requirements in California.

California Seismic Hazards Mapping Act

The California Seismic Hazards Mapping Act provides a statewide seismic hazard mapping and technical advisory program to assist local governments in protecting public health and safety relative to seismic hazards. The act provides direction and funding for the State Geologist to compile seismic hazard maps and to make those maps available to local governments. The Act,

along with related standards in the Seismic Hazards Mapping Regulations (CCR Title 14, Division 2, Chapter 8, Article 10, Section 3270 et seq.), also directs local governments to require the completion and review of appropriate geotechnical studies prior to approving development projects. These requirements are implemented on a local level through means such as general plan directives and regulatory ordinances.

Alquist-Priolo Earthquake Fault Zoning Act

The Alquist-Priolo Act (PRC Section 2621 et seq.) is intended to prevent the construction of buildings used for human occupancy on the surface trace of active faults. The law requires the State Geologist to establish regulatory zones known as Earthquake Fault Zones (previously called Special Studies Zones and Fault-Rupture Hazard Zones) around the surface traces of active faults, and to distribute maps of these zones to all affected cities, counties and state agencies. The Act also requires completion of a geologic investigation prior to project approval, to demonstrate that applicable structures will not be constructed across active faults and/or that appropriate setbacks from such faults (generally 50 feet) are included in the project design.

Local Standards

The County of Los Angeles and the cities of Palmdale and Lancaster have adopted standards to address geology and soils related issues. Local standards are implemented through requirements such as general plan elements, ordinances and codes, and typically reflect the previously described federal, state and industry standards. While PWD is typically exempt from local requirements, the proposed Project design and implementation will include measures to provide conformance with applicable local regulations wherever practical. Applicable local standards that will be reflected in the Project design and implementation as appropriate include the following:

- The County of Los Angeles General Plan Safety Element (1990); and Grading Code (Title 26, County of Los Angeles Building Code, Appendix J).

- The City of Palmdale General Plan Safety Element (1993); Engineering Design Standards (1991); and Grading Permit (Section 8.04.265, Chapter 70, Excavation and Grading, Palmdale Municipal Code).

- The City of Lancaster General Plan, Plan for Public Health and Safety (2009); and Grading Ordinance (Ordinance No. 2225, Title 15, Building Code, Lancaster Municipal Code).

3.4.2 Significance Thresholds

The PWD utilizes CEQA Guidelines Appendix G for criteria to determine significant impacts. Accordingly, the following significance thresholds are used (with potential impacts related to erosion addressed in Section 3.6 of this EIR as previously noted).

The Project would result in a significant or potentially significant impact if it would:

- Expose people or structures to potential substantial adverse effects, including the risk of loss, injury or death involving:

  i. Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area, or based on other substantial evidence of a known fault (refer to CGS Special Publication 42);

  ii. Strong seismic ground shaking;

  iii. Seismic related ground failure, including liquefaction; or

  iv. Landslides.

- Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse.

- Be located on expansive soil, as defined in Section 1803.5.3 of the CBC, creating substantial risks to life or property.

- Have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater.

3.4.3 Impact Analysis

Ground Rupture

Ground rupture from fault displacement and related effects such as lurching (i.e., the rolling motion of surface materials associated with passing seismic waves) can adversely affect surface and subsurface facilities such as structures, pipelines and wells. As previously described, no known active/potentially active faults or associated CGS Earthquake Fault Zones are located within or adjacent to the proposed Project site. Accordingly, the potential for earthquake-related ground rupture and/or related effects to impact proposed facilities/operations is considered generally low. Because the site and vicinity could encompass currently unknown active or potentially active faults and has not been subject to Project-specific geotechnical investigation, however, associated impacts are considered potentially significant. Mitigation is identified below in Section 3.4.4 to address these potential impacts, and entails completion of a detailed geotechnical analysis for proposed development to evaluate potential geologic hazards from ground rupture and identify associated standard remedial design and construction measures.

Seismic Ground Shaking

As described above in Section 3.4.1, the proposed Project site could potentially experience peak ground shaking values of up to approximately 0.7g in association with large earthquake events along major faults (particularly the nearby San Andreas Fault Zone). This level of ground shaking could potentially result in significant impacts to proposed facilities such as structures

and pipelines. Mitigation is identified below in Section 3.4.4 to address these potential impacts, and entails completion of a detailed geotechnical analysis for proposed development to evaluate potential geologic hazards from ground shaking and identify associated standard remedial measures.

Liquefaction and Related Effects

Liquefaction is the phenomenon whereby soils subjected to seismic (or other) ground shaking effects exhibit a loss of shear strength and demonstrate fluid-like flow behavior due to excess pore pressure. Loose, granular and saturated soils with relative densities of less than approximately 70 percent are most susceptible to these effects, with liquefaction potential greatest at depths of less than approximately 50 feet. Surface and near surface manifestations from these events can include loss of support for structures/foundations, pavement and pipelines; excessive dynamic settlement; and other effects such as lateral spreading (i.e., horizontal displacement on sloped surfaces as a result of underlying liquefaction). Based on the previously described assessment of the local seismic environment, the CGS conducted an evaluation of liquefaction potential that includes the proposed Project site and vicinity (CGS 2003). This analysis concluded that many of the described alluvial and fluvial deposits present in the proposed Project site and vicinity are susceptible to liquefaction under appropriate seismic and groundwater conditions. Specifically, while shallow groundwater was not observed in on-site areas subject to exploratory borings, local levels in other portions of the site may vary, particularly if perched groundwater is present (with perched groundwater generally consisting of one or more unconfined aquifers supported by impermeable or semi-permeable strata, and variable with conditions including seasonal precipitation). Based on the described stratigraphic and seismic conditions in the proposed Project site vicinity, as well as the fact that the presence/level of groundwater in much of the site has not been verified, potential impacts from liquefaction and related effects would be potentially significant. Mitigation is identified below in Section 3.4.4 to address these potential impacts, and entails completion of a detailed geotechnical analysis for proposed development to evaluate potential geologic hazards related to liquefaction and identify associated standard remedial design and construction measures.

Landslides

The occurrence of landslides and other types of slope failures (e.g., rock falls) is influenced by a number of factors, including slope grade, geologic and soil characteristics, moisture levels and vegetation cover. Landslides can be triggered by a variety of potentially destabilizing conditions or events, such as gravity, fires, precipitation, grading and seismic activity. As described above in Section 3.4.1, the proposed Project site and vicinity exhibit primarily level terrain, with the nearest areas of substantial topography located approximately 2 miles to the east (Alpine Butte) and 3 miles to the south (the San Gabriel Mountains). Based on the described conditions, as well as the fact that many of the proposed facilities would be located underground (i.e., pipelines), potential impacts to the proposed Project from off-site landslides are considered less than significant. It should also be noted that assessment of landslide hazards is a standard element of geotechnical investigation, and would be evaluated as part of the detailed geotechnical analysis outlined below in Section 3.4.4.

The proposed Project would also involve the construction of manufactured slopes in association with the recharge basins and soil stockpile, with associated potential slope failure impacts addressed below under the discussion of Geologic and Soil Instability.

Geologic and Soil Instability

Implementation of the proposed Project could potentially result in impacts associated with geologic and soil instability. Specifically, this could involve issues related to manufactured slopes, trench excavations, compressible/collapsible soils, subsidence, and corrosive soils as outlined below. Potential instability issues involving off-site landslides, seismically-induced liquefaction and related effects are addressed above in this section.

Manufactured Slopes

While many of the proposed Project facilities would be located underground and/or would not entail the construction of manufactured slopes, the proposed recharge basins would include earthen embankments with maximum heights of approximately eight feet and maximum grades of 3:1 (horizontal to vertical). The interior embankment slopes would be lined with shotcrete to enhance stability (KJC 2015b), although the exterior (and potentially interior) slopes could be subject to significant impacts related to instability (i.e., slope failure) and mitigation is identified below in Section 3.4.4 to address these potential impacts. The soil stockpile that would occur on the Recharge Site as a result on maintenance activities associated with the recharge basins would also be subject to significant impacts related to instability and mitigation is identified below in Section 3.4.4 to address these potential impacts. As previously described, this would entail completion of a detailed geotechnical analysis for proposed development to evaluate potential hazards related to manufactured slope instability and identify associated standard remedial design and construction measures (with potential erosion/sedimentation issues on manufactured slopes and other areas addressed in Section 3.6 as previously noted). The temporary percolation ponds associated with the Recovery Wells would also include earthen embankments, although no associated significant impacts related to slope instability would result due to their small scale (maximum heights of approximately 3 feet) and temporary nature (refer to Section 2.5.1, *Project Activities*).

Trench Excavations

The proposed Project would require the excavation of relatively large trenches to accommodate the construction and installation of pipelines up to 36 inches in diameter. These excavations would be required to conform with applicable federal and state safety requirements (e.g., U.S. Occupational Safety and Health Administration [OSHA] and California Occupational Safety and Health Administration [Cal-OSHA] standards), which identify related measures for trench dimensions and shoring. Accordingly, potential impacts related to the stability of trench excavations are considered significant, and related mitigation is identified below in Section 3.4.4 to address these potential impacts. As previously described, this would entail completion of a detailed geotechnical analysis for proposed development to evaluate potential hazards related to trench instability and identify associated standard remedial design and construction measures.

Compressible/Collapsible Soils

A number of on-site materials may potentially be compressible under loading, including alluvial deposits. In addition, portions of these materials may also be susceptible to hydro-collapse, a process in which loose, dry soils undergo rapid consolidation (collapse) when wetted. The potential occurrence of compressible and/or collapsible soils could result in hazards such as differential settlement (different degrees of settlement over relatively short distances), with associated significant potential effects to facilities including structures and pipelines. Mitigation is identified below in Section 3.4.4 to address these potential impacts, and entails completion of a site-specific geotechnical analysis for proposed development to evaluate potential geologic hazards related to compressible/collapsible soils and identify associated standard remedial design and construction measures.

Subsidence

Potential impacts related to subsidence are typically associated with conditions such as groundwater (or other fluid) withdrawal and/or loading related to the placement of larger surface structures. The Project Feasibility Study (KJC 2015a) provides a preliminary analysis of potential subsidence issues associated with the implementation of groundwater recharge alternatives (including the proposed Project), along with an assessment of historic subsidence related to groundwater withdrawal in the AVGB. Specifically, subsidence in the AVGB has occurred primarily in the Lancaster subbasin, with observed land subsidence of up to approximately 6.6 feet in the central portion of the subbasin, and between approximately 1 and 2 feet in the northern portion of the proposed Project site (near the recharge basins, refer to Figure 3.4-1). This subsidence is attributed to historic groundwater withdrawals of up to approximately 400,000 AFY during the 1940s to 1960s, which exceeded the recharge rate of approximately 30,000 AFY (KJC 2015a). Associated subsidence modeling was conducted for the proposed Project as part of the previously described Feasibility Study and updated groundwater model. These analyses include applicable elements from previous hydrogeologic studies and models conducted for the AVGB, as well as modifications to reflect site-specific conditions (i.e., a smaller extent) and increased resolution (from reduced model grid spacing, with detailed descriptions provided in the Project Feasibility Study and updated groundwater model [KJC 2015a and 2015c]). The Feasibility Study analysis identified potential Project-related subsidence of up to approximately 0.1 foot (1.2 inches) in the vicinity of the proposed Recharge Site, while the more current and detailed groundwater model update concludes that the proposed Project would "…not…lead to appreciable land subsidence." (KJC 2015c). Based on these conclusions and the fact that the proposed Project would entail controlled groundwater recharge and recovery (with no substantial surface development/ loading), associated potential subsidence impacts would be less than significant. As noted above for landslides, however, assessment of subsidence hazards is a standard element of geotechnical investigation, and the noted results from the Project Feasibility Study and updated groundwater model would be evaluated and verified (or modified as necessary) as part of the detailed geotechnical analysis outlined below in Section 3.4.4.

Corrosive Soils

Based on existing soil survey data and geotechnical investigations conducted for other (unrelated) facilities in the proposed Project vicinity (including an area that crosses the proposed Raw Water/Return Water Pipeline), alluvial soils mapped within and adjacent to the site exhibit generally low to moderate corrosion potential (USDA/SCS 1970, KJC 2015b). Specifically, the noted geotechnical investigations identified the following data related to corrosive soil potential: (1) pH levels ranging between 7.4 and 8.1; (2) soluble sulfate levels of between 4.6 and 307 parts per million (ppm); (3) soluble chloride levels ranging from 1.2 to 33 ppm; and (4) saturated resistivity levels (i.e., the ability to restrict, or resist, electric current) of between 1,400 and 4,400 ohms centimeter (Ohm-cm). Based on these levels, the associated investigations concluded that the subject soils exhibit a generally moderate corrosive potential (KJC 2015b). The proposed Project design includes corrosion protection for pipelines through measures such as cement mortar coating, bonding rubber ring joints (for electrical conductivity), and installation of test stations (KJC 2015b). Long-term exposure of proposed Project facilities to corrosive soils, however, could potentially result in significant impacts related to deterioration and eventual failure of concrete (from sulfate) and metal (from pH, chloride and resistivity) structures, including foundations, reinforcing steel and subsurface pipelines. Mitigation is identified below in Section 3.4.4 to address these potential impacts, and entails completion of a site-specific geotechnical analysis for proposed development, including evaluation of potential corrosion hazards, and identification of associated standard remedial design and construction measures.

Expansive Soils

Expansive (or shrink-swell) behavior in soils is attributable to the water-holding capacity of clay minerals, and can adversely affect the integrity of facilities such as foundations, pavement and underground pipelines. While mapped alluvial soils in the proposed Project site and vicinity are generally identified as exhibiting low expansion potential (USDA/SCS 1970), a number of these materials (as well as lacustrine deposits) may locally exhibit higher clay content and related expansion potential. Accordingly, impacts from expansive soils would be potentially significant, and mitigation is identified below in Section 3.4.4 to address these potential impacts. As previously described, this would entail completion of a detailed geotechnical analysis for proposed development to evaluate potential hazards related to expansive soils and identify associated standard remedial design and construction measures.

Wastewater Disposal Systems

The Potable Water Pump Station would include a restroom facility in the control room, which would require an on-site septic tank and leach field. The proposed septic system/leach field facilities are not anticipated to result in significant effects to groundwater quality, based on the small-scale nature of the proposed system, the presence of extensive alluvial deposits in the proposed Project site area (which are anticipated to be suitable for septic system operation), and the anticipated lack of shallow groundwater or bedrock (as discussed above and in Section 3.6). Due to the preliminary nature of proposed Project design features and related (e.g., percolation) analyses conducted as part of the described Feasibility Study, however (KJC 2015a), potential

impacts related to septic system operation are considered significant and related mitigation is provided in Section 3.6 based on the relationship of this issue to groundwater quality.

3.4.4 Mitigation Measures

As described above in Section 3.4.3, implementation of the proposed Project would result in a number of potentially significant impacts related to geology and soils. Accordingly, the following mitigation is provided to address those issues, and would (along with related mitigation for septic system operation in Section 3.6) avoid or reduce all identified geology and soils impacts below a level of significance.

MM GEO-1: Conduct Site-specific Geotechnical Investigation

A site-specific geotechnical investigation shall be completed for the proposed Project prior to final Project design approval. This investigation shall identify appropriate site-specific criteria related to considerations such as grading, excavation, fill, and structure/facility design. Applicable results and recommendations from the geotechnical investigation (including on-the-ground geotechnical observations and testing to be conducted during the proposed Project excavation, grading and construction activities) shall be incorporated into the associated proposed Project design documents to address identified potential geologic and soil hazards. Specifically, this shall include, but is not necessarily limited to, the following potential hazards: ground rupture; ground acceleration (ground shaking); soil liquefaction (and related issues such as dynamic settlement and lateral spreading); landslides; geologic and soil instability (including manufactured slopes, trench excavations, compressible/collapsible soils, subsidence [based on review/verification or, if applicable, modification of the conclusions in the proposed Project updated groundwater model], and corrosive soils); and expansive soils. The final proposed Project design documents shall also encompass applicable standard design and construction practices from sources including the CBC, IBC/Greenbook, and (as appropriate) City/County standards, along with the results and recommendations of plan review by the PWD and on-the-ground geotechnical observations and testing (with related requirements to be included in applicable engineering/design drawings and construction contract specifications). A summary of the types of remedial measures typically associated with identified potential geologic and soil hazards, pursuant to applicable regulatory and industry standards (as noted), is provided below. The remedial measures identified/recommended as part of the described site-specific geotechnical investigation shall take priority over the more general types of standard regulatory/industry measures listed below.

- Ground Rupture: (1) locate (or relocate) applicable facilities away from known active (or potentially active) faults and outside of associated CGS Earthquake Fault Zones; and (2) require appropriate (typically 50-foot) building exclusion buffers on either side of applicable fault traces.

- Ground Acceleration (Ground Shaking): (1) incorporate applicable seismic loading factors (e.g., IBC/CBC criteria) into the design of facilities such as structures, pavement, pipelines, manufactured slopes, and drainage facilities; (2) use remedial grading techniques where appropriate (e.g., removing/replacing and/or reconditioning unsuitable soils); and (3) use properly engineered fill per applicable industry/regulatory standards

(e.g., IBC/CBC), including criteria such as appropriate fill composition, placement methodology, compaction levels, and moisture content.

- Liquefaction and Related Effects: (1) remove unsuitable soils and replace with engineered fill (as previously described), per applicable regulatory/industry standards (e.g., IBC/CBC); (2) employ measures such as deep soil mixing (i.e., introducing cement to consolidate loose soils) or use of subsurface structures (e.g., stone columns or piles) to provide support (i.e., by extending structures into competent underlying units); (3) install subdrains in appropriate areas to avoid or reduce near-surface saturation; and (4) design for potential settlement of liquefiable materials through means such as use of post-tensioned foundations and/or flexible couplings for pipeline connections.

- Landslides: (1) replace susceptible deposits with stabilized fill where appropriate; and (2) incorporate structures such as retaining walls and buttresses where appropriate to provide support.

- Geologic and Soil Instability: (1) use standard efforts such as over-excavation and recompaction or replacement of unsuitable soils with engineered fill; (2) employ applicable slope grade and/or height limitations, landscaping/irrigation design, and slope drainage controls per established regulatory/industry standards (e.g., IBC/CBC); (3) limit trench slope grades as appropriate to reflect local conditions (e.g., dry or cohesive soils, and seepage); (4) use appropriate trench shoring per applicable regulatory requirements (CBC, OSHA and/or Cal-OSHA); (5) use engineered fill, subdrains, surcharging (i.e., loading prior to construction to induce settlement) and/or settlement monitoring (e.g., through the use of settlement monuments) in appropriate areas (e.g., areas of identified subsidence potential); (6) implement groundwater withdrawal monitoring/ restrictions per established legal/regulatory/industry standards (if applicable); and (7) remove unsuitable (corrosive) deposits and replace with non-corrosive fill, use corrosion-resistant construction materials (e.g., corrosion-resistant concrete and coated or non-metallic facilities), and install cathodic protection devices (e.g., use of a more easily corroded "sacrificial metal" to serve as an anode and draw current away from the structure to be protected) per established regulatory/industry standards (e.g., IBC/CBC).

- Expansive Soils: (1) replace and/or mix expansive materials with non-expansive fill; and (2) cap expansive soils in place with an appropriate thickness of non-expansive fill per established regulatory/industry standards (e.g., IBC/CBC).

3.4.5 Conclusions

Based on the implementation of the mitigation described in Sections 3.4.4 and 3.6.4 (i.e., for septic system operation), all identified Project-related impacts associated with geology and soils would be avoided or reduced below a level of significance, with no significant unavoidable adverse impacts.

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3.5 GREENHOUSE GAS EMISSIONS

This section identifies and evaluates the proposed Project's potential to have adverse effects related to GHG emissions during construction and operation.

3.5.1 Existing Conditions

Climate change refers to any significant change in measures of climate, such as average temperature, precipitation, or wind patterns over a period of time. Climate change may result from natural factors, natural processes, and human activities that change the composition of the atmosphere and alter the surface and features of the land. Significant changes in global climate patterns have recently been associated with global warming, which is an average increase in the temperature of the atmosphere near the Earth's surface; this is attributed to an accumulation of GHG emissions in the atmosphere. GHGs trap heat in the atmosphere, which, in turn, increase the Earth's surface temperature. Some GHGs occur naturally and are emitted to the atmosphere through natural processes, while others are created and emitted solely through human activities. The emission of GHGs through fossil fuel combustion in conjunction with other human activities appears to be closely associated with global warming (OPR 2008).

As defined under California's Assembly Bill (AB) 32, GHGs include carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF_6). Although water vapor is the most abundant and variable GHG in the atmosphere, it is not considered a pollutant; it maintains a climate necessary for life.

GHGs have long atmospheric lifetimes that range from one year to several thousand years. Long atmospheric lifetimes allow for GHGs to disperse around the globe. Because GHGs vary widely in the power of their climatic effects, climate scientists have established a unit called global warming potential (GWP). The GWP of a gas is a measure of both potency and lifespan in the atmosphere as compared to CO_2. For example, because methane and N_2O are approximately 25 and 298 times more powerful than CO_2, respectively, in their ability to trap heat in the atmosphere, they have GWPs of 25 and 298, respectively (CO_2 has a GWP of 1). Carbon dioxide equivalent (CO_2e) is a measurement that enables all GHG emissions to be considered as a group despite their varying GWP. The GWP of each GHG is multiplied by the prevalence of that gas to produce CO_2e. The atmospheric lifetime and GWP of selected GHGs are summarized in Table 3.5-1, *Global Warming Potentials and Atmospheric Lifetimes.* As shown in the table, the GWP for common GHGs ranges from 1 (CO_2) to 22,800 (SF_6).

Table 3.5-1
GLOBAL WARMING POTENTIALS AND ATMOSPHERIC LIFETIMES

Greenhouse Gas	Atmospheric Lifetime (years)	Global Warming Potential (100-year Time Horizon)
Carbon Dioxide (CO_2)	50-200	1
Methane (CH_4)	12	25
Nitrous Oxide (N_2O)	114	298
HFC-134a	14	1,430
PFC: Tetraflouromethane (CF_4)	50,000	7,390
PFC: Hexafluoroethane (C_2F_6)	10,000	12,200
Sulfur Hexafluoride (SF_6)	3,200	22,800

Source: IPCC 2007
HFC: hydrofluorocarbon; PFC: perfluorocarbon

AB 32, the California Global Warming Solutions Act of 2006, recognizes that California is the source of substantial amounts of GHG emissions. The statute states that:

> Global warming poses a serious threat to the economic wellbeing, public health, natural resources, and the environment of California. The potential adverse impacts of global warming include the exacerbation of air quality problems, a reduction in the quality and supply of water to the state from the Sierra snowpack, a rise in sea levels resulting in the displacement of thousands of coastal businesses and residences, damage to marine ecosystems and the natural environment, and an increase in the incidences of infectious diseases, asthma, and other human health-related problems.

In order to avert these consequences, AB 32 establishes a State goal of reducing GHG emissions to 1990 levels by the year 2020, which is a reduction of approximately 16 percent from forecasted emission levels, with further reductions to follow (CARB 2014).

The northern portion of the proposed Project site, which encompasses the Recharge and Distribution Sites and Recovery Wells, is currently undeveloped and does not directly generate GHG emissions due to the absence of on-site water use, energy use, and vehicle trip generation. While the proposed pipeline alignments are located mostly within area roadways that include vehicle trips that generate GHG emissions, those trips are not attributable to the proposed Project.

3.5.2 Significance Thresholds

Given the relatively small levels of emissions generated by a typical project in relationship to the total amount of GHG emissions generated on a national or global basis, individual development projects are not expected to result in significant, direct impacts with respect to climate change. However, given the magnitude of the impact of GHG emissions on the global climate, GHG emissions from new development could result in significant, cumulative impacts with respect to climate change. Thus, the potential for a significant GHG impact is limited to cumulative impacts.

According to Appendix G of the CEQA Guidelines, a project would normally have a significant adverse environmental impact on air quality if it would:

- Generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment.

- Conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of GHGs.

The CEQA Guidelines require Lead Agencies to adopt GHG thresholds of significance. When adopting these thresholds, the amended Guidelines allow Lead Agencies to consider thresholds of significance adopted or recommended by other public agencies, or recommended by experts, provided that the thresholds are supported by substantial evidence, and/or to develop their own significance threshold.

The PWD has not yet adopted a significant threshold for GHGs. The AVAQMD's *CEQA and Federal Conformity Guidelines* (AVAQMD 2011) establish significance thresholds to assess the impact of Project-related GHG emissions in the AVAQMD. The AVAQMD GHG Significance Threshold is 100,000 tons of CO_2e per year for long-term operational and short-term construction emissions. A project with emissions rates below this threshold is considered to have a less than significant effect on climate change.

3.5.3 Impact Analysis

GHG Emissions

GHG emissions from Project construction and operation are assessed using the California Emission Estimator Model (CalEEMod), Version 2013.2.2 (SCAQMD 2013). CalEEMod is a computer model developed by SCAQMD with the input of several air quality management and pollution control districts to estimate emissions from various urban land uses (SCAQMD 2013). CalEEMod has the ability to calculate mobile (i.e., vehicular), area source, and energy source emissions. CalEEMod allows land use selections that include project land use types, sizes, and metric specifics.

Construction

The principal source of GHG emissions during construction of the proposed Project would be the internal combustion engines of construction equipment, on-road construction vehicles, and workers' commuting vehicles.

For modeling purposes, it was assumed construction of the Project would commence in the summer of 2017 and require approximately 21 months to complete. It was also assumed construction activities would occur during normal working hours Monday through Friday with the exception of Recovery Well drilling and testing activities, which would occur 24 hours per day, 7 days per week from July 2017 through January 2018. As described in Section 2.0, *Project Description*, construction of the proposed project would occur in five phases: Recovery Well drilling, Recovery Well equipping, pipelines and SWP Turnout, Recharge Site, and

Distribution Site. The proposed Project construction emissions were estimated using the assumptions provided in Table 2-2.

Emissions of GHGs related to the construction of the proposed Project would be temporary. As shown in Table 3.5-2, *Annual GHG Construction Emissions*, based on emission estimates from CalEEMod for heavy construction equipment, total GHG emissions associated with construction are estimated at 1,703 tons of CO_2e for the duration of construction. The CalEEMod output showing construction equipment assumptions and detailed emissions are included in Appendix D of this EIR.

Table 3.5-2
ANNUAL CONSTRUCTION GHG EMISSIONS (Tons)

Year	CO_2e
2017	917
2018	760
2019	27
Total Emissions	1,703[1]
Amortized Construction Emissions[2]	57

Source: CalEEMod (output data is provided in Appendix D)
[1] The total presented is the sum of the unrounded values.
[2] Construction emissions are amortized over 30 years.

GHG emissions reduction measures for construction equipment are relatively limited. Therefore, in its *Draft Guidance Document – Interim CEQA Greenhouse Gas (GHG) Significance Thresholds*, the SCAQMD recommends that construction emissions be amortized over a 30-year Project lifetime so that GHG reduction measures would address construction GHG emissions as part of the operational GHG reduction strategies (SCAQMD 2008). That methodology is used in this analysis, and there is no quantitative evaluation of significance for construction impacts. Instead, the construction GHG emissions are included in the total operational GHG emissions from the proposed Project, as discussed below.

Operations

Long-term activities for the proposed Project would consist of maintenance. An operator would visit the Recharge Site and Distribution Site on a daily basis. Removal of debris in Recovery Well site blow-offs would occur on a quarterly basis, while removal of accumulated sediment would occur on an annual basis. The proposed pumps would be housed inside the Pump Station Building at the Distribution Site, requiring minimal maintenance. Weekly water softener cylinders would be changed by an outside vendor. Salt would be delivered (via one 10- to 14-ton truck) on a quarterly basis and blown into the on-site combination brine saturator and salt storage tank. The emissions from mobile sources were calculated using CalEEMod default trip lengths and emission factors from EMFAC2011.

The primary source of operational GHG emissions associated with the proposed Project is energy use at the Potable Water Pump Station. Projects that increase electricity consumption

also result in an indirect increase in GHG emissions. The generation of electricity through the combustion of fossil fuels typically yields CO_2, and to a much smaller extent, methane and nitrous oxide. As described in Section 2.0, the Potable Water Pump Station would operate continuously to meet PWD's potable demands. At full build-out, the Potable Water Pump Station would include a total of six 400-horsepower pumps. For the purposes of this analysis it is assumed all six pumps would operate at full capacity year-round and result in an energy consumption of 15.7 million kilowatt-hours per year.

As shown in Table 3.5-3, *Annual Operational GHG Emissions (Tons)*, the total combined operational and amortized construction emissions is 5,026 tons of CO_2e, which is below the AVAQMD threshold of significance. Therefore, impacts would be less than significant, and no mitigation is required.

Table 3.5-3
ANNUAL OPERATIONAL GHG EMISSIONS (Tons)

Emissions Source	CO_2e
Area	<0.5
Energy	4,965
Mobile	4
Total Operational Emissions	4,969
Amortized Construction (Table 3.5-2)	57
Total Annual Emissions	5,026
AVAQMD Annual Thresholds	*100,000*
Exceeds AVAQMD Thresholds?	No

Source: AVAQMD 2011 (thresholds). See Appendix D for calculations.

Consistency with Applicable Plans, Policies, and Regulations

There are numerous State plans, policies and regulations adopted for the purpose of reducing GHG emissions. The principal overall State plan and policy is AB 32, the California Global Warming Solutions Act of 2006. The quantitative goal of AB 32 is to reduce GHG emissions to 1990 levels by 2020. Statewide plans and regulations such as GHG emissions standards for vehicles (AB 1493), the Low Carbon Fuel Standard (LCFS), and regulations requiring an increasing fraction of electricity to be generated from renewable sources are being implemented at the statewide level; as such, compliance at the project level is not addressed. Therefore, the proposed Project does not conflict with those plans and regulations.

As previously discussed, the increase in GHG emissions would be less than the AVAQMD significance threshold being applied to this analysis. Implementation of the proposed Project would not conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing GHG emissions. This would represent a less than significant impact.

3.5.4 Mitigation Measures

The proposed Project would not result in a significant GHG impact. Therefore, no mitigation measures are required.

3.5.5 Conclusions

Project GHG emissions during construction and operations would remain below the AVAQMD emissions threshold. Implementation of the proposed Project would not conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing GHG emissions.

3.6 HYDROLOGY AND WATER QUALITY

This section describes and analyzes hydrologic and water quality conditions, associated potential effects to surface and groundwater resources, and related design and/or mitigation measures to address potential impacts associated with development of the proposed Project. A number of technical analyses applicable to hydrology and water quality concerns have been prepared for the proposed Project by KJC, including the following: (1) a Feasibility Study to evaluate several potential Project design alternatives, including an alternative essentially the same as the proposed Project (KJC 2015a); (2) a Preliminary Design Report (PDR), which provides design, operational, cost and related information (e.g., permit/easement requirements) for the proposed Project (KJC 2015b); and (3) a Project-specific groundwater model to update preliminary modeling conducted as part of the Feasibility Study (KJC 2015c). The Feasibility Study includes descriptions of regional/local hydrogeologic conditions, as well as technical evaluations for potential groundwater-related issues including water banking needs, groundwater and related water quality modeling, percolation testing, and resistivity analysis (to determine bedrock depths). The Project-specific groundwater model was prepared to update the groundwater model conducted as part of the Feasibility Study, based on site-specific Project and aquifer information and a current (2014) regional model prepared for the AVGB by the USGS. Applicable information from the referenced studies (and other pertinent sources) is included in the following analysis, with the Project Feasibility Study, PDR, and groundwater model included in Appendices B, C, and G, respectively, of this EIR. While this section is focused predominantly on hydrology/water quality conditions and related concerns within and adjacent to the areas proposed for development, portions of the analysis necessarily include a broader scope (e.g., regional drainage descriptions).

3.6.1 Existing Conditions

Watershed and Drainage Characteristics

The proposed Project site is located within the Antelope Hydrologic Unit (HU), one of 29 such drainage areas designated for the South Lahontan Hydrologic Basin in the 1995 (as amended) Lahontan RWQCB Water Quality Control Plan (Basin Plan). The Antelope HU is an irregularly shaped area of approximately 2,460 square miles located predominantly in southern Kern and northern Los Angeles counties (with minor portions of the HU also extending into western San Bernardino County). The HU is divided into a number of hydrologic areas (HAs) based on local drainage characteristics, with the Project site and vicinity located within portions of the Lancaster Buttes and Rock Creek HAs (Figure 3.6-1, *Project Location within Local Hydrologic Designations*). Surface drainage within the Antelope HU and related HAs is internal (i.e., does not exit the associated watersheds), and occurs primarily as unconfined (sheet or overland) flow and through a number of small to intermediate creeks including Littlerock Creek, Littlerock Wash, Big Rock Creek and Big Rock Wash in the proposed Project site vicinity. Specifically, Littlerock Creek originates in the San Gabriel Mountains approximately 12 miles south of the Project site, and continues generally north to Littlerock Reservoir (approximately 5.5 miles southwest of the proposed Project site). Downstream of the reservoir, the creek continues north/northeast as an intermittent drainage (Littlerock Wash) for approximately 22 miles (and extends through the western portion of the proposed Project site), before terminating at Rosamond Dry Lake approximately 11 miles northeast of the proposed Project site.

Big Rock Creek also originates in the San Gabriel Mountains approximately 14 miles southeast of the proposed Project site, and flows generally north/northwest before leaving the mountains near the community of Valyermo. This drainage then continues generally north as Big Rock Wash (an intermittent drainage), and flows towards Alpine Butte (east of the proposed Project site) before ultimately terminating in the vicinity of Rosamond and Rogers dry lakes. Littlerock and Big Rock washes are the principal drainage courses in the proposed Project site and immediate vicinity as noted, with additional site drainage provided through a number of smaller unnamed intermittent drainages and as overland flow. Surface flows within the proposed Project site and related watershed areas are associated primarily with seasonal storm events, and ultimately drain north before terminating in one or more dry lakes as described. Average annual precipitation in the general vicinity of the proposed Project site (Palmdale/Lancaster) is approximately 7.4 inches, with the majority of this precipitation (nearly 84 percent) occurring during the period of November through March (Melissadata.com 2015).

The proposed Project site and adjacent areas include undeveloped land, as well as low- to medium-density residential sites (and related commercial/institutional uses), agriculture, several small solar arrays, and two recycled water seasonal storage ponds (refer to Section 2.4, *Existing Setting and Land Uses*, for additional information). Existing drainage improvements in the site and vicinity are limited primarily to a number of bridge and culvert crossings of larger local drainages (i.e., Littlerock and Big Rock washes), although many local crossings are "at-grade" (including multiple crossings of Littlerock Wash along East Palmdale Avenue within the proposed Project site).

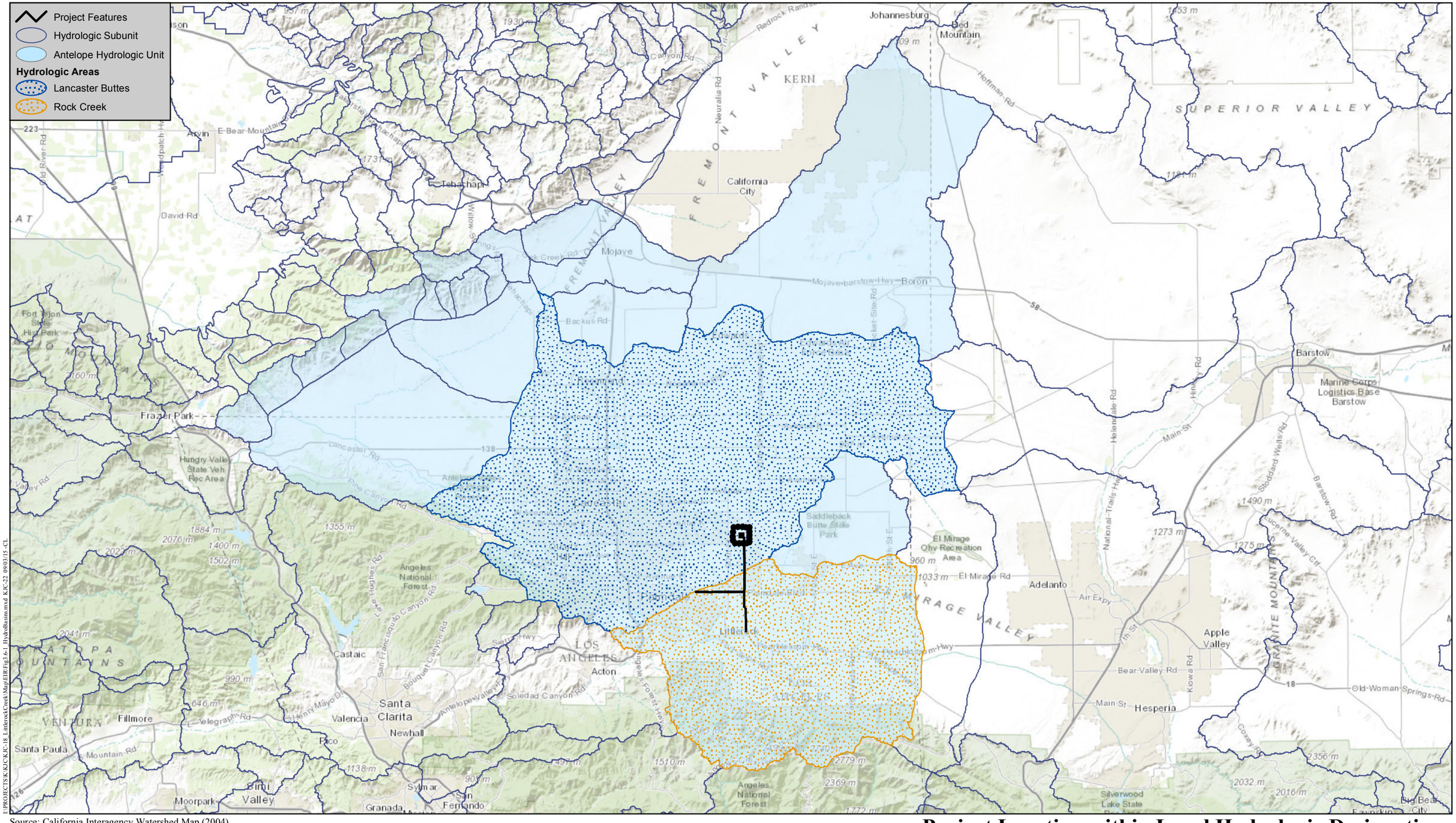
Flood Hazards

The proposed Project site and vicinity have been mapped for flood hazards by the Federal Emergency Management Agency (FEMA). Portions of the site are within areas of mapped 100-year floodplains[1] associated with portions of Big Rock and Littlerock washes, as depicted on Figure 3.6-2, *Project Site Location within Mapped FEMA 100-Year Floodplain*, and outlined below.

- The entire Recharge and Distribution Sites, as well as portions of the associated facilities (including the Potable Water Pump Station, recharge basins, several Recovery Wells, and applicable portions of the associated Raw Water/Return Water, Potable and Recycled Water pipelines), are located within a mapped 100-year floodplain associated with Big Rock Wash (FEMA 2008a through 2008d).

- An approximately 1.9-mile long segment of the proposed 30-inch Potable Water Pipeline and 36-inch Raw Water/Return Water Pipeline alignment along 105th Street East is located within a mapped 100-year floodplain associated with Big Rock Wash. Specifically, this pipeline segment begins at the Distribution Site, and ends approximately 400 feet north of East O Street (FEMA 2008b and 2008e).

[1] A 100-year floodplain is associated with a storm event defined as exhibiting a one percent chance of occurring in any given year (i.e., a 100-year storm).



I:\PROJECTS\KIC\KIC-18_LittlerockCreek\Map\EIR\Fig3.6-1_HydroBasins.mxd KIC-22 09/03/15 CL

Source: California Interagency Watershed Map (2004)

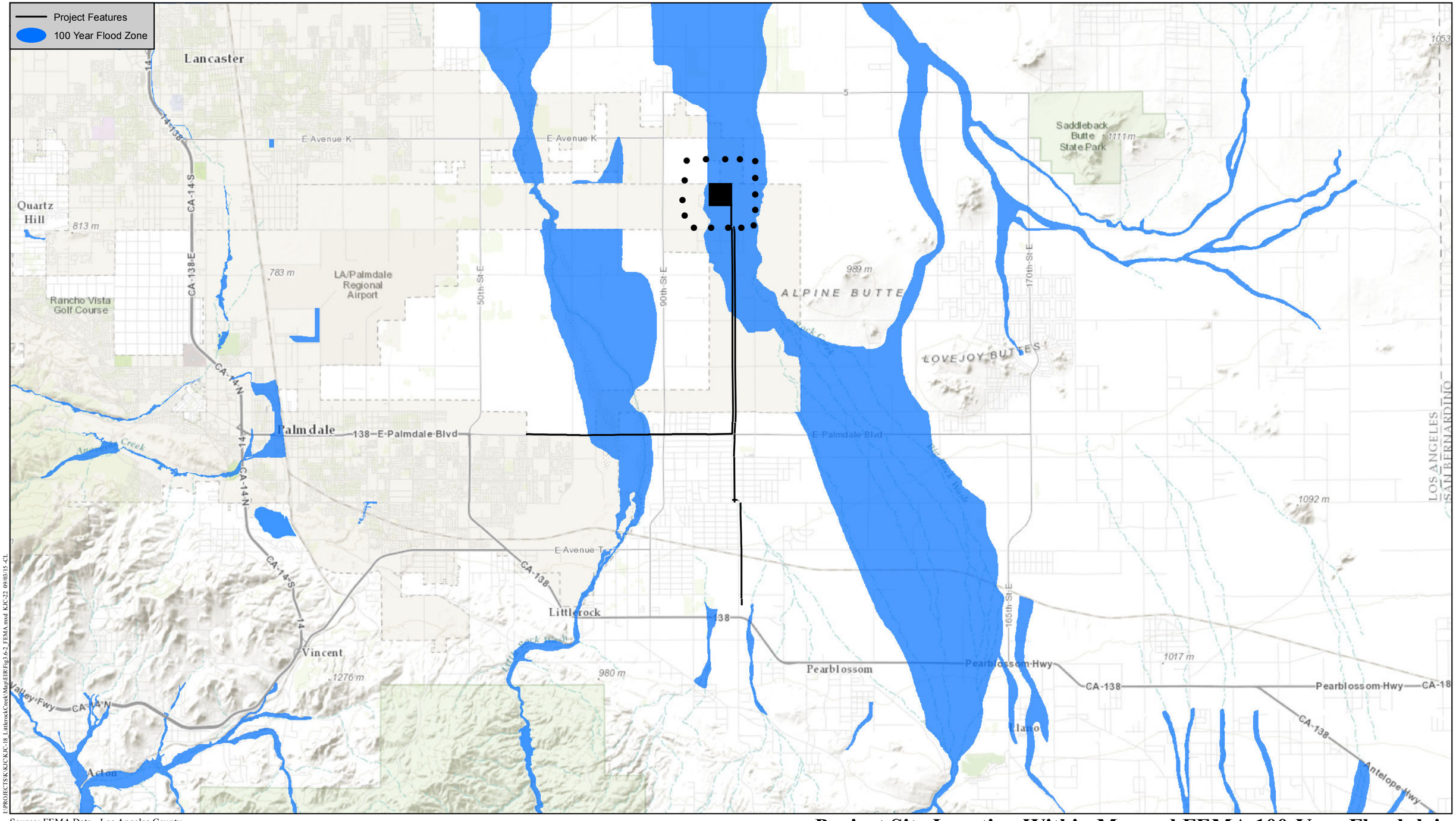
Project Location within Local Hydrologic Designations

PALMDALE REGIONAL GROUNDWATER RECHARGE AND RECOVERY PROJECT

HELIX Environmental Planning

0 8.5 Miles

Figure 3.6-1



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Source: FEMA Data - Los Angeles County

Project Site Location Within Mapped FEMA 100-Year Floodplain

PALMDALE REGIONAL GROUNDWATER RECHARGE AND RECOVERY PROJECT

HELIX Environmental Planning

0 2 Miles

Figure 3.6-2

- An approximately 1.4-mile long section of the proposed 30-inch Potable Water Pipeline alignment along East Palmdale Avenue is located within a mapped 100-year floodplain associated with Littlerock Wash. Specifically, this pipeline segment begins approximately 100 feet west of 87th Street East, and ends approximately 1,000 feet west of 75th Street East (FEMA, 2008f and 2008g).

The remainder of the site and adjacent areas are located outside of the mapped 100-year floodplain boundaries (FEMA 2008a through 2008h).

Groundwater

The proposed Project site is located within the AVGB, which includes an areal extent of approximately 1,580 square miles and a storage capacity of between approximately 68 to 70 million acre-feet (DWR 2004). The AVGB is topographically closed, with internal surface drainage as previously described and groundwater flow predominantly to the northeast and confined to within the AVGB boundaries (except for minor outflow in the northwestern-most area; Los Angeles County 2014b, KJC 2015a and 2015c). The AVGB is located within a structural depression and includes a thick sequence of alluvial deposits derived from the surrounding mountains, as well as local lacustrine (lake) deposits (refer to Section 3.4, *Geology and Soils*, for additional discussion of local geologic and stratigraphic conditions). A number of groundwater subbasins are associated with the AVGB, with the proposed Project site located in portions of the Pearland, Buttes, and Lancaster subbasins (refer to Figure 3.4-1, *Hydrogeologic Setting and Historical Subsidence in the Antelope Valley Groundwater Basin*). Localized faulting may constitute barriers to groundwater movement between subbasins in the AVGB, including an assumed fault between the Pearland and Buttes subbasins that is anticipated to act as a partial groundwater flow barrier (KJC 2015a and 2015c).

There are three primary aquifers associated with the AVGB, the upper, middle and lower aquifers, with most current groundwater withdrawal derived from the upper aquifer. The upper aquifer occurs mainly within alluvial deposits, and varies from unconfined to confined based on the localized occurrence of low permeability lacustrine deposits. The upper aquifer is locally separated from the middle/lower aquifers by the noted lake deposits, and extends from near the ground surface to a depth of several hundred feet in the Project vicinity. Both the middle and lower aquifers are assumed to be confined by the noted lake deposits and/or other locally occurring aquitards (e.g., low permeability units, Los Angeles County 2014b).

Historic and recent groundwater levels in the proposed Project site vicinity have been recorded at depths of approximately 175 to 350 feet below ground surface (bgs) between 1943 and 2013 (KJC 2015a). Three exploratory borings were conducted in the vicinity of the proposed Recharge Site as part of the proposed Project percolation testing program. These borings extended to maximum depths of 21.5 feet bgs and no groundwater was encountered, although local groundwater levels may vary with conditions such as seasonal precipitation and groundwater pumping (KJC 2015a).

Natural recharge of the AVGB occurs through infiltration of mountain front runoff and (to a lesser extent) local stream/wash flows, and was identified as approximately 30,300 AFY in groundwater modeling conducted as part of the Project Feasibility Study (KJC 2015a).

Additional (artificial) recharge also occurs through agricultural return flows (from irrigation) and, in more recent years, from sources including local recharge efforts (e.g., at the Palmdale Water Reclamation Plant). The groundwater model in the proposed Project Feasibility Study identified historic basin-wide withdrawal (pumping) levels of approximately 400,000 AFY during the mid-1940s to mid-1960s, with these levels declining to approximately 100,000 AFY at the end of the modeling period in 1995 (KJC 2015a). As a result, the AVGB has been in an overdraft condition (i.e., withdrawals exceeding recharge) for several decades, with associated effects such as lowering of local groundwater levels. Based on these conditions, an adjudication process was implemented for the AVGB in 1999, with a safe yield[2] of 110,000 AFY identified in 2011. While groundwater production has decreased from the historic highs noted above, it remains above the identified safe yield (KJC 2015a and 2015c). Under the described (and ongoing) adjudication process, PWD is anticipated to receive groundwater rights for 7,200 AFY beginning in 2022 (with a 4-year "tapering" period prior to that time, KJC 2015a). With this assumption and other local supplies (i.e., the SWP and local surface water), the PWD is projected to face a water supply deficit by 2021, with this deficit expected to increase over time and ultimately reach approximately 21,000 AFY at buildout (KJC 2015a). Accordingly, the groundwater model in the Feasibility Study assessed a number of alternative scenarios (including an alternative essentially the same as the proposed Project) to help address projected deficit conditions through proposed groundwater recharge and recovery efforts. As previously noted, the groundwater model prepared as part of the Feasibility Study was updated to reflect specific proposed Project conditions, as well as the most current (2014) USGS regional groundwater model for the AVGB (along with other applicable Project-related information). The results of the updated and preliminary groundwater models prepared for the proposed Project are included under the assessment of potential impacts in Section 3.6.3 as appropriate.

Water Quality

Surface Water

As previously noted, surface water in the Project site and vicinity consists predominantly of intermittent flows from storm events, with no known surface water quality data available from the Project site or adjacent areas. Available quantitative and qualitative water quality data in the Project vicinity are outlined below, and include information from the following sources: (1) water and fish tissue sampling conducted at Littlerock Reservoir under the State Surface Water Ambient Monitoring Program (SWAMP); (2) impaired water listings conducted under Section 303(d) of the federal CWA; and (3) qualitative assessments provided in the 2010 PWD Urban Water Management Plan (UWMP, PWD 2011), and the City of Lancaster General Plan 2030 Hydrology and Water Quality Technical Appendix (RBF Consulting 2008).

SWAMP Monitoring

Monitoring under the SWAMP periodically rotates among watersheds, with monitoring conducted at one upstream location in the Antelope HU (Littlerock Reservoir) between 2001 and 2003 (SWAMP 2007). Specifically, this program included four sampling events (two in the fall

[2] The safe yield is generally defined as the amount of groundwater that can be withdrawn without producing adverse effects (e.g., reduced aquifer levels/well production), and for the AVGB is equivalent to the sum of natural recharge and return flows.

and two in the spring), with a total of eight samples collected and these samples including multiple measurements (or data points). The described samples were tested for conformance with applicable Basin Plan criteria in the Antelope HU (as outlined below under *Regulatory Setting*). Based on limited sampling data as noted, the test results indicate that Basin Plan water quality objectives were exceeded at moderate to high frequencies for dissolved oxygen, total dissolved solids (TDS), fluoride, sulfate and boron (SWAMP 2007).

Fish tissue sampling was also conducted at Littlerock Reservoir in 2010 under the SWAMP Statewide Lakes Survey. This testing identified elevated levels of mercury and polychlorinated biphenyls (PCBs) in certain species, and a related advisory on fish consumption was issued for Littlerock Reservoir in 2014 by the California Environmental Protection Agency/Office of Environmental Health Hazard Assessment (CalEPA/OEHHA 2014).

Bi-annual Clean Water Act Assessments

The SWRCB and RWQCBs are scheduled to produce bi-annual qualitative assessments of statewide and regional water quality conditions. These assessments are focused on CWA Section 303(d) impaired water listings and priority status for assignment of total maximum daily load (TMDL) requirements. Specifically, the Section 303(d) and TMDL assessments involve prioritizing waters on the basis of water quality (i.e., impaired) status and the necessity for assigning quantitative contaminant load restrictions (i.e., TMDLs), with these data submitted to the USEPA for review and approval. Impaired waters within the proposed Project site watershed identified in the most current (2010) approved assessment include 100 acres of Littlerock Reservoir listed for manganese (SWRCB 2015). The proposed TMDL completion date for this listed impairment is 2021.

2010 Urban Water Management Plan

The PWD derives a portion of its overall water supply from Littlerock Reservoir. Water derived from this reservoir is treated at the Palmdale Water Treatment Plant prior to municipal use, with the 2010 UWMP noting that this source "…is generally of very high quality." (PWD 2011).

City of Lancaster General Plan 2030 Hydrology and Water Quality Technical Appendix

The referenced General Plan Water Quality Appendix provides an overview of typical pollutant sources in storm water flows, and notes that "The project site lacks any measured data on storm quality runoff." Based on the relationship between land use types and associated pollutant generation, however, the analysis goes on to conclude that: "The expected existing pollutants in…storm water runoff from developed areas…include trash, nutrients, bacteria, oil and grease, and household hazardous wastes…", while "…undeveloped areas could add suspended solids in the storm water runoff." (RBF Consulting 2008).

Groundwater

Available groundwater quality data in the proposed Project vicinity are outlined below, and include information from the following sources: (1) the DWR Statewide Groundwater Assessment Bulletin (DWR 2004); (2) the Antelope Valley Salt and Nutrient Management Plan (SNMP, Los Angeles County 2014b); (3) the groundwater model conducted as part of the

previously described Project Feasibility Study (KJC 2015a); and (4) the PWD 2010 UWMP (PWD 2011).

DWR Groundwater Assessment

Groundwater in the AVGB is generally classified as calcium bicarbonate in character near the surrounding mountains, and sodium-calcium bicarbonate (upper aquifer) or sodium bicarbonate (middle/lower aquifers) in character in the eastern part of the basin (generally including the proposed Project site area, DWR 2004). The average TDS level reported in the AVGB from a 1995 study was 300 milligrams per liter (mg/l), with an associated range of 200 to 800 mg/l and high levels of boron and nitrates observed locally (DWR 2004).

Antelope Valley Salt and Nutrient Management Plan

Current groundwater quality in the AVGB upper aquifer is described in the SNMP as "excellent" although the overall quality "…degrades toward the northern portion of the dry lake areas." (Los Angeles County 2014b). The referenced SNMP also includes an assessment of groundwater quality based on monitoring data collected between 2001 and 2010, including data from the California Groundwater Ambient Monitoring and Assessment (GAMA) Program for several wells in the proposed Project site and vicinity. Specifically, this includes assessment of observed levels for constituents including arsenic, boron, chloride, fluoride, nitrate, chromium and TDS, as summarized in Table 3.6-1, *Average Water Quality Concentrations in the Buttes, Lancaster and Pearland Groundwater Subbasins*. As indicated from these data, none of the identified primary maximum contaminant levels (MCLs[3]) or secondary drinking water MCLs (SMCLs) are exceeded for average constituent levels in the three subbasins (or the AVGB as a whole), although individual levels may vary by well and/or depth. Based on the noted data, the AVGB is characterized as exhibiting "…generally good water quality"... that "…meets the SNMP water quality management goals." (Los Angeles County 2014b).

Feasibility Study Groundwater Modeling

The groundwater model included in the previously described Feasibility Study includes water quality modeling, and incorporates applicable data from the GAMA Program. Based on these modeling efforts, the Feasibility Study notes that "…comparatively calcium- and magnesium-rich groundwater trends northward into the Antelope Valley from the mountain fronts, generally following both the Littlerock Creek and Bigrock Creek washes." (KJC 2015a).

[3] Primary MCLs are mandatory (enforceable) standards established by the USEPA to protect human health, and represent the maximum allowable amounts of a contaminant in drinking water delivered to consumers. SMCLs are non-enforceable standards established as guidelines to assist public water providers in managing drinking water for aesthetic considerations such as taste, color and odor, typically include recommended and upper level limits, and are not considered to present a risk to human health.

Table 3.6-1
AVERAGE WATER QUALITY CONCENTRATIONS IN THE BUTTES, LANCASTER AND PEARLAND GROUNDWATER SUBBASINS (2001 – 2010)

Subbasin	Constituents						
	Arsenic[1]	Boron[2]	Chloride[2]	Fluoride[2]	Nitrate[2]	Total Chromium[1]	TDS[2]
Buttes	1.32	0.07	19.1	0.38	1.42	8.77	301
Lancaster	8.88	0.14	35.2	0.43	1.53	6.10	325
Pearland	0.76	0.07	17.5	0.19	4.06	1.91	256
MCL[3]	***10***	***1[4]***	***500[5]***	***2***	***10***	***50***	***1,000[6]***

Source: Los Angeles County (2014b)
[1] micrograms per liter (µ/l).
[2] milligrams per liter (mg/l).
[3] Primary Maximum Contaminant Level (drinking water standard) unless otherwise noted.
[4] There is no MCL for boron, with 1 mg/l representing the notification level for the applicable water system governing bodies.
[5] The secondary MCL (SMCL) for chloride includes a 250 mg/l recommended level and a 500 mg/l upper level.
[6] The SMCL for TDS includes a 500 mg/l recommended level and a 1,000 mg/l upper level.

Palmdale Water District Urban Water Management Plan (UWMP)

Local groundwater quality is generally assessed in the PWD 2010 UWMP, which identifies TDS levels in the AVGB of approximately 110 to 1,480 mg/l, and samples from four local (unidentified) wells that exceed the recommended SMCL of 500 mg/l for TDS (PWD 2011). The UWMP also identifies nitrate and (potentially) arsenic as local groundwater quality concerns, with observed nitrate levels from individual wells ranging from undetectable to 15 mg/l and three (unidentified) tested wells exceeding the associated primary drinking water MCL of 10 mg/l (PWD 2011).

Regulatory Setting

The proposed Project is subject to a number of regulatory requirements associated with federal, state and local guidelines, as summarized below.

Federal Clean Water Act/National Pollutant Discharge Elimination System Standards

The CWA is intended to "restore and maintain [the] chemical, physical and biological integrity of the Nation's waters…" with the overall goal of making all surface waters "fishable and swimmable." The CWA regulates the discharge of pollutants to "waters of the U.S." (as defined in the CWA), and prohibits the discharge of pollutants unless authorized under a NPDES permit or waste discharge order. Specific NPDES requirements associated with the proposed Project include conformance with: (1) the General Permit for Storm Water Discharges Associated with Construction and Land Disturbance Activities (Construction General Permit, NPDES No. CAS000002, SWRCB Order No. 2009-0009-DWQ; as amended by Order Nos. 2010-0014-DWQ and 2012-0006-DWQ); and (2) pertinent General Permits and/or Waste Discharge Requirements (WDRs) related to construction-related groundwater extraction/disposal (dewatering) and/or operational discharges, if applicable (with these potential requirements discussed below under SWQCB/RWQCB Standards).

General Construction Activity Storm Water Permit

Conformance with the Construction General Permit is required prior to development (including grading or other surface disturbance) exceeding one acre, with this permit issued by the SWRCB under an agreement with the USEPA. Specific conformance requirements include implementing a storm water pollution prevention plan (SWPPP), an associated Construction Site Monitoring Program (CSMP), employee training, and minimum best management practices (BMPs), as well as a Rain Event Action Plan (REAP) for applicable projects (e.g., those in Risk Categories 2 or 3, as outlined below). Under the Construction General Permit, project sites are designated as Risk Level 1 through 3 based on site-specific criteria (e.g., sediment erosion and receiving water risk), with Risk Level 3 sites requiring the most stringent controls. Based on the site-specific risk level designation, the SWPPP and related plans/efforts identify detailed measures to prevent and control the off-site discharge of pollutants in storm water runoff. Depending on the risk level, these may include efforts such as mandatory technology-based action levels, effluent and receiving water monitoring/reporting, and advanced treatment systems (ATS). Specific pollution control measures require the use of best available technology economically achievable (BAT) and/or best conventional pollutant control technology (BCT) levels of treatment, with these requirements implemented through applicable BMPs. While site-specific measures vary with conditions such as risk level, proposed grading and slope/soil characteristics, detailed guidance for construction-related BMPs is provided in the permit and related local standards (as outlined below), as well as additional sources including the *EPA National Menu of Best Management Practices for Storm Water Phase II – Construction* (USEPA 2015), and *Storm Water Best Management Practices Handbooks* (California Stormwater Quality Association [CASQA] 2012). Specific requirements for the proposed Project under this permit would be determined during SWPPP development, after completion of Project plans and application submittal to the SWRCB.

State Standards

California Code of Regulations

California Code of Regulations (CCR) Titles 17 and 22 contain a number of requirements related to the use of recycled water and conformance with the California Department of Public Health (CDPH) Drinking Water Program. Specifically, these include requirements related to cross-connections and backflow prevention for applicable recycled water facilities, as well as criteria for groundwater replenishment (recharge) efforts such as dilution factors, constituent testing and control, retention times, and monitoring/reporting (pursuant to associated RWQCB authorization, as outlined below under SWRCB/RWQCB Standards). Under Title 22, Article 7, Section 60323, an Engineering Report is also required for applicable recycled water use, to provide "…a description of the design of the proposed reclamation system, the means for compliance with…regulations,…any other features specified by the regulatory agency…and a contingency plan which will ensure that no untreated or inadequately treated wastewater will be delivered to the use area."

SWRCB/RWQCB Standards

Basin Plan

Surface Water. The RWQCB Lahontan Basin Plan establishes a number of beneficial uses and water quality objectives for surface and groundwater resources. Beneficial uses are generally defined as the uses of water necessary for the survival or well being of man, plus plants and wildlife. Identified existing and potential beneficial uses for surface waters and wetlands in the proposed Project area watersheds include: municipal and domestic supply (MUN); agricultural supply (AGR); groundwater recharge (GWR); freshwater replenishment (FRSH); contact and non-contact water recreation (REC-1 and REC-2); commercial and sportfishing (COMM); warm and cold freshwater habitat (WARM and COLD); wildlife habitat (WILD); water quality enhancement (WQE); and flood peak attenuation/flood water storage (FLD).

Water quality objectives identified in the Basin Plan are based on established beneficial uses and non-degradation policy requirements, and are defined in the Porter-Cologne Water Quality Control Act as "the allowable limits or levels of water quality constituents or characteristics which are established for the reasonable protection of beneficial uses of water or the prevention of nuisance within a specific area" (California Water Code, Division 7, Section 13000 et seq.). Beneficial uses are described above, while the non-degradation policy (SWRCB Resolution No. 68-16) is generally intended to maintain existing water quality where it exceeds Basin Plan objectives. Water quality objectives include both narrative requirements (which can encompass qualitative and quantitative standards) and specific numeric objectives for identified contaminants and waters. Established numeric water quality objectives for applicable surface waters in the Antelope HU are limited to Littlerock Reservoir, as summarized in Table 3.6-2, *Surface Water Quality Objectives for Littlerock Reservoir*.

Table 3.6-2
SURFACE WATER QUALITY OBJECTIVES FOR LITTLEROCK RESERVOIR

Surface Waters	Constituent (mg/l)[1]							
	TDS	Cl	SO_4	F	B	NO_3-N	N	PO_4
Littlerock Reservoir	176/180	12.5/20	16.5/19	0.20/0.38	0.03/0.05	0.4/0.7	--	--

Source: RWQCB 1995, as amended.
[1] Values shown are annual average/90th percentile.
TDS = Total Dissolved Solids; Cl = Chloride; SO_4 = Sulfate; F = Fluoride; B = Boron; NO_3-N= Nitrogen as Nitrate; N = Total Nitrogen; PO_4 = Dissolved Orthophosphate.

Groundwater. Beneficial uses listed for the AVGB include MUN, AGR, industrial service supply (IND), and FRSH. All groundwater resources in the Lahontan Basin are subject to narrative and numerical water quality objectives related to coliform bacteria, chemical constituents (e.g., drinking water standards), radioactivity and taste/odor.

Groundwater Extraction/Disposal (Dewatering)

Proposed Project implementation would require conformance with applicable requirements if construction activities would require discharge of extracted groundwater (i.e., dewatering). Such activities would likely be authorized under one or more of the following adopted RWQCB and SWRCB orders:

- RWQCB Order No. R6T-2014-0049, Renewed WDRs and NPDES General Permit for Limited Threat Discharges to Surface Waters – This order is specifically applicable to construction dewatering, although it is generally limited to circumstances involving the discharge of "…high quality or relatively pollutant-free water that poses little or no threat to water quality or beneficial uses of water."

- RWQCB Order No. R6T-2010-0024, WDRs for Surface Water Disposal of Treated Groundwater – This order may be applicable to construction dewatering activities under circumstances where treatment is required prior to disposal to meet applicable water quality requirements.

- RWQCB Order No. R6T-2004-0015 (WDID 6A099311007), WDRs for Land Disposal of Treated Groundwater – This order is specifically intended to address hydrocarbon pollutants, and may be applicable to construction dewatering activities under circumstances where associated treatment is required prior to disposal to meet applicable water quality requirements.

- SWRCB Order No. 2003-0003-DWQ, Statewide General WDRs for Discharges to Land with a Low Threat to Water Quality – This order is specifically applicable to construction dewatering, although it also requires conformance with "…any more stringent standards in the applicable Basin Plan."

Depending on the specific circumstances of potential groundwater extraction/disposal requirements associated with proposed Project implementation, one or more separate individual WDRs may also be required in addition to, or in lieu of, the above noted orders.

Recycled Water Use

The SWRCB has adopted a resolution (No. 2009-0011) and related Recycled Water Policy regarding water quality control for recycled water use. This Resolution/Policy provides direction to the Regional Water Boards on permitting recycled water projects, including the use of recycled water for groundwater recharge projects. Resolution/Policy 2009-0011 acknowledges that proposed groundwater recharge projects using recycled water "…must be reviewed on a site-specific basis, and…will require project-by-project review." Associated general approval requirements are identified for such projects, however, and include conformance with applicable CDPH regulations (per CCR Titles 17 and 22, as previously noted), implementation of applicable groundwater quality monitoring, and conformance with appropriate RWQCB (e.g., Basin Plan) standards. This Resolution/Policy also directs local agencies/stakeholders to develop and adopt salt/nutrient management plans for associated groundwater basins, with this criterion met for the AVGB through adoption of the previously noted *Antelope Valley Salt and*

Nutrient Management Plan (Los Angeles County 2014b). Specifically, this plan provides an assessment of groundwater quality and assimilative capacity in the AVGB for applicable constituents (refer to Table 3.6-1), develops water quality projections and monitoring requirements for pertinent groundwater development/use scenarios, and identifies related management criteria for applicable stakeholders (including the PWD) to address salt and nutrient loading in the AVGB and maintain conformance with related Basin Plan criteria.

Operational Discharge

Long-term operation of the proposed Project would involve discharges from activities such as well/pump testing that may potentially be subject to one or more adopted RWQCB and SWRCB orders, including RWQCB Order No. R6T-2014-0049 and SWRCB Order No. 2003-0003-DWQ, as previously described. Specifically, RWQCB Order No. R6T-2014-0049 provides coverage for "…discharges of pollutants to surface waters that constitute low-threat concentrations and/or waste loads…" per applicable criteria identified in the permit, and includes "Well construction and pump testing of potable aquifer supplies." Similarly, SWRCB Order No. 2003-0003-DWQ is associated with "…discharges to land with a low threat to water quality…" and includes activities such as "…well development discharge, monitoring well purge water discharge, and boring waste discharge." Both of these orders include discharge criteria such as conformance with applicable Basin Plan beneficial uses and water quality objectives.

As noted above under potential dewatering requirements, separate individual WDRs may also potentially be required for operational discharges in addition to, or in lieu of, the above noted orders, depending on the specific circumstances of potential discharges associated with proposed Project implementation (with additional discussion provided below in Section 3.6.3).

Palmdale Water District Standards

UWMP/Groundwater Assessment and Protection Program/Wellhead Protection Plan

The 2010 UWMP provides an overview of PWD demand projections, water supply sources, reliability, efficiency, demand management measures, and other applicable information. The UWMP is intended to maintain efficient use of urban water supplies, continue to promote conservation programs and policies, ensure that sufficient water supplies are available for future uses, and provide a mechanism for response during drought conditions. Because groundwater provides approximately 40 percent of the PWD water supply, the UWMP includes applicable elements of the PWD *Groundwater Assessment and Protection Program* and *Wellhead Protection Plan*. These efforts are generally intended to protect groundwater and related resources, and include measures to: (1) identify and assess local groundwater sources and wells; (2) delineate/evaluate groundwater protection areas and associated risks to water quality; (3) develop strategies to protect water quality and implement public education/involvement efforts; and (4) implement appropriate monitoring and assessment procedures.

Cross-connection Program

The PWD Cross-connection Program is intended to implement applicable CDPH Drinking Water Program requirements related to cross-connections and backflow prevention for recycled water facilities, as previously described under State Standards.

Local Standards

The County of Los Angeles and the cities of Palmdale and Lancaster have adopted standards to address hydrology and water quality related issues. Local standards are implemented through requirements such as general plan elements, ordinances and codes, and typically reflect associated requirements under the previously described federal, state and regional standards. While the PWD is typically exempt from local requirements, the proposed Project design and implementation would include measures to provide conformance with applicable local regulations wherever practical. Applicable local standards that will be reflected in the proposed Project design and implementation as appropriate include the following:

- The County of Los Angeles General Plan Safety Element (1990); Grading Code (Title 26, County of Los Angeles Building Code, Appendix J); Integrated Regional Water Management Plan (2013); Salt and Nutrient Management Plan for the Antelope Valley (2014b); Low Impact Development Standards Manual (2014c); applicable portions of the Municipal Code, including the *Flood Control District Code*, and Title 11 (Health and Safety), Division 1, Part 2 regarding well drilling and operating permits.

- The City of Palmdale General Plan Safety Element (1993); Engineering Design Standards (1991); Grading Permit (Section 8.04.265, Chapter 70, Excavation and Grading, Palmdale Municipal Code); and Floodplain Management Standards (Title 15, Chapter 15.28, Palmdale Municipal Code).

- The City of Lancaster General Plan, Plan for Public Health and Safety (2009); Grading Ordinance (Ordinance No. 2225, Title 15, Building Code, Lancaster Municipal Code); and Storm Water Management Plan (2003).

3.6.2 Significance Thresholds

PWD utilizes CEQA Guidelines Appendix G for criteria to determine significant impacts. Accordingly, the following significance thresholds are used.

The proposed Project would result in a significant or potentially significant impact if it would:

- Substantially alter the existing drainage patterns or storm water flows of the site or area, including through the alteration of the course of a stream or river, in a manner that would substantially affect downstream drainage patterns or flows, increase the rate or amount of surface runoff, generate erosion/sedimentation, or result in flooding on- or off-site.

- Create or contribute runoff water which would exceed the capacity of existing or planned storm water drainage systems or provide substantial additional sources of polluted runoff.

- Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map.

- Place within a 100-year flood hazard area structures that would impede or redirect flood flows.

- Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam; or inundation by seiche, tsunami or mudflow.

- Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level.

- Violate any water quality standards or waste discharge requirements, or otherwise substantially degrade water quality.

3.6.3 Impact Analysis

Drainage Patterns/Flow Directions

As previously described, surface drainage within the Project site and adjacent areas is primarily to the north through a number of intermittent washes and as overland flow, and ultimately enters one or more dry lakes. Implementation of the proposed Project would have the potential to result in some modification of the existing on-site drainage patterns and directions through proposed grading and construction. These modifications are generally not anticipated to be substantial, however, based on the nature and extent of the proposed development. Specifically, proposed Project development would consist largely of subsurface pipelines, with surface features limited to the proposed SWP Turnout, recharge basins and associated berms, Recovery Wells and related temporary percolation ponds (refer to Section 2.5.1, *Project Activities*), and the 2-acre Distribution Site. Accordingly, overall drainage patterns within the site and vicinity (i.e., north to the vicinity of Rosamond and Rogers dry lakes) are not anticipated to be substantially altered by proposed development. Because a detailed hydrology study has not been conducted, however, the associated site-specific effects to drainage patterns and flow directions within and from the proposed Project site cannot be determined. As a result, while overall drainage and flow pattern alterations are not anticipated to be substantial as noted, proposed Project implementation could potentially result in significant impacts related to drainage patterns/directions, as well as associated erosion and/or flooding issues. Mitigation is identified below in Section 3.6.4 to address these potential impacts, and entails completion of a site-specific hydrologic analysis for proposed development to evaluate potential impacts, including drainage alteration and related issues, and to identify associated standard remedial measures.

Runoff Rates/Amounts and Storm Water Management

Proposed Project development is not expected to substantially increase the rate or amount of surface runoff within or from the site. This conclusion is based on the relatively small extent of proposed on-site development, as well as the nature of associated facilities. Specifically, new impervious surfaces (which increase runoff rates and amounts), would generally be limited to the SWP Turnout structure and the two-acre Distribution Site, with some additional areas (e.g., well pads/support facilities) to encompass minor areas of impervious surfaces and/or surface compaction. Based on the noted conclusions and assumptions, potential impacts related to runoff rates/amounts and storm drain capacity from proposed Project development are expected

to be less than significant. As noted above under the discussion of Drainage Patterns/Flow Directions, however, mitigation in the form of a site-specific hydrologic analysis would be conducted for the proposed Project. Because assessment of pre- and post-development runoff rates is a standard element of such hydrologic analysis, these conditions would be evaluated as part of the proposed Project hydrologic investigation. Accordingly, if adverse issues related to runoff rates/amounts or storm drain capacities are identified during these investigations, associated standard remedial measures would be implemented to address these conditions (as outlined in Section 3.6.4).

Flooding/Floodplain Hazards

100-year Floodplains

As described above in Section 3.6.1, several mapped 100-year floodplains are located within or adjacent to the Project site (Figure 3.6-2). Because no housing is proposed as part of the proposed Project development, no associated impacts related to locating such structures within flood hazard areas would result from proposed Project implementation. Additionally, based on the subsurface location of most proposed facilities (i.e., pipelines and the Distribution Box), the proposed elevation of other applicable facilities within mapped floodplains (i.e., Recovery Wells, pumps and related surface structures) above identified flood water levels (i.e., through grading), and the relatively minor extent of proposed surface development within the noted floodplains, no associated substantial impacts are anticipated in relation to flood-related hazards and impeding or redirecting flood flows. Because detailed studies have not been conducted, however, site-specific effects related to flood flow movements and directions from proposed surface facilities are considered potentially significant. Mitigation is identified below in Section 3.6.4 to address these potential impacts, and entails completion of a site-specific hydrologic analysis for proposed development to evaluate potential impacts, including floodplain-related issues, and to identify associated standard remedial measures.

Tsunamis, Seiches, Mudflows and Dam Inundation

Tsunamis (commonly referred to as tidal waves) are sea waves associated with phenomena such as underwater earthquakes or volcanic activity, and can generate impacts related to inundation in coastal zones. Because the Project site is located approximately 47 miles inland and at elevations of over 2,500 feet amsl, no associated impacts related to tsunami hazards would occur.

Seiches are defined as wave-like oscillatory movements in enclosed or semi-enclosed bodies of water such as lakes or reservoirs, and are most typically associated with seismic activity. Seiches can result in flooding damage and related effects (e.g., erosion) in surrounding areas from spilling or sloshing water, as well as increasing pressure on containment structures. The only source of potential seiche impacts within the Project site is Littlerock Reservoir, located approximately 5.5 miles to the southwest. Based on this distance and the discussion of potential dam inundation effects from this reservoir provided below, associated potential Project-related impacts from seiche hazards would be less than significant.

Proposed Project development is generally not considered susceptible to significant impacts from inundation by mudflow, based on the fact that the proposed Project site and vicinity exhibit

primarily level terrain, with the nearest areas of substantial topography located approximately 2 miles to the east (Alpine Butte) and 3 miles to the south (the San Gabriel Mountains).

Based on mapping provided in the Palmdale (1993) and Los Angeles County (1990) general plan safety elements, the mapped inundation area for Littlerock Reservoir is located along portions of Littlerock Wash located outside of the proposed Project site. Specifically, the mapped inundation zone ends approximately 1.8 miles south of East Palmdale Avenue and 2 miles west of 106th Street East at its closest points. As a result, no significant impacts related to dam inundation hazards would result from implementation of the proposed Project.

Groundwater Supplies/Recharge

Groundwater Supplies/Levels

As previously described, groundwater modeling was conducted as part of the Project Feasibility Study (KJC 2015a), with an update completed in 2015 to reflect current proposed Project criteria and the most recent (2014) USGS regional modeling for the AVGB (KJC 2015c). Modeling conducted for the Feasibility Study included assessment of potential aquifer drawdown and mounding effects from implementation of the proposed Project. Specifically, this effort involved the use of data and results from several previous regional models conducted for the AVGB, with a number of modifications incorporated to reflect local and Project-specific conditions (including aquifer parameters such as transmissivity and conductivity, as well as current pumping data, with a detailed description of model methodology provided in Appendix E of the Project Feasibility Study [KJC 2015a]). The resulting analytical model provides an estimate of proposed Project-related impacts to groundwater elevations and associated effects related to "residence" (or retention) times for recycled water and water quality considerations (i.e., the time between recharge in the basins and withdrawal from the Recovery Wells, as discussed below), as well as subsidence hazards (as discussed Section 3.4 of this EIR). Based on the results of the described modeling, the following summary conclusions from the Feasibility Study are provided:

- The proposed number (16) and surrounding configuration of the proposed Recovery Wells are based on the described modeling, with the Feasibility Study noting that this design would: "…produce much less drawdown in the vicinity of the extraction wells. This is attributable simply to increasing the separation distances between individual wells so that superposition of the wells' cones of depression is minimized."

- The potential for localized elevation of aquifer levels (or groundwater mounding) was also evaluated in the noted modeling, with the Feasibility Study concluding that: "…predicted groundwater mounding (with respect to average ambient conditions) ranges between 80 and 180 feet [in depth]; all remaining substantially beneath the target limitation of 50-foot depth below ground surface."

The updated groundwater model involved similar methodology and data sources as outlined above for the Feasibility Study model, but also includes more current regional modeling and proposed Project design/operational information as previously described. Specifically, the current (updated) groundwater model is focused on an approximately 110-square mile area centered on the proposed Project site, with appropriate grid spacing to provide a more detailed

assessment of Project-related conditions. The updated model also evaluates a number of operational scenarios to encompass baseline conditions, proposed Project operations by PWD only, and proposed Project operations with up to an additional 100,000 acre-feet of groundwater recharge/recovery by one or more partner agencies. Based on the updated modeling, the following conclusions are provided and are applicable to all operational scenarios for the proposed Project (KJC 2015c):

- Drawdown associated with proposed Project recovery activities: "…do not locally dewater the shallow aquifer and/or lead to appreciable land subsidence."

- Groundwater mounding levels from proposed Project recharge operations are below the target criterion of 50 feet bgs, with maximum mounding levels on the order of 200 to 250 feet bgs.

- Minimum travel (residence) times for groundwater between the recharge basin and Recovery Wells is approximately 1.5 years for wells along the northern perimeter, and 3 to 4 years for wells along the southern perimeter.

From the above information and the nature of the proposed Project (i.e., controlled groundwater recharge and recovery), it is concluded that no significant impacts related to groundwater supplies/levels (including aquifer drawdown or mounding effects) would result from implementation of the proposed Project (KJC 2015c and 2015d).

Groundwater Recharge

As described under the discussion of Runoff Rates/Amounts and Storm Water Management, new impervious surfaces associated with the proposed Project would generally be limited to the SWP Turnout structure, the two-acre Distribution Site, and additional areas (e.g., well pads/support facilities) that would encompass minor areas of impervious surfaces and/or surface compaction. Based on these considerations, the fact that most natural recharge in the AVGB occurs in association with infiltration of mountain front runoff as previously noted, the results of the updated groundwater model as outlined above, and the nature of the proposed Project (i.e., controlled groundwater recharge and recovery), no significant impacts related to groundwater recharge capacity would result from implementation of the proposed Project.

Water Quality

Surface Water

As discussed below, potential surface water quality impacts from implementation of the proposed Project are associated with both short-term construction activities and long-term operation and maintenance. Specifically, potential short-term effects are related to erosion and off-site sediment transport (sedimentation), the use and storage of construction-related hazardous materials (e.g., fuels and lubricants), and the extraction/disposal of shallow groundwater (dewatering) if required. Potential long-term water quality effects are associated predominantly with sources including well-related activities (e.g., pump testing), the on-site use and/or storage of materials such as sodium hypochlorite and lubricants (for electric pumps), and the discharge

of hydrocarbons (e.g., leaks) and particulates (e.g., brake/tire wear) from maintenance-related vehicular traffic.

Construction-related Pollutants

Erosion/Sedimentation. Proposed excavation, grading, and construction activities could potentially result in related erosion and sedimentation. Specifically, proposed Project activities could involve the removal of surface stabilizing features such as vegetation, excavation of existing compacted materials from graded or cut areas, redeposition of excavated material as fill in proposed development sites and, potentially, disposal of extracted groundwater onto graded or unstable areas (i.e., during construction dewatering, if required). Proposed Project-related erosion could result in off-site sediment transport, with associated water quality effects such as turbidity and transport of other pollutants that tend to adhere to sediment particles (e.g., hydrocarbons). While graded, excavated, and filled areas associated with construction activities would be stabilized through efforts such as compaction and installation of proposed facilities (including the use of shotcrete on recharge basin embankments), erosion potential would be higher in the short-term than for existing conditions. Developed areas would be most susceptible to erosion between the beginning of grading/construction and the installation of permanent features. Erosion and sedimentation are not considered to be significant long-term concerns for proposed development, with developed areas to be stabilized as noted.

In addition to the water-related erosion potential described above, construction activities at the proposed Project site may potentially be subject to wind-generated erosion. While such effects are generally smaller in scale and magnitude than water-related erosion, similar potential impacts to on- and off-site water quality could potentially occur.

Identified potential impacts from construction-related erosion/sedimentation would be addressed through conformance with the NPDES Construction General Permit, as described in Section 3.6.1 under Regulatory Framework. This would include implementing an authorized SWPPP for proposed construction, including (but not limited to) erosion and sedimentation BMPs. While specific BMPs would be determined during the NPDES/SWPPP process based on regulatory criteria and site characteristics (soils, slopes, etc.), they would likely include standard industry measures and guidelines from the Construction General Permit and local storm water standards, as well as the additional sources identified in Section 3.6.1 under Regulatory Framework. A summary of standard erosion and sedimentation BMPs that may be applicable to the proposed Project is provided below. Based on the implementation of these and/or other appropriate erosion and sediment control BMPs as part of (and in conformance with) the Project SWPPP and related regulatory requirements, associated potential erosion/sedimentation impacts from proposed Project development would be less than significant. Erosion and sedimentation controls implemented for the proposed Project would be further defined during the NPDES/SWPPP process, with the resulting BMPs taking priority over the more general types of standard industry measures listed below.

- Comply with seasonal grading restrictions during the rainy season for applicable locations/conditions.

- Prepare and implement a CSMP to ensure appropriate monitoring, testing, BMP effectiveness, and conformance with applicable discharge requirements.

- Prepare and implement a REAP, if applicable (i.e., depending on risk level), to ensure that active construction areas/activities have adequate erosion and sediment controls in place within 48 hours of the onset of any likely precipitation event (i.e., 50 percent or greater probability of producing precipitation, per National Oceanic and Atmospheric Administration projections).

- Preserve existing vegetation wherever feasible, and use phased grading schedules to limit the area subject to erosion at any given time.

- Properly manage storm water and non-storm water flows to minimize runoff.

- Use erosion control/stabilizing measures such as geotextiles, mulching, mats, plastic sheets/tarps, fiber rolls, soil binders, compost blankets, soil roughening and/or temporary hydroseeding (or other plantings) established prior to October 1 in appropriate areas (e.g., disturbed areas and graded slopes).

- Use sediment controls to protect the construction site perimeter and prevent off-site sediment transport, potentially including measures such as temporary inlet filters, silt fence, fiber rolls, silt dikes, biofilter bags, gravel bag berms, compost bags/berms, temporary sediment basins, check dams, street sweeping/vacuuming, ATS (if applicable based on risk assessment), energy dissipators, stabilized construction access points/sediment stockpiles and properly fitted covers for sediment transport vehicles.

- Store BMP materials in applicable on-site areas to provide "standby" capacity adequate to provide complete protection of exposed areas and prevent off-site sediment transport.

- Provide full erosion control for disturbed areas and material stockpiles not scheduled for additional activity for 14 or more consecutive calendar days.

- Provide appropriate training, including emergency preparedness training, for the personnel responsible for BMP installation and maintenance.

- Use solid waste management efforts such as proper containment and disposal of construction trash and debris.

- Comply with local dust control requirements (AVAQMD Rule 403), potentially including measures such as regular watering, use of chemical palliatives, limiting construction vehicle/equipment speeds and restricting/precluding construction operations during periods of high wind speeds (see also Standard Condition SC 3.1-1 in Section 3.1, *Air Quality*).

- Implement appropriate monitoring and maintenance efforts (e.g., prior to and after storm events) to ensure proper BMP function and efficiency.

- Implement sampling/analysis, monitoring/reporting and post-construction management programs per NPDES requirements.

- Implement additional BMPs as necessary to ensure adequate erosion and sediment control (e.g., enhanced treatment and more detailed monitoring/reporting).

Construction-related Hazardous Materials. Construction related to proposed Project development would involve the use and/or storage of hazardous materials such as fuels, lubricants, solvents, concrete, paint, trash/debris, drilling fluids, and portable septic system wastes. The accidental discharge of such materials during construction could potentially result in significant water quality impacts. Implementation of a SWPPP would be required under NPDES guidelines as previously noted, and would include specific measures to avoid or reduce potential impacts related to the use and potential discharge of construction-related hazardous materials. While detailed BMPs would be determined as part of the NPDES/SWPPP process based on regulatory criteria and Project-specific parameters, they are likely to include standard industry measures and guidelines from the Construction General Permit and local requirements, as well as the additional sources identified in Section 3.6.1 under Regulatory Framework. A summary of anticipated construction-related hazardous material BMPs that may be applicable to the proposed Project is provided below. Based on the implementation of these and/or other appropriate hazardous material BMPs as part of (and in conformance with) the SWPPP and related requirements, associated impacts would be less than significant. Construction-related hazardous materials controls implemented for development at the proposed Project site would be further defined during the NPDES/SWPPP process, with the resulting BMPs taking priority over the more general types of standard industry measures provided below.

- Minimize the amount of hazardous materials used and stored on site, and restrict storage/use locations to areas at least 50 feet from storm drains and surface drainages.

- Use raised (e.g., on pallets), covered and/or enclosed storage facilities for all hazardous materials.

- Maintain accurate and up-to-date written inventories and labels for all stored hazardous materials.

- Use berms, ditches, impervious liners and/or other applicable methods for material storage, vehicle/equipment maintenance and fueling areas, and drilling sites to provide a containment volume of 1.5 times the volume of stored/used materials and prevent discharge in the event of a spill.

- Place warning signs in areas of hazardous material use or storage and along drainages and storm drains (or other appropriate locations) to avoid inadvertent hazardous material disposal.

- Properly maintain all construction equipment and vehicles.

- Restrict paving operations during wet weather, use appropriate sediment control devices/methods downstream of paving activities, and properly contain and dispose of

wastes and/or slurry from sources including concrete and paint, by using properly designed and contained washout areas.

- Provide training for applicable employees in the proper use, handling and disposal of hazardous materials, as well as appropriate action to take in the event of a spill.
- Store absorbent and clean-up materials in readily accessible on-site locations.
- Properly locate, maintain and contain portable wastewater facilities.
- Regularly (at least weekly) monitor and maintain hazardous material use/storage facilities and operations to ensure proper working order.
- Implement solid waste management efforts such as proper containment and disposal of construction trash and debris, and restrict associated storage areas to appropriate locations at least 50 feet from storm drain inlets and drainage courses.
- Employ a licensed waste disposal operator to regularly (at least weekly) remove and dispose of construction trash and debris at an authorized off-site location.
- Use recycled or less hazardous materials wherever feasible.
- Post regulatory agency telephone numbers and a summary guide of clean-up procedures in a conspicuous on-site location.
- Implement additional BMPs as necessary (and in conformance with applicable requirements) to ensure adequate hazardous material control.

Disposal of Extracted Groundwater. As previously described, historic groundwater levels in the Project site vicinity are approximately 175 to 350 feet bgs, with no groundwater observed in exploratory borings extending to depths of 21.5 feet bgs in the vicinity of the proposed Recharge Site. Based on related analysis in the Project Feasibility Study, however, local groundwater levels may vary with conditions such as seasonal precipitation and groundwater pumping (KJC 2015a). Accordingly, while shallow groundwater is not anticipated to be encountered during proposed Project construction, some potential exists for the localized occurrence of shallow or perched aquifers and related dewatering requirements. Disposal of groundwater extracted during construction activities (if required) could potentially generate significant water quality impacts through erosion/sedimentation, as well as the possible occurrence of pollutants in local groundwater aquifers. Proposed Project construction would require conformance with applicable RWQCB/SWRCB criteria prior to disposal of extracted groundwater, as outlined under Regulatory Framework in Section 3.6.1. While specific requirements to address potential water quality concerns from disposal of extracted groundwater would be determined based on regulatory criteria and site-specific parameters, they would likely include the types of standard measures outlined below.

- Use erosion and sediment controls similar to those described for NPDES/SWPPP compliance in applicable areas/conditions (e.g., disposal of extracted groundwater on slopes or graded areas).

- Test extracted groundwater for appropriate contaminants prior to discharge.

- Treat extracted groundwater prior to discharge, if required, to provide conformance with applicable discharge criteria (e.g., through methods such as filtration, aeration, adsorption, disinfection and/or conveyance to a municipal wastewater treatment plant).

Based on the required conformance with regulatory standards and the implementation of related measures, water quality impacts from disposal of extracted groundwater at the proposed Project site would be less than significant.

Operational Pollutants

The long-term operation and maintenance of proposed Project facilities would generally not entail the generation of pollutants associated with most types of urban development, such as nutrients, trash and debris, hydrocarbons, oxygen demanding substances, bacteria and viruses, and pesticides. Specifically, the proposed facilities do not entail on-site habitation or associated uses such as substantial vehicular activity and landscaping that can generate the noted types of pollutants. Operational discharges from well-related activities (e.g., pump testing) could entail surface discharges, although associated potential impacts would be less than significant based on the following considerations: (1) discharge from the noted operational activities would consist of groundwater from local aquifers (including SWP and/or recycled water used for proposed recharge efforts) and, if subject to regulatory requirements, would not be expected to include pollutants that would constitute a threat to potential receiving waters and/or applicable (e.g., Basin Plan) water quality standards; (2) because the proposed Project area and vicinity are within a closed (internal) drainage basin, any discharge from operational (or other) sources would be retained within the local watershed(s), with associated surface drainage ultimately terminating in one or more dry lakes as described in Section 3.6.1; and (3) due to the noted internal drainage and arid nature of the local watersheds, there are no downstream receiving waters and discharges from sources such as pump testing would dissipate locally from percolation and/or evaporation. Accordingly, such operational activities are typically (and have historically within the PWD) not been subject to related regulatory discharge standards (PWD 2015). If such regulatory standards are subsequently determined to be appropriate for the proposed Project, however, they would likely entail conformance with requirements including RWQCB Order No. R6T-2014-0049, SWRCB Order No. 2003-0003-DWQ, or an individual WDR as preciously described under Regulatory Framework. Such conformance would be mandatory and would involve standard measures (such as testing/treatment) to avoid or reduce associated potential water quality impacts below a level of significance.

The proposed Project may also involve the on-site use and/or storage of potential pollutants such as sodium hypochlorite and pump-related lubricants, as well as the generation of hydrocarbons/particulates from vehicle operation (e.g., for operational and/or maintenance personnel). The potential for long-term water quality issues associated with the noted activities is considered generally low, due to: (1) limited use and extent of potential pollutants;

(2) the nature of proposed Project operations (as previously noted); and (3) the fact that on-site storage of sodium hypochlorite and lubricants would be confined within the proposed Potable Water Pump Station building at the Distribution Site, and within associated lubricant enclosures for the Recovery Well pumps (KJC 2015b, refer also to Section 7.3, *Hazards and Hazardous Materials*). As a result, associated potential long-term surface water quality impacts would be less than significant.

Groundwater

Potential impacts to groundwater quality from proposed Project implementation are related to the use of SWP and recycled water for proposed recharge efforts in local aquifers, as well as a proposed septic tank/leach field associated with the control room facility at the Potable Water Pump Station. The previously described groundwater modeling conducted as part of the Project Feasibility Study included water quality modeling to assess potential effects to "…the quality of water recovered from the Project wells and from wells in surrounding areas." This modeling included available local groundwater data from sources including the GAMA Program to provide an analytical assessment of ambient groundwater quality conditions and "…identify possible groundwater chemistry responses to the introduction of recharge water of differing composition." (KJC 2015a). Specifically, this included assessment of potential direct and indirect impacts. Direct impacts could include the introduction and mechanical spreading of constituents in recharge water (i.e., water exhibiting different constituent levels than ambient conditions), while indirect effects entail potential mineralogical interactions from changed aquifer geochemical conditions (e.g., mobilization of naturally occurring trace elements in response to changing pH levels, KJC 2015a). The described modeling also included assessment of residence time for the potential use of recycled water for recharge, with this issue evaluated in the updated groundwater model as well (as previously described). Based on these efforts, the Feasibility Study provides the following conclusions for the proposed Project:

- From modeled chloride concentrations (with chloride serving as a non-reactive tracer), the model results indicate that the proposed well field would capture the majority of recharged water (thereby reducing potential recharge-related groundwater quality effects in more distant portions of the aquifer and related wells).

- Modeled concentrations of arsenic suggest "…little potential for mobilization of arsenic as a result of pH changes and other effects."

- With respect to the required one-year "residence" time for recycled water in recharge operations: "…a one year travel time between the basin boundary and the nearest extraction well is realized, assuming average local parameter values for hydraulic conductivity, aquifer thickness, and specific yield." As previously noted, this conclusion was evaluated/verified in the updated groundwater model, which identified residence times of between approximately 1.5 and 4 years, depending on the individual well locations (KJC 2015c).

Based on the above considerations and conclusions from Project-related groundwater quality modeling, significant impacts to groundwater quality from implementation of the proposed groundwater recharge efforts are not anticipated. The proposed septic system/leach field

facilities are also not anticipated to result in significant effects to groundwater quality, based on the small-scale nature of the proposed system, the presence of extensive alluvial deposits in the proposed Project site area (which are anticipated to be suitable for septic system operation), and the anticipated lack of shallow groundwater or bedrock (as discussed above and in Section 3.4). Due to the preliminary and analytical nature of the described Feasibility Study investigations and design features, however, detailed, site-specific water quality modeling and septic system evaluation would be required to verify the noted conclusions. As a result, Project-related impacts related to groundwater quality are considered potentially significant, with mitigation identified below in Section 3.6.4 to address these potential impacts. Specifically, this mitigation entails completion of site-specific numerical groundwater quality modeling (including a Title 22 Engineering Report) and a septic system evaluation to evaluate associated potential impacts and, if applicable, to identify associated standard remedial measures.

3.6.4 Mitigation Measures

As described in Section 3.6.3, implementation of the proposed Project would result in potentially significant impacts related to hydrologic conditions (including drainage alteration, runoff generation/storm water management, flood hazards, and groundwater quality). Accordingly, the following mitigation measures are provided to address those issues, and would avoid or reduce all identified hydrology and water quality impacts below a level of significance.

MM HYD-1: Conduct a Site-specific Hydrologic Investigation

A site-specific hydrologic investigation shall be completed for the proposed Project prior to approval of final design. All applicable results and recommendations from this investigation shall be incorporated into the associated final design documents to address identified potential hydrologic concerns, including, but not necessarily limited to, drainage alteration, runoff rates/amounts and storm water management, and flood hazards. The final Project design documents shall also encompass applicable standard design and construction practices from sources including NPDES and local standards (with related requirements to be included in applicable engineering/design drawings and/or construction contract specifications). A summary of the types of remedial measures typically associated with identified potential hydrologic concerns, pursuant to applicable regulatory and industry standards (as noted), is provided below. The remedial measures identified/recommended as part of the described site-specific hydrologic investigation will take priority over the more general types of standard regulatory/industry measures listed below.

- Drainage Alteration: (1) locate applicable facilities outside of surface drainage courses and drainage channels; (2) re-route surface drainage around applicable facilities, with such re-routing to be limited to the smallest area feasible and re-routed drainage to be directed back to the original drainage course at the closest feasible location (i.e., the closest location to the point of diversion); and (3) use drainage structures to convey flows within/through development areas and maintain existing drainage patterns, where appropriate and feasible.

- Runoff Rates/Amounts and Storm Water Management: (1) minimize the installation of new impervious surfaces (e.g., by surfacing with pervious pavement, gravel or

decomposed granite); (2) use flow regulation facilities (e.g., detention/retention basins) and velocity control structures (e.g., riprap dissipation aprons at drainage outlets), to maintain pre-development runoff rates and amounts, if applicable; and (3) utilize additional and/or enlarged drainage facilities to ensure adequate on- and off-site storm drain system capacity, if applicable.

- Flood Hazards: (1) locate proposed facilities outside of mapped 100-year floodplain boundaries wherever feasible; (2) based on technical analyses such as Hydrologic Engineering Center-River Analysis System (HEC-RAS) studies, restrict facility locations to avoid adverse impacts related to impeding or redirecting flood waters; (3) based on HEC-RAS studies, use measures such as raised fill pads to elevate proposed structures above calculated flood levels, and/or utilize protection/containment structures (e.g., berms, barriers or water-tight doors) to avoid flood damage; and (4) if Project-related activities/facilities result in applicable proposed changes to mapped FEMA floodplains, obtain an approved Conditional Letter of Map Revision (CLOMR) and/or Letter of Map Revision (LOMR) from FEMA, as applicable.

MM HYD-2: Conduct a Site-specific Groundwater Quality Investigation

A site-specific groundwater quality investigation shall be completed for long-term operations associated with the proposed Project, prior to the RWQCB issuing a permit to operate. This investigation shall include detailed, numerical modeling to assess potential proposed Project-related effects to groundwater quality in proposed Project Recovery Wells and other applicable wells in the site vicinity. All applicable results and recommendations from this investigation shall be incorporated into the associated individual final Project design documents to address identified potential long-term groundwater quality issues related to proposed recharge and recovery efforts, including the use of recycled water. The described modeling/investigative efforts and the final Project design documents shall also encompass applicable regulatory standards from sources including the SWQCB/RWQCB, CCR Titles 17 and 22 (including a Project-specific Title 22 Engineering Report per Article 7, Section 60323), Title 22 Water Code section 13562.5 for Groundwater Replenishment Using Recycled Water, and pertinent local standards, with related requirements to be included in associated engineering/design drawings and construction/operation contract specifications. Depending on the results of the noted modeling/investigative efforts, standard remedial measures that could potentially be used to address identified concerns may include: (1) reduction (e.g., through blending) or elimination of recycled water as a recharge source; (2) implementation of applicable source water treatment (e.g., to reduce TDS levels) prior to recharge; and (3) modification of the proposed Project elements such as the location and/or configuration of Recovery Wells (e.g., to increase the residence time and/or recovery percentage of recharged water), and/or the location/capacity of recharge basins. The measures identified/recommended as part of the described site-specific groundwater quality investigation shall take priority over the more general types of standard efforts identified above.

MM HYD-3: Conduct a Site-specific Septic System Investigation

A site-specific septic system investigation shall be completed for the proposed Project, prior to final Project design approval, to assess related potential impacts to groundwater quality. This

investigation shall include appropriate analysis of the proposed septic system, pursuant to applicable regulatory requirements from sources including the SWQCB/RWQCB, Los Angeles County, and the City of Palmdale. Specific elements of the septic system analysis may include: (1) system design adequacy (e.g., septic tank/leach field locations and dimensions, and provision of adequate separation from groundwater aquifers); (2) soil/percolation testing; (3) assessment of potential groundwater quality impacts from nitrates and other applicable contaminates; and (4) identification of appropriate operation and maintenance requirements to ensure proper system function. Applicable results and recommendations from this investigation shall be incorporated into the final septic system design to address potential groundwater quality issues related to proposed septic system operation. Depending on the results of the noted evaluation, standard remedial measures that could potentially be used to address identified concerns may include: (1) redesign/relocation of proposed septic system facilities; (2) use of alternative septic system design (e.g., disinfection systems); (3) use of alternative waste disposal systems (e.g., composting or incinerator toilets); and (4) connection to a municipal sewer system. The measures identified/recommended as part of the described septic system investigation shall take priority over the more general types of efforts identified above.

3.6.5 Conclusions

Based on the implementation of the mitigation described in Section 3.6.4, all identified Project-related impacts associated with hydrology and water quality would be avoided or reduced below a level of significance, with no significant unavoidable adverse impacts.

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3.7 NOISE

This section describes the existing noise and vibration environment within the proposed Project site and applicable off-site areas, identifies pertinent regulatory requirements associated with noise- and vibration-related issues, evaluates potential noise and vibration impacts, and identifies mitigation measures related to implementation of the proposed Project (as applicable). An Acoustical Analysis Report has been prepared for the proposed Project by HELIX (2015b), with this study summarized in the following analysis along with other applicable information. The complete acoustical report is included as Appendix H of this EIR.

3.7.1 Existing Conditions

Fundamentals of Noise and Vibration

Sound, Noise and Acoustics

Sound can be described as the mechanical energy of a vibrating object transmitted by pressure waves through a liquid or gaseous medium (e.g., air) to a hearing organ, such as a human ear. Noise is defined as loud, unexpected, or annoying sound.

In the science of acoustics, the fundamental model consists of a sound (or noise) source, a receiver, and the propagation path between the two. The loudness of the noise source and obstructions or atmospheric factors affecting the propagation path to the receiver determine the sound level and characteristics of the noise perceived by the receiver. The field of acoustics deals primarily with the propagation and control of sound.

All noise or sound level values presented herein are expressed in terms of decibels (dB), with A-weighting (dBA) used to approximate the hearing sensitivity of humans. Time-averaged noise levels are expressed by the symbol L_{EQ}, with a specified duration (e.g., one hour). The community noise equivalent level (CNEL) is a 24-hour average, where noise levels during the evening hours of 7:00 p.m. to 10:00 p.m. have an added 5 dB weighting, and sound levels during the nighttime hours of 10:00 p.m. to 7:00 a.m. have an added 10 dB weighting. This is similar to the Day-Night sound level (L_{DN}), which is a 24-hour average with an added 10 dB weighting on the same nighttime hours but no added weighting on the evening hours. Sound levels expressed in CNEL are always based on dBA. These metrics are used to express noise levels for both measurement and municipal regulations, as well as for land use guidelines and enforcement of noise ordinances.

Because decibels are logarithmic units, under the decibel scale a doubling of sound energy corresponds to a 3-dB increase. In other words, when 2 identical sources are each producing sound of the same loudness, the resulting sound level at a given distance would be 3 dB higher than one source under the same conditions. Accordingly, to create an overall 3-dBA L_{EQ} change in traffic noise (for example), the traffic volume must double while maintaining the same speed.

As described above, a doubling of sound energy results in a three dB increase in sound. The subjective human perception of a doubling of loudness, however, will usually be different than what is measured with precise instrumentation. In typical noisy environments, changes in noise of 1 to 2 dB are generally not perceptible, although it is widely accepted that people begin to

detect sound level increases of 3 dB. In addition, a 5-dB increase is generally perceived as distinctly noticeable, and a 10-dB increase is generally perceived as a doubling of loudness. Accordingly, a doubling of sound energy (e.g., doubling the volume of traffic on a highway) that would result in a 3-dB increase in sound would generally be perceived as barely detectable by the human ear.

Vibration

Vibration is defined as any oscillatory motion induced in a structure or mechanical device as a direct result of some type of energy input. Sources of ground-borne vibrations can include natural phenomena (e.g., earthquakes, volcanic eruptions, sea waves or landslides) and human activities (e.g., trains, traffic or construction equipment/operations). Most perceptible indoor vibration is caused by sources within buildings, such as operation of mechanical equipment, movement of people, or slamming of doors. Typical outdoor sources of perceptible ground-borne vibration include construction equipment, steel-wheeled trains, and traffic on rough roads (with vibration from traffic on smooth roadways rarely perceptible). For purposes of this analysis, ambient and source vibration information is expressed in terms of peak particle velocity (PPV), given in inches per second (in/sec) over a range of 1 to 100 Hertz (Hz) (with additional information provided in Appendix H).

Existing Noise and Vibration Environment

Existing Noise and Vibration Sources

Existing sources of noise and vibration in the proposed Project site and vicinity include roadway, rail and aircraft traffic. Existing major roadways within or adjacent to the site include Highway 138 (Pearblossom Highway) just south of the proposed SWP Turnout; East Palmdale Boulevard, which encompasses portions of the proposed Potable Water Pipeline alignment; and 105th and 106th Streets East, which include portions of the proposed Potable Water and/or Raw Water/Return Water Pipelines (refer to Figure 2-3, *Proposed Project - Aerial Photograph*). Additional potential sources of noise and vibration in the proposed Project vicinity include Los Angeles/Palmdale Regional Airport, approximately 3.5 miles northwest of the proposed Project site at its closest point (from the 30-inch Potable Water Pipeline), a single rail line that crosses the proposed Project site (36-inch Raw Water/Return Water Pipeline corridor) at 106th Street East (just south of East Avenue T), and a number of additional local roadways.

The proposed Project site and adjacent areas include a mix of low- to medium-density residential sites (and related commercial/institutional uses), agriculture, several small solar arrays, two recycled water seasonal storage ponds and undeveloped (vacant) areas. Specifically, the Recharge Site and related Recovery Wells, Distribution Site and pipeline facilities are in an area that is predominantly undeveloped and contains natural vegetation and some unpaved roads/trails used by off-highway vehicles. The Raw Water/Return Water and Potable Water Pipelines encompass undeveloped areas, as well as urban development including uses such as residential (and related) sites, roads, agriculture, and other facilities as noted.

The proposed Project site is relatively level with an overall grade to the north, and exhibits elevations of between approximately 2,500 and 2,900 feet amsl.

Noise-Sensitive Land Uses

Noise-sensitive land uses include sites that may be subject to stress and/or interference from excessive noise. Noise-sensitive receptors include residences, schools, hospitals, and other areas where people live and/or sleep. The recharge/recovery area portion of the proposed Project site (including the proposed Recovery Wells, Recharge Site, and Distribution Site) does not contain any noise-sensitive receptors. The nearest existing noise-sensitive land uses to this portion of the proposed Project site are residences located over 1,500 feet to the south at East Avenue M-8.

The nearest residential areas to the proposed pipeline alignment construction (beyond the residences identified above along East Avenue M-8) begin about 4.25 miles south of the recharge site at the intersection of East Palmdale Boulevard and 105th Street East. The pipeline alignments would split at this location, with the 30-inch Potable Water Pipeline extending west along East Palmdale Avenue, and the 36-inch Raw Water/Return Water Pipeline continuing south (with a small jog west at East Avenue S to 106th Street East) to the proposed SWP Turnout. There are several separate residential community areas along the noted portions of both pipeline routes, with houses as close as 30 feet to the edge of the roadway. Other noise-sensitive land use sites in proximity to the pipeline routes include Daisy Gibson Elementary School on East Palmdale Boulevard (west of 97th Street East), Littlerock High School on East Avenue R (east of 105th Street East and south of East Palmdale Boulevard), and a church on East Avenue S (north of 106th Street East).

Vibration-Sensitive Land Uses

Vibration-sensitive land uses include sites where vibration could potentially interfere with operations or equipment, such as research, manufacturing, hospital, and laboratory operations. The degree of sensitivity depends on the specific operations or equipment that would be affected by the ground-borne vibration. Excessive levels of ground-borne vibration of either a regular or an intermittent nature can also result in "annoyance effects" to residential uses. No vibration-sensitive land uses are located within or adjacent to the proposed Project site (other than residences as previously described), with the closest off-site vibration sensitive use consisting of health care facilities located on East Palmdale Boulevard approximately 1.3 miles west of 60th Street East.

Noise Measurement Locations and Results

The proposed Project site and vicinity are relatively quiet, with a series of 5-minute noise measurements conducted at the Recharge Site and along the pipeline alignments on Wednesday, July 15, 2015. The noise measurement locations and observed noise levels are outlined below in Table 3.7-1, *Project Area Measured Noise Levels* (with additional description of noise measurement methodology and conditions provided in Appendix H).

Table 3.7-1
PROJECT AREA MEASURED NOISE LEVELS
(July 15, 2015)

No.	Time	Location	dBA L_{EQ}	Noise Source
1	2:00 p.m.	106th Street East, east side, 75 feet north of the East Branch of the California Aqueduct	56.3	Traffic on Pearblossom Highway
2	2:15 p.m.	106th Street East, east side, across from residence (110 feet north of East Avenue T-6)	43.3	Wind
3	2:30 p.m.	106th Street East, east side across from pumps at East Avenue T	48.4	Pumps
4	2:45 p.m.	106th Street East, east side at East Avenue S	60.1	Traffic and Residential Stereo
5	3:05 p.m.	105th Street East and East Avenue R-6 (northeast corner)	55.7	Two Cars
6	3:30 p.m.	105th Street East and East Avenue Q	46.8	Crow
7	3:50 p.m.	105th Street East and East Avenue N	45.9	Wind
8	4:10 p.m.	10[5th] Street East and East Avenue M	44.4	Wind
9	4:50 p.m.	58th Street East and East Palmdale Boulevard (southeast corner)	73.1	Traffic
10	5:20 p.m.	East Palmdale Boulevard in front of Daisy Gibson Elementary School	72.1	Traffic and Solar Inverters

Source: HELIX 2015b

Regulatory Framework

When a local water agency such as PWD is directly and immediately engaged in "the production, generation, storage, treatment, or transmission of water…", the agency has an absolute exemption from complying with local building and zoning ordinances for the location or construction of facilities (Government Code, §53091, subds. [d],[e]). The proposed Project involves facilities directly and immediately engaged in the production, generation, treatment, and transmission of water. For this reason, and because the PWD is the applicable regulatory agency and CEQA lead agency, the proposed Project is exempt from the noise limits for Los Angeles County (County) and the cities of Palmdale and Lancaster. The proposed Project design and implementation, however, would include measures to provide conformance with applicable local regulations wherever practical. Accordingly, pertinent noise and vibration standards of the County and the cities of Palmdale and Lancaster are outlined below.

County of Los Angeles Noise Control Ordinance

Construction Noise and Vibration Limits

Construction noise and vibration limits are included in Chapter 12.08, Noise Control, of the Los Angeles County Code of Ordinances, as stated below:

§12.08.440 Construction Noise

A. Operating or causing the operation of any tools or equipment used in construction, drilling, repair, alteration or demolition work between weekday hours of 7:00 p.m. and 7:00 a.m., or at any time on Sundays or holidays, such that the sound creates a noise disturbance across a residential or commercial real-property line, except for emergency work of public service utilities or by variance issued by the health officer is prohibited.

B. Noise Restrictions at Affected Structures. The contractor shall conduct construction activities in such a manner that the maximum noise levels at the affected buildings will not exceed those listed in the following schedule:

1. At Residential Structures.

a. Mobile Equipment (Table 3.7-2, *Mobile Construction Equipment Noise Limits*). Maximum noise levels for nonscheduled, intermittent, short-term operation (less than 10 days) of mobile equipment:

Table 3.7-2
MOBILE CONSTRUCTION EQUIPMENT NOISE LIMITS

Time	Single-family Residential	Multi-family Residential	Semi-residential/ 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

Source: Los Angeles County Code of Ordinances

b. Stationary Equipment (Table 3.7-3, *Stationary Construction Equipment Noise Limits*). Maximum noise level for repetitively scheduled and relatively long-term operation (periods of 10 days or more) of stationary equipment:

Table 3.7-3
STATIONARY CONSTRUCTION EQUIPMENT NOISE LIMITS

Time	Single-family Residential	Multi-family Residential	Semi-residential/ 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

Source: Los Angeles County Code of Ordinances

2. At Business Structures.

   a. Mobile equipment. Maximum noise levels for nonscheduled, intermittent, short-term operation of mobile equipment.

   b. Daily, including Sunday and legal holidays, all hours: maximum of 85 dBA.

   c. All mobile or stationary internal-combustion-engine powered equipment or machinery shall be equipped with suitable exhaust and air-intake silencers in proper working order.

   d. In case of a conflict between this chapter and any other ordinance regulating construction activities, provisions of any specific ordinance regulating construction activities shall control.

   (Ord. 11778 §2 (Art. 5 §501(c)), 1978: Ord. 11778 §2 (Art. 5 §501(c)), 1978.)

§12.08.560 Vibration

Operating or permitting the operation of any device that creates vibration which is above the vibration perception threshold of any individual at or beyond the property boundary of the source if on private property, or at 150 feet (46 meters) from the source if on a public space or public right-of-way, is prohibited. The perception threshold shall be a motion velocity of 0.01 in/sec over the range of 1 to 100 Hz.

(Ord. 11778 §2 (Art. 5 §501(d)), 1978: Ord. 11773 §2 (Art. 5 §501(d)), 1978.)

Operational Noise and Vibration Limits

Operational noise and vibration impacts from the proposed Project are governed by the Los Angeles County Code, as stated below:

§12.08.390 Exterior Noise Standards (Table 3.7-4, *Operational Exterior Noise Standards*)

A. Unless otherwise herein provided, the following exterior noise levels shall apply to all receptor properties within a designated noise zone:

B. Unless otherwise herein provided, no person shall operate or cause to be operated, any source of sound at any location within the unincorporated county, or allow the creation of any noise on property owned, leased, occupied or otherwise controlled by such person which causes the noise level, when measured on any other property either incorporated or unincorporated, to exceed any of the following exterior noise standards:

   Standard No. 1 shall be the exterior noise level which may not be exceeded for a cumulative period of more than 30 minutes in any hour. Standard No. 1 shall be the applicable noise level from subsection A of this section; or, if the ambient L_{50} exceeds the foregoing level, then the ambient L_{50} becomes the exterior noise level for Standard No. 1.

Table 3.7-4
OPERATIONAL EXTERIOR NOISE STANDARDS

Noise Zone	Designated Noise Zone Land Use (Receptor Property)	Time Interval	Exterior Noise Level (dB)
I	Noise-sensitive area	Anytime	45
II	Residential properties	10:00 p.m. to 7:00 a.m. (nighttime)	45
		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
		7:00 a.m. to 10:00 p.m. (daytime)	60
IV	Industrial properties	Anytime	70

Source: Los Angeles County Code of Ordinances

Note: For the purposes of this analysis, the noise level limits presented in this table are considered to be expressed in dBA instead of dB, per the measurement methodologies expressed in Section 12.08.370 of the County Ordinance.

Standard No. 2 shall be the exterior noise level which may not be exceeded for a cumulative period of more than 15 minutes in any hour. Standard No. 2 shall be the applicable noise level from subsection A of this section plus 5 dB; or, if the ambient L_{25} exceeds the foregoing level, then the ambient L_{25} becomes the exterior noise level for Standard No. 2.

Standard No. 3 shall be the exterior noise level which may not be exceeded for a cumulative period of more than five minutes in any hour. Standard No. 3 shall be the applicable noise level from subsection A of this section plus 20 dB; or, if the ambient $L_{8.3}$ exceeds the foregoing level, then the ambient $L_{8.3}$ becomes exterior noise level for Standard No. 3.

Standard No. 4 shall be the exterior noise level which may not be exceeded for a cumulative period of more than one minute in any hour. Standard No. 4 shall be the applicable noise level from subsection A of this section plus 15 dB; or, if the ambient $L_{1.7}$ exceeds the foregoing level, then the ambient $L_{1.7}$ becomes the exterior noise level for Standard No. 4.

Standard No. 5 shall be the exterior noise level which may not be exceeded for any period of time. Standard No. 5 shall be the applicable noise level from subsection A of this section plus 20 dB; or, if the ambient L_0 exceeds the foregoing level then the ambient L_0 becomes the exterior noise level for Standard No. 5.

(Ord. 11778 §2 (Art. 4 §403), 1978: Ord. 11773 §2 (Art. 4 §403), 1978.)

§12.08.560 Vibration

Operating or permitting the operation of any device that creates vibration which is above the vibration perception threshold of any individual at or beyond the property boundary of the source if on private property, or at 150 feet (46 meters) from the source if on a public space or public right-of-way is prohibited. The perception threshold shall be a motion velocity of 0.01 in/sec over the range of 1 to 100 Hz.

(Ord. 11778 §2 (Art. 5 §501(d)), 1978: Ord. 11773 §2 (Art. 5 §501(d)), 1978.)

County of Los Angeles Noise Element

Per the Noise Element of the County General Plan, noise levels up to 60 CNEL are considered "normally acceptable" for low-density residential development.

City of Palmdale Noise Ordinance

Construction Noise

§8.28.030 Construction Noise Prohibited in Residential Zones

Except as otherwise provided in this chapter, no person shall perform any construction or repair work on any Sunday, or any other day after 8:00 p.m. or before 6:30 a.m., in any residential zone or within 500 feet of any residence, hotel, motel or recreational vehicle park. For the purposes of this section, construction and repair work includes work of any kind upon any building or structure, earth excavating, filling, or moving, and delivery, preparation or operation of construction equipment, materials or supplies where any of the foregoing entails the use of an air compressor, jack hammer, power-driven drill, riveting machine, excavator, semi-truck, diesel power truck, tractor, cement truck, or earth moving equipment, hand hammer, or other machine, tool, device or equipment which makes loud noise which disturbs the peace and quiet of any neighborhood or which causes discomfort or annoyance to any reasonable person of normal sensitiveness sleeping or residing in the area.

(Ord. 1335 §1, 2007; Ord. 584 §1, 1986)

Operational Noise

§9.18.010 Noise

(A) It shall be unlawful for any person to willfully make or continue, or cause or permit to be made or continued, any loud, unnecessary, or unusual noise which unreasonably disturbs the peace and quiet of any neighborhood or which causes discomfort or annoyance to any reasonable person of normal sensitiveness residing in the area.

(B) The characteristics and conditions, which may be considered in determining whether such noise violates the provisions of this section, shall include, but not be limited to, the following:

(1) The volume of the noise;

(2) The intensity of the noise;

(3) Whether the nature of the noise is usual or unusual;

(4) Whether the origin of the noise is natural or unnatural;

(5) The volume and intensity of the background noise, if any;

(6) The proximity of the noise to sleeping facilities;

(7) The nature and zoning of the area within which the noise emanates;

(8) The density of the inhabitation of the area within which the noise emanates;

(9) The time of the day or night the noise occurs;

(10) The duration of the noise;

(11) Whether the noise is recurrent, intermittent, or constant;

(12) Whether the noise is produced by a commercial or noncommercial activity.

(Ord. 1332 §1, 2007)

City of Lancaster Noise Ordinance

Construction Noise

§8.24.040 Loud, Unnecessary and Unusual Noises Prohibited—Construction and Building

A person at any time on Sunday or any day between the hours of 8:00 p.m. and 7:00 a.m. shall not perform any construction or repair work of any kind upon any building or structure or perform any earth excavating, filling or moving where any of the foregoing entails the use of any air compressor, jack hammer, power-driven drill, riveting machine, excavator, diesel-powered truck, tractor or other earth-moving equipment, hard hammers on steel or iron or any other machine tool, device or equipment which makes loud noises within 500 feet of an occupied dwelling, apartment, hotel, mobile home or other place of residence.

Operational Noise

§8.24.010 - Declaration of Policy

It is declared to be the policy of the city to prohibit unnecessary, excessive and annoying noises from all sources subject to its police power. At certain levels noises are detrimental to the health and welfare of the citizenry, and, in the public interests, such noise levels shall be systematically proscribed.

§8.24.030 - Loud, Unnecessary and Unusual Noises Prohibited.

Notwithstanding any other provision of this chapter, and in addition thereto, no person shall make, cause or suffer, or permit to be made upon any premises owned, occupied or controlled by him/her any unnecessary noises or sounds which are physically annoying to persons of ordinary

sensitiveness which are so harsh or so prolonged or unnatural or unusual in their use, time, or place as to occasion physical discomfort to the inhabitants of any neighborhood. All animals shall be so maintained.

3.7.2 Significance Thresholds

The PWD utilizes CEQA Guidelines Appendix G for criteria to determine significant impacts. Accordingly, the following significance thresholds are used.

The Project would typically result in a significant or potentially significant impact if it would:

- Expose people to, or result in the generation of, noise levels that exceed the standards established in local general plans or noise ordinances, or applicable standards of other agencies.
- Expose people to, or result in the generation of, excessive ground-borne vibration or ground-borne noise levels.
- Result in a substantial permanent increase in ambient noise levels in the project vicinity above noise levels existing without the project.
- Result in a substantial temporary or periodic increase in ambient noise levels in the project vicinity above noise levels existing without the project.
- For a project located within an airport land use plan, or where such a plan has not been adopted, within two miles of a public airport or public use airport, expose people residing or working in the project area to excessive noise levels.
- For a project within the vicinity of a private airstrip, expose people residing or working in the project area to excessive noise levels.

3.7.3 Impact Analysis

Assumptions

In the assessment of potential impacts, the Project Acoustical Analysis Report identifies a number of assumptions for Project-related construction and operational activities, as outlined below.

Construction-related Assumptions

The proposed Project would include the construction of the Recharge Site, Distribution Site, Recovery Wells and pipelines. Pipeline construction activities would include trenching, installation of pipes, backfilling, and (if applicable) repaving of the affected portions of streets. In addition, the proposed 36-inch Raw Water/Return Water Pipeline alignment includes the following two locations where jack-and-bore procedures, also known as auger boring, would be used: (1) along 105th Street East where the pipeline would pass under East Palmdale Avenue; and (2) along 106th Street East where the pipeline would pass under railroad tracks. The

jack-and-bore process at the noted locations would involve digging a pit with an excavator on each side of East Palmdale Avenue and the railroad tracks (an entrance and exit pit for the bore/auger), and boring under the roadway/tracks from the entrance pit to the exit pit on the other side of the roadway/tracks. The described jack-and-bore activities would require approximately two weeks at each noted location (one-month total). The loudest activity associated with pipeline construction as described would be the excavator used to dig the pipeline trenches and jack-and-bore pits, as the actual jack-and-bore activities would be conducted in the pit which would provide some noise shielding.

Nighttime pipeline construction may be required due to daytime traffic and transportation requirements for two locations along East Palmdale Boulevard where the pipeline is required to pass under the roadway. These two locations are:

- Approximately 750 feet east of the centerline of 70th Street East on Palmdale Avenue. The closest residential property is approximately 750 feet away from this station. The work and potential impacts would be the City of Palmdale.

- Approximately 500 feet west of the centerline of 87th Street East along East Palmdale Boulevard, with the closest residential property at a distance of approximately 1,050 feet. The work and potential impacts would be within unincorporated Los Angeles County.

Recharge basin construction activities would include the excavation and movement of soils to create perimeter berms. Potable Water Pump Station construction at the Distribution Site would include excavation, movement of soils, fill compaction, and building/pavement (and related facility) installation. The loudest activity associated with construction of at the Recharge Site and Distribution Site would be the dozer work.

Recovery Well construction activities would include excavation to create a level pad, drilling of the Recovery Well shaft (on a continuous 24 hours per day, 7 days per week schedule), paving of a concrete pad, and installation of above-ground pump equipment. The loudest activity associated with construction of the Recovery Wells would be an excavator during the daytime and the well rig (and associated equipment) at night.

Construction-related traffic noise also would be generated from haul trucks and employee vehicles.

The Project Acoustical Analysis Report also assumes that no construction activities other than the noted Recovery Well drilling would occur between the hours of 8:00 p.m. and 7:00 a.m. on Sundays or on legal holidays, as outlined in the Los Angeles County Code of Ordinances.

The noise source data for the described "noisiest" equipment used in the acoustical analysis is shown below in Table 3.7-5, *Construction Noise Source Data*.

Table 3.7-5
CONSTRUCTION NOISE SOURCE DATA

Equipment	Noise Levels in dB[1] Measured at Octave Frequencies in Hz									Overall Noise Level (dBA)
	31.5 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1,000 Hz	2,000 Hz	4,000 Hz	8,000 Hz	
Excavator[2]	117	122	115	114	114	110	118	105	100	116
Dozer as a Line Source	–	99.3	98.4	107.9	110.3	112.5	119.7	103.5	95.4	121.2
Well Rig	–	103.0	107.0	104.0	101.0	102.0	107.0	102.0	97.0	110.6

Source: HELIX 2015b
[1] Based on Sound Power Levels (S_{WL}).
[2] An excavator does not work continuously at full power, with the listed value representing the noise source for an hourly average assuming full power for 40 percent of the time.

Operational-related Assumptions

During operation, the proposed Project would include the following activities: (1) traffic trips associated with routine monitoring, inspection and maintenance efforts; and (2) operation of the recharge basins, Potable Water Pump Station, pipelines, and Recovery Wells.

Project Noise-related Impacts

Construction Noise Levels

Construction of the proposed Project would generate elevated noise levels that may disrupt nearby on- and/or off-site noise sensitive receptors through construction activity or related traffic. The noise levels generated at nearby noise-sensitive land uses from each type of activity are described below. As noted above in Section 3.7.1 under Regulatory Framework, the PWD is not subject to local government building or zoning regulations (including noise control ordinances). For the purposes of this analysis, however, the following assessment of impact significance considers the limits set forth for construction activities in applicable local noise standards.

Cities of Palmdale and Lancaster

Both the Cities of Palmdale and Lancaster prohibit construction within 500 feet of residential or other noise sensitive locations on Sunday, or any other day after 8:00 p.m. or before 6:30 a.m. Only the proposed Recovery Wells would involve construction activities that extend outside the noted hours, with the associated Recovery Well sites located at minimum distances of 2,500 feet (City of Palmdale) and 5,000 feet (City of Lancaster) from any existing residential uses. As a result, potential Project-related construction noise impacts in the cities of Palmdale and Lancaster would be less than significant.

Los Angeles County

The County noise control ordinance limits short-term, mobile operating equipment noise levels to 75 dBA at single-family residential structures between the hours of 7:00 a.m. and 8:00 p.m. on all days except Sunday and legal holidays. Los Angeles County provides a nighttime construction ordinance limit for mobile equipment of 60 dBA L_{EQ}.

As previously noted, it is assumed that construction of the proposed Potable and Raw Water/Return Water Pipelines would occur during the daytime, except for the two locations noted above, where nighttime construction of pipeline would potentially occur. Accordingly, the County-established noise limit used in this construction noise impact analysis is 75 dBA for daytime impacts. Between 8:00 p.m. and 7:00 a.m. on Sundays and on legal holidays, the allowable maximum stationary source construction-related noise level at single-family residential structures is 60 dBA. The County-established noise limit for mobile construction equipment used in this construction noise impact analysis for nighttime impacts is 60 dBA.

Project-related construction activity within the County portion of the proposed Project would include installation of pipelines and Recovery Wells. Specifically, this would encompass the following proposed Project elements: (1) mobile pipeline construction east of 87th Street East along East Palmdale Boulevard; (2) mobile and stationary (jack-and-bore) pipeline construction south of East Palmdale Boulevard along 105th Street East, East Avenue S and 106th Street East; and (3) construction of Recovery Wells north of East Avenue L but outside of the Lancaster city limits, as outlined below.

Mobile Pipeline Construction. Excavators and dump trucks associated with mobile pipeline construction would create a noise level of 75 dBA at a distance of approximately 50 feet. Pipeline excavation might occur as close as approximately 40 feet to the nearest residence, with corresponding noise levels as high as 76.5 dBA. While this would exceed the noted Los Angeles County standard of 75 dBA for daytime construction noise levels at single-family residential structures, associated potential impacts at any given residence would be less than significant based on the following considerations: (1) pipeline construction is expected to occur at a rate of approximately 300 feet per day, with any individual residence therefore only exposed to the maximum noise levels associated with pipeline construction during a single day; (2) the maximum potential noise level of 76.5 dBA is relatively close to the noted County limit of 75 dBA; and (3) as previously described, the proposed Project is technically not subject to the County noise control ordinance.

For nighttime pipeline construction at the two proposed locations (near 70th Street East and near 87th Street East on East Palmdale Boulevard), maximum noise levels for the construction from a dump truck and an excavator at 500 feet (the distance to the nearest residence from the 70th Street East location) would be approximately 55.1 dBA L_{EQ} and 49 dBA at 1,050 feet (the distance to the nearest residence at the 87th Street East location). Because nighttime construction (pipeline installation) noise impacts would only occur near any given residential property for a short duration—one or possibly two nights—and in consideration of the noise levels generated in comparison to the County of Los Angeles noise ordinance thresholds, noise impacts for nighttime construction operations in East Palmdale Boulevard would be less than significant.

Stationary (Jack-and-Bore) Pipeline Construction. Proposed jack-and-bore activities associated with pipeline construction would occur at minimum distances of 150 feet to the closest home along East Palmdale Boulevard, and 600 feet to the closest home at the railroad crossing. As a result, proposed jack-and-bore activities along East Palmdale Boulevard would generate higher noise levels at associated nearby residences than the railroad crossing. The excavator associated with this activity would generate the highest noise levels as previously noted, with the actual jack-and-bore activities to be conducted in the associated pit which would provide some noise shielding. Accordingly, the maximum calculated noise level associated with jack-and bore excavation activities would be approximately 65 dBA at the closest home along East Palmdale Boulevard (150 feet), which is below the noted County limit of 75 dBA. As a result, associated potential impacts would be less than significant.

Well Construction. The well rig and related equipment used for installation of Recovery Wells at the Recharge Site would create a noise level of 60 dBA at a distance of approximately 300 feet. As previously described, the nearest noise-sensitive land uses to this portion of the proposed Project site are residences located more than 1,500 feet to the south. As a result, associated construction noise levels would be below the noted maximum stationary source noise level limit for single-family residential structures of 60 dBA, and related impacts would be less than significant.

Construction Traffic. The proposed Project would generate minimal traffic during construction, with such trips limited primarily to off-site transport of excavated soil material via hauling trucks and employee ingress/egress. The haul trucks would temporarily elevate noise levels along the transport route during construction. Specifically, at 55 miles per hour truck noise for five trucks per hour (a conservative estimate) would be 56.5 dBA at 50 feet. The described truck trips would also be infrequent and occur intermittently during construction, and associated potential noise impacts would be less than significant.

Operational Noise Levels

For transportation-related noise, a significant impact would occur if the proposed Project results in a 3 CNEL or greater increase in traffic noise on a roadway segment and the resultant noise levels exceeds 60 CNEL for residential uses in any of the areas of the proposed Project.

City of Palmdale

Well Operations. The Recharge Site and Distribution Site in the City of Palmdale are zoned Planned Industrial, which has no specific noise limit or consideration of a noise limit. At 50 feet from a pump, the noise level may be as high as 68.5 dBA, with no associated significant impacts.

Operational Traffic. The vast majority of operational traffic for the proposed Project, which would consist of daily visits to the Recharge Site and Distribution Site and quarterly and annual maintenance activities, would occur at the Recharge Site and Distribution Site in the City of Palmdale. As indicated above, this area is zoned Planned Industrial and operation-related traffic noise is therefore not subject to specific noise limits. In addition, operational traffic associated with the proposed Project would not result in a perceptible change in noise levels associated with

traffic. As a result, potential noise impacts related to operational traffic in the City of Palmdale would be less than significant.

City of Lancaster

Well Operations. The City of Lancaster ordinances set the nighttime residential property line threshold of significance at 45 dBA. Based on the previously described pump design/operation (i.e., pumps located inside Recovery Well buildings with ventilation required for temperature control), associated noise impacts from any of the Recovery Well pumps within the City of Lancaster (with two proposed) may exceed 45 dBA at a distance of up to 750 feet from the pump. Under the currently proposed Project design, the pumps would be located at distances as close as 50 feet from existing (undeveloped) residential-zoned property lines within the City of Lancaster. Based on the distance from the pumps to the noted property lines and the associated noise levels, impacts from Recovery Well pump noise within the City of Lancaster would be potentially significant, with related mitigation provided below in Section 3.7.4.

Operational Traffic. Traffic associated with the proposed Project operation would be limited to a small number of monthly vehicle trips to and from the site during monitoring, inspection and maintenance visits. As described above for the City of Palmdale analysis, these trips would not result in a perceptible change in noise levels associated with traffic. As a result, potential noise impacts related to operational traffic in the City of Lancaster would be less than significant.

Los Angeles County

Well Operations. Operational noise impacts would be considered significant if Project-related noise levels exceed the County regulations for nighttime residential property-line threshold of 45 dBA. As noted above under the City of Lancaster discussion, noise impacts from any of the Recovery Well pumps within the County (with five proposed) may exceed 45 dBA at a distance of up to 750 feet from the pump. Under the currently proposed Project design, the pump locations would be located at distances as close as 50 feet from existing (undeveloped) residential-zoned property lines in the County. Based on the distance from the pumps to the noted property lines and the associated noise levels, impacts from Recovery Well pump noise within the County would be potentially significant, with related mitigation provided below in Section 3.7.4.

Operational Traffic. As previously described, Project-related operational traffic would be limited to a small number of monthly trips related to facility monitoring, inspection and maintenance. These trips would not result in a perceptible change in noise levels associated with traffic. As a result, potential noise impacts related to operational traffic in the County would be less than significant.

Project Vibration-related Impacts

Construction Vibration

There are no established construction vibration ordinances in the County or the cities of Palmdale and Lancaster. As a result, construction vibration is analyzed based on the "severe"

criteria, as specified by the California Department of Transportation (Caltrans; 2004) and outlined below and in Table 3.7-6, *Vibration Source Amplitudes for Construction Equipment*:

- A maximum of 2 PPV in/sec for transient sources.[1]
- A maximum of 0.4 PPV in/sec for continuous/frequent intermittent sources.[2]

Table 3.7-6
VIBRATION SOURCE AMPLITUDES FOR CONSTRUCTION EQUIPMENT (in/sec)

Vibration Source	PPV at 25 ft
Pile Driver	0.65
Vibratory roller	0.21
Large dozer	0.089
Caisson drilling	0.089
Loaded trucks	0.076
Small dozer	0.003
Loaded Truck (flatbed)	0.027

Source: Caltrans 2004

A vibratory roller is the most likely source of construction-related vibration impacts for both the pipeline corridors and the Recharge Site. As shown in Table 3.7-6, the vibration reference associated with a vibratory roller at a distance of 25 feet level is 0.21 PPV, which is below the identified significance threshold of 0.4 PPV. As a result, potential vibration-related impacts during construction of the proposed Project would be less than significant.

Operational Vibration

Cities of Palmdale and Lancaster

There are no operational vibration limits identified in applicable standards adopted by the cities of Lancaster and Palmdale. Accordingly, no significant vibration-related impacts would result from Project operation in either of these jurisdictions. In addition, as noted below for the County, operational vibration levels associated with the proposed Project would be limited to pumps at the Recovery Wells, with the level and extent of such vibration effects to be minor.

Los Angeles County

The County Code of Ordinances specify that operational vibration would be considered a significant impact if a motion velocity of 0.01 in/sec over the range of 1 to 100 Hz occurs at any individual location at or beyond the property boundary of the source if on private property, or at 150 feet from the source if on a public space or public right-of-way.

[1] Transient sources create a single, isolated vibration event, such as blasting or drop balls.
[2] Continuous/frequent intermittent sources include impact pile drivers, pogo-stick compactors, crack-and-seat equipment, vibratory pile drivers, and vibratory compaction equipment.

The previously described, pumps at the Recovery Wells and Distribution Site are the only source of operational vibration associated with operation of the proposed Project. Based on the associated (and standard) pump operations, vibration levels exceeding the described County criterion would be limited to areas within approximately 5 to 10 feet of the Recovery Well pumps. Because, as previously noted, the closest vibration-sensitive land uses to the proposed Recovery Well pumps are residential sites located more than 1,500 feet to the south, associated potential vibration impacts would be less than significant. It should also be noted, as described above for operational noise impacts, that currently undeveloped properties zoned for residential use in the County are located as close as 50 feet from proposed Recovery Well sites. Based on the described vibration levels for Recovery Well pump operations, however, even if residential development occurs at distances of 50 feet, Project-related vibration levels from pump operations would not exceed the identified County criterion, and associated potential vibration impacts would be less than significant.

Airport-related Noise Impacts

Public Airports

The closest public airport the proposed Project site, Los Angeles/Palmdale Regional Airport, is located approximately 3.5 miles to the northwest at its closest point (from the 30-inch Potable Water Pipeline alignment), and is included in the Los Angeles County Airport Land Use Plan (2004). While the proposed Project site is not located within the identified airport safety or hazard zones, portions of the site are located within the identified 65 CNEL contour associated with the airport. Specifically, this would include an approximately 0.85-mile segment of the proposed 30-inch Potable Water and 36-inch Raw Water/Return Water Pipeline alignment along 105th Street East (between East Avenue M and Barstow Road), several of the Recovery Wells located along East Avenue M, and all or part of the Distribution Site. Associated potential impacts from airport-related uses (aircraft), however, would be less than significant based on the following considerations: (1) none of the noted project facilities within (or outside of) the identified 65 CNEL contour would involve on-site occupation; (2) the noted pipeline segments within 105th Street East would be subsurface and would not entail the extended or long-term presence of Project-related personnel; (3) the potential presence of Project-related personnel at applicable Recovery Well sites within the identified 65 CNEL contour would be limited to temporary and relatively short-duration inspection/maintenance activities; (4) any extended presence by Project-related personnel at the Distribution Site (e.g., control room activities) would be conducted within an enclosed building; and (5) the 65 CNEL noise level is well below the established OSHA "trigger" threshold of 80 CNEL (as an 8-hour average) for potential adverse impacts to construction or operational employees.

Private Airstrips

There are no private airstrips within the nearby vicinity of the proposed Project site, with the closest such facilities located approximately 6.5 miles to the southeast (Crystal Airport), 6.5 miles to the east (Nichols Farms Airport), 8.4 miles to the northwest (Sterks Ranch Airport), and 10 miles to the east (Brian Ranch Airport). Based on the noted distances, as well as the proposed Project operational conditions described above for public airports, potential

noise-related impacts from private airstrip operations at the proposed Project site would be less than significant.

3.7.4 Mitigation Measures

As described above in Section 3.7.3, implementation of the proposed Project would result in potentially significant noise impacts to residentially-zoned properties in the County of Los Angeles and City of Lancaster from Recovery Well pump operations. Accordingly, the following mitigation measure is provided to address those issues, and would avoid or reduce all identified noise impacts below a level of significance.

MM NOI-1: Recovery Well Pump Building Design

If the PWD does not own all of the land within 750 feet of a planned Recovery Well pump and building outside the City of Palmdale limits, the Recovery Well building shall be designed and built to provide noise control reduction to the less-than-significant level of 45 dBA at 50 feet. Specifically, this could potentially include standard industry measures such as providing appropriately designed noise-control louvers or in-line duct silencers for the well building ventilation to reduce external noise levels.

3.7.5 Conclusions

Based on the implementation of the mitigation described in Section 3.7.4, all identified Project-related impacts associated with noise generation from Recovery Well pump operations would be avoided or reduced below a level of significance, with no significant unavoidable adverse impacts.

4.0 CUMULATIVE IMPACT ANALYSIS

4.1 INTRODUCTION

The State CEQA Guidelines define cumulative impacts as "two or more individual effects which, when considered together, are considerable or which compound or increase other environmental impacts" (State CEQA Guidelines Section 15355). According to State CEQA Guidelines Section 15130, an EIR shall discuss cumulative impacts of a project when the project's incremental effect is cumulatively considerable. A cumulative impact analysis must include either: (1) a list of past, present, and reasonably anticipated future projects; or (2) a summary of projections contained in adopted plans designed to evaluate regional or area-wide conditions.

A cumulative impact analysis considers the collective impacts posed by individual land use plans and projects. Cumulative impacts can result from individually minor, but collectively substantial, impacts taking place over a period of time. The cumulative impact analysis presented in this chapter addresses all of the resource issues evaluated in this EIR, which were included in the EIR because they were determined to have the potential for adverse impacts as a result of the proposed Project.

4.2 CUMULATIVE IMPACT ANALYSIS METHODS

To determine resources with the potential for cumulative impacts, this analysis evaluated impacts of the proposed Project when combined with impacts from past, current, and reasonably anticipated future projects. A list of cumulative projects located within 5 miles of the proposed Project was compiled with the cooperation of the cities of Palmdale and Lancaster and the County of Los Angeles. Although the proposed Project includes components within the Lancaster city limits, the developed portion of the City of Lancaster is located approximately 7 miles to the west of the proposed Project site. Consequently, none of the past, current, and reasonably anticipated future projects provided by the City of Lancaster was within the cumulative projects area for the site. The locations of cumulative projects are illustrated on Figure 4-1, *Cumulative Projects*, and their key characteristics are presented in Table 4-1, *Cumulative Projects.*

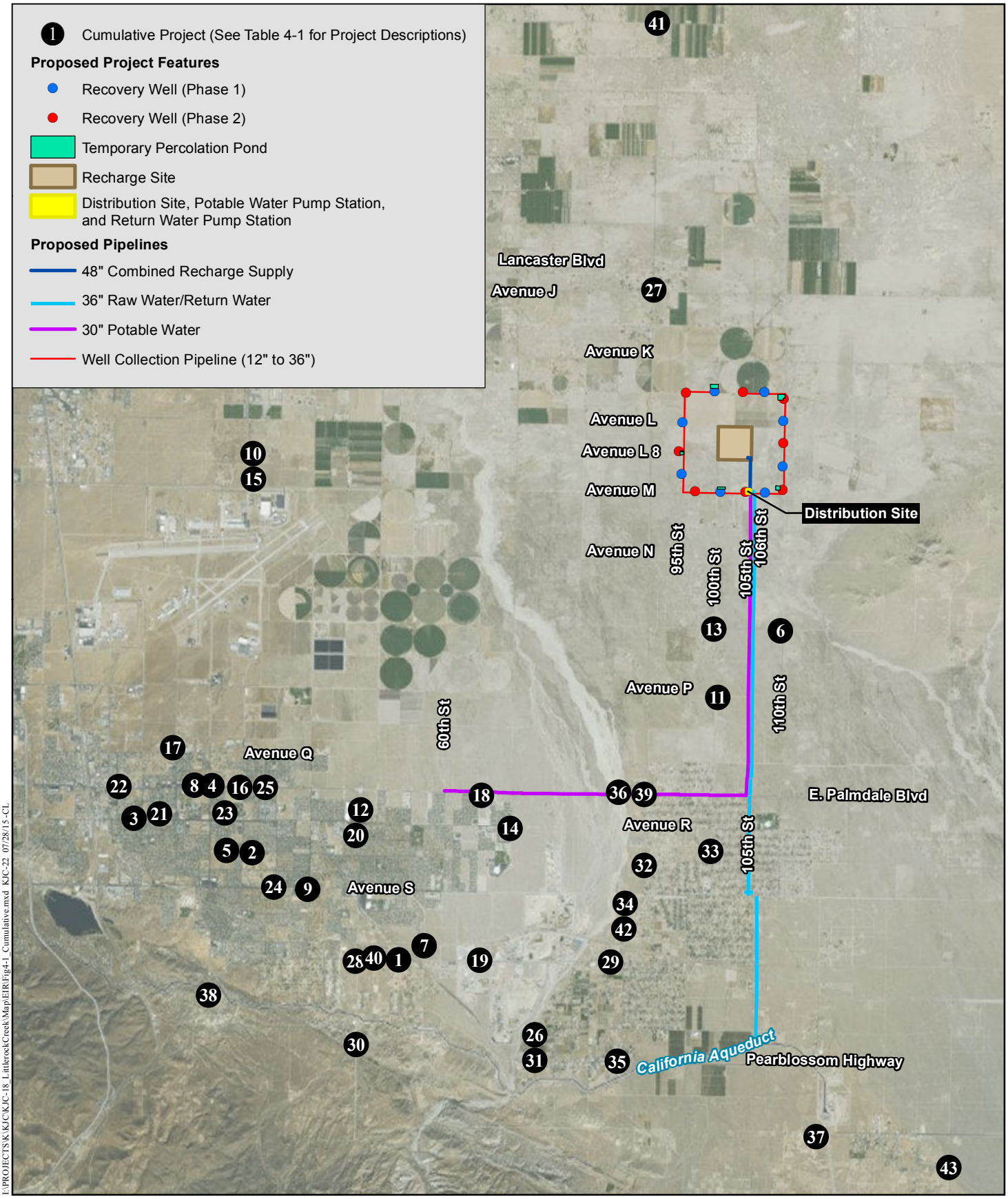
4.3 CUMULATIVE IMPACT ANALYSIS

4.3.1 Air Quality

The proposed Project, in conjunction with other projects in the area, would have the potential to produce a cumulative increase in criteria pollutant emissions. The regional and local daily emissions thresholds established by AVAQMD have been developed specifically to address cumulative impacts to air quality. Air quality impacts could be considered cumulatively considerable if: (1) a project's contribution of air emissions would exceed the national or state AAQS thresholds for a criteria pollutant that the air basin is in nonattainment for; or (2) project construction emissions combined with construction emissions from other projects would exceed national or state AAQS thresholds for a criteria pollutant.

Table 4-1
CUMULATIVE PROJECTS

Map No.	Project No.	Location	Description	Status
City of Palmdale				
1	CUP14-012	5508 Pearblossom Highway	75-foot high wireless telecommunications tower	Applied
2	CUP14-028	3030 East Avenue R-8	Proposed legalization of existing religious assembly use and proposed 6,817-square foot expansion	Applied
3	CUP15-003	1328 East Avenue R	A request to develop 1.09 acres into church classrooms – one building at 2,075 square feet	Applied
4	CUP15-023	2728 East Palmdale Boulevard	Request to establish a restaurant with alcohol sales at an existing 4,000-square foot commercial building	Applied
5	PA15-010	3243 East Avenue R-8	Proposed communications facility	Applied
6	SPR14-009 and SPR14-010	Southwest corner of East Avenue O and 110th Street East	Request to develop 24 acres for solar from original SPR13-003	Applied
7	CUP12-015	Northwest corner of Pearblossom Highway and Fort Tejon	Swap meet (Four Points Swap Meet Conditional Use Permit)	Approved
8	CUP14-009	2210 East Palmdale Boulevard	Request to establish fitness center within a lease space totaling 31,361 square feet	Approved
9	CUP14-014	Southwest corner of Avenue S and 40th Street East	65-foot high wireless telecommunications tower disguised as a water tank	Approved
10	SPR14-004	Northeast corner of Avenue M and 30th Street East	Request to construct a 20-megawatt photovoltaic facility consisting of 160 acres	Approved
11	SPR14-006	Southeast corner future alignment Avenue P and 100th Street East	Proposal to construction a ground mounted solar photovoltaic facility of 30 acres	Approved
12	SPR14-008	Avenue R and 47th Street East	Request to develop a 1.4-acre parcel with a 4,152-square foot retail/food use	Approved
13	SPR15-001	Southwest corner of 100th Street East and Avenue O	Request to develop 25 acres into a solar photovoltaic facility on three parcels	Approved
14	PA13-017	Southwest corner of 70th Street East and Avenue R	Request to subdivide 80 acres into 203 lots	Completed



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Cumulative Projects

PALMDALE REGIONAL GROUNDWATER RECHARGE AND RECOVERY PROJECT

HELIX Environmental Planning

N 0 2 Miles

Figure 4-1

Table 4-1 (cont.)
CUMULATIVE PROJECTS

Map No.	Project No.	Location	Description	Status
City of Palmdale (cont.)				
15	PA14-004	North of Avenue M, on both sides of 30th Street East	A 403 photovoltaic solar power plant	Completed
16	PA14-009	West side of 30th Street East, south of Palmdale Boulevard	Multi-family apartments	Completed
17	PA14-010	North of Avenue Q, west of 20th Street East	Subdivide parcel into four finished lots	Completed
18	PA14-015	Southwest corner of Palmdale Boulevard and 55th Street East	Request to subdivide 20 acres into 75 lots	Completed
19	PA14-016	6205 East Avenue T	Request to establish a concrete precast lining manufacturing plant	Completed
20	PA14-017	Northwest corner of Avenue R and 47th Street East	Request to develop a 1.4-acre parcel with a 4,152-square-foot retail use	Completed
21	PA14-018	Avenue Q-15 / 17th Street East	Dining area and classrooms for Sunday School	Completed
22	PA14-019	1104 East Palmdale Boulevard	Request to develop 5.83 acres into a multi-family development – 183 units	Completed
23	PA14-024	2520 East Palmdale Boulevard	Request to develop a commercial lot – 2,700 square feet	Completed
24	PA15-001	3347 East Avenue S	Request to construct a Buddhist Worship Center	Completed
25	PA15-002	30th Street East / Palmdale Boulevard	Request to develop 4.67 acres into office/medical use with four buildings	Completed
County of Los Angeles				
26	00-118	7331 Pearblossom Highway, Littlerock	Add 12 antennas, 6 equipment cabinets and GPS antenna	Approved
27	01-071	44400 90th Street East	Installation and operation of 6 panel antennas, one microwave antenna, one GPS antenna, 5 equipment cabinets, and 3 utility cabinets	Approved
28	89-003	Southwest corner of Pearblossom Highway and 47th Street East	Conditional Use Permit, Zone Change	Application Received
29	93-045	8533 East Avenue T, Littlerock	Addition of four modular classrooms to existing church	Approved

Table 4-1 (cont.)
CUMULATIVE PROJECTS

Map No.	Project No.	Location	Description	Status
County of Los Angeles (cont.)				
30	99-280	35613 47th Street East, Palmdale	Modify existing wireless telecommunications facility, install backup generator, 3 panel antennas, fiber cables and cabinet	Approved
31	R2005-01675	7331 Pearblossom Highway, Littlerock	T-Mobile upgrade of antennas for existing wireless telecommunications site	Approved
32	R2006-02483	37539 90th Street East, Sun Village	To authorize a rodeo with an existing single family residential, and the sale of alcoholic beverages located in the A-2 zone	Application Received
33	R2008-02283	37721 100th Street East, Littlerock	T-Mobile proposes to remove 3 existing antennas and install 3 new antennas and 6 tower-mounted amplifiers behind each new antenna	Approved
34	R2008-02353	Southeast corner of 90th Street East and Avenue S-8, Littlerock	T-Mobile proposes to remove 6 existing antennas and install 3 new antennas. T-Mobile also proposes to install 6 tower-mounted amplifiers behind each new antenna.	Approved
35	R2009-00955	8719 Pearblossom Highway, Littlerock	Modify wireless telecommunications facility	Approved
36	R2009-01065	8837 East Palmdale Boulevard, Palmdale	Replace existing antennas and other equipment for existing wireless telecommunications facility	Approved
37	R2011-00144	34141 116th Street East, Littlerock	Modification of existing wireless telecommunications facility	Additional Information Received
38	R2011-00841	2454 Old Nadeau Road, Palmdale	To authorize the construction, operation, and maintenance of an 80-foot wireless telecommunications facility mono-pine	Approved
39	R2011-01959	8837 East Palmdale Boulevard, Palmdale	Modify an existing unmanned wireless telecommunications facility	Additional Information Received

Table 4-1 (cont.)
CUMULATIVE PROJECTS

Map No.	Project No.	Location	Description	Status
County of Los Angeles (cont.)				
40	R2012-00057	5160 Pearblossom Highway, Palmdale	New church and assembly building	Revised Plan Review
41	R2013-03397	Corner of East Avenue F and 90th Street East	A solar photovoltaic facility up to 7.45 megawatts in size. The project will operate year-round producing energy during daylight hours.	Fire Additional Review
42	R2015-03397	Corner of East Avenue S-8 and 90th Street East	New conditional use permit for co-location on existing stealth water tank	Affidavit of Acceptance Received
43	R2015-02117	Valyermo Road and 136th Street East, Pearblossom	Proposing 46 single-family lots	Filing Received

Sources: City of Palmdale 2015; City of Lancaster 2015a and 2015b; Los Angeles County 2015a.

Development of the proposed Project, in conjunction with other related projects in the MDAB, would have the potential to produce a cumulative increase in criteria pollutant emissions during the construction phases of these projects, assuming the construction activities overlap with that of the proposed Project. In all cases, construction emissions would be temporary and would cease once project development is complete. Construction of the proposed Project would result in emissions of criteria pollutants, as well as minor amounts of toxic air contaminant emissions, including diesel equipment exhaust due to construction activity. Emissions of criteria pollutants generated by proposed Project construction activities would be below applicable thresholds and relatively short-term in duration. Thus, construction of the proposed Project would not violate any air quality standard or contribute substantially to an existing or projected air quality violation. However, proposed Project construction would contribute incremental amounts of emissions to the MDAB. The region is a federal and/or state nonattainment area for ozone and PM_{10}. The proposed Project would contribute particulates and the ozone precursors VOC and NO_X to the area during short term proposed Project construction. Because the proposed Project would contribute incremental amounts of emissions to the MDAB for pollutants that the basin is in non-attainment for, the proposed Project would contribute to a cumulative air quality impact. The proposed Project's contribution to cumulative emissions would not be considerable since the emissions would be temporary in nature and they would not exceed the construction thresholds established by the AVAQMD for criteria pollutants. The proposed Project would not contribute to any cumulative increase in operational emissions in the proposed Project area since no new emission sources are proposed.

With respect to local impacts, cumulative particulate impacts are considered when projects may be within a few hundred yards of each other. As identified in Table 4-1 and Figure 4-1, most of the cumulative projects occurring in the area are not within a few hundred yards of the proposed Project. The construction schedule for the other projects is unknown and, although it is unlikely

that they would all be under construction at the same time as the proposed Project, they are conservatively assumed to overlap for the purposes of this analysis. As shown in Table 3.1-4 and Table 3.1-5, implementation of the standard conditions during construction would ensure construction and operational emissions would be below AVAQMD thresholds. Because these thresholds have been developed for the specific purpose of addressing cumulative impacts, the proposed Project would not contribute significantly to cumulative impacts regarding local pollutant emissions. In summary, the proposed Project would result in cumulative impacts to regional and local air pollutant emissions; however, the cumulative impact would be less than significant.

4.3.2 Biological Resources

Portions of the cumulative proposed Project area support, or previously supported, habitat types such as desert salt bush scrub, which may provide habitat for species such as loggerhead shrike, northern harrier, California horned lark, Le Conte's thrasher, coast horned lizard, and prairie falcon. Development of cumulative projects and past disturbances related to agricultural use that has occurred in the region has resulted in a loss of these habitats and associated species. The proposed Project would also result in the removal of desert salt bush scrub, however, based on the low quality of the habitat, it's wide dispersal in the Mojave Desert, and the retention of a portion of the Recharge Site as a natural area following construction, the proposed Project's impact is less than significant.

The Mohave ground squirrel and desert tortoise were determined to be absent from the proposed Project area. As discussed in Section 3.2, Project-related impacts to the four additional sensitive species identified within the proposed Project area (loggerhead shrike, northern harrier, California horned lark, and Le Conte's thrasher) would be less than significant as these species can move out of harm's way. Impacts to burrowing owls would be reduced to less-than-significant levels through implementation of mitigation; thus, the proposed Project would not contribute to a cumulative effect to these sensitive species.

The proposed Project site contains vegetation and structures that may provide nesting opportunities for common birds, including raptors. These birds are protected under the MBTA and California Fish and Game Code, and the potential for adverse impacts to nesting birds would be minimized through mitigation for nesting birds. Based on the proposed Project's mitigation, and based on an expectation that other projects would also be compelled to comply with the MBTA, thereby avoiding or minimizing potential impacts to nesting birds, the proposed Project would not contribute significantly to cumulative impacts to nesting birds.

4.3.3 Cultural and Paleontological Resources

Each cumulative project listed in Table 4-1 has the potential to result in impacts to cultural and paleontological resources and to contribute to a cumulatively considerable impact. The proposed Project would result in less than significant impacts to the East Branch of the California Aqueduct. None of the cumulative projects identified in Table 4-1 would result in impacts to the East Branch of the California Aqueduct, thus, the proposed Project would not contribute to cumulatively considerable impacts to the East Branch of the California Aqueduct or other historic resources.

Construction of the proposed Project, in conjunction with related projects, could affect known and unknown archaeological and paleontological resources in the region. The National Register of Historic Preservation and the California Register of Historical Resources have been established to ensure significant resources are not obliterated, and provide criteria for determining significance of a resource. These programs provide framework to ensure cumulative impacts to historic (and prehistoric) resources are not significant. Because the proposed Project would not affect known resources considered eligible for listing on the National Register of Historic Preservation or California Register of Historical Resources, and mitigation has been established to mitigate potential effects to previously undiscovered cultural resources, the proposed Project would not make a cumulatively considerable contribution toward cumulative impacts on cultural resources.

4.3.4 Geology and Soils

While geologic hazards due to seismic shaking and fault rupture can potentially occur throughout southern California, each site has unique conditions that influence the on-site uses' susceptibility to these hazards. Consequently, potential direct geologic impacts vary from site to site. The proposed Project, as discussed in Section 3.4, has the potential to result in significant impacts associated with geology and soils. The preparation of a geological investigation that identifies site-specific criteria related to considerations such as grading, excavation, fill, and structure/facility would reduce impacts from the proposed Project to a less than significant level. The construction of the proposed Project wouldn't incrementally add to geological effects of cumulative projects occurring in the area, and thus would not result in a cumulatively considerable impact associated with geology and soils.

4.3.5 Greenhouse Gas Emissions

GHG emissions generated by development affect climate conditions on a global scale since the effects occur within the upper atmosphere. Thus, no defined study area is feasible for identifying other projects with which the proposed Project could combine to cause cumulatively considerable impacts on global climate. An individual project cannot generate enough GHG emissions to effect a discernible change in global climate. However, the GHG emissions from the proposed Project may combine with increases from other sources of GHGs, and constitute a potential influence on global climate change. The assessment of GHG emissions is inherently cumulative because climate change is a global phenomenon. Therefore, the discussion in Section 3.5 of this EIR addresses cumulative GHG impacts and determines that the impact of the proposed Project's GHG emissions on climate change would not be cumulatively considerable, as the proposed Project would not exceed the AVAQMD screening threshold or conflict with an applicable GHG plan, policy, or regulation. The proposed Project would not contribute significantly to cumulative GHG emission impacts.

4.3.6 Hydrology/Water Quality

The cumulative impact area for hydrology and water quality is the watershed in which the proposed Project is located. Potential cumulative water quality impacts associated with construction-related activities (erosion/sedimentation, use and storage of hazardous materials, and generation of demolished debris) and long-term operations and maintenance at the various

project sites in the cumulative project area would be reduced to a level below significance by implementation of project-specific design, source control, and treatment control BMPs including those related to the NPDES permit and related storm water requirements. Therefore, implementation of BMP design features on a project-specific basis on all related projects, conformance with applicable permit and regulatory requirements and regulatory enforcement of those permit requirements by the RWQCB would avoid cumulatively significant water quality impacts.

4.3.7 Noise

Each cumulative project listed in Table 4-1 would produce temporary construction noise. Since construction noise is localized and would not travel great distances and only a few of the related projects are close to the proposed Project, cumulative construction equipment noise impacts would not be significant. Operational noise impacts would occur as a result of noise associated with the Distribution Site and Recovery Wells (no operational noise would occur along the proposed pipeline alignments). The cumulative projects identified as occurring closest to the sources of the proposed Project operational noise include two photovoltaic solar projects (identified as projects 6 and 13 in Table 4-1) and one wireless telecommunications facility (identified as project 27 in Table 4-1). Each of these three projects are located at distances of approximately 1.9 to 2.1 miles from the nearest noise-generating use from the proposed Project (recovery wells). Based on the distance between noise sources for the proposed Project and the nearest cumulative projects, the proposed Project would not contribute to a cumulatively considerable noise impact.

5.0 OTHER CEQA CONSIDERATIONS

In addition to the topics analyzed elsewhere in this EIR, Section 15126 of the State CEQA Guidelines requires analysis of the following topics addressed in this chapter: growth-inducing impacts; significant environmental effects that cannot be avoided upon implementation of the proposed Project; and significant irreversible environmental effects associated with implementation of the proposed Project.

5.1 GROWTH INDUCEMENT

In accordance with Section 15126(d) of the State CEQA Guidelines, an EIR must include an analysis of the growth-inducing impact of the proposed Project. The growth inducement analysis must address: (1) the ways in which a proposed project could foster economic or population growth, or the construction of additional housing, either directly or indirectly in the surrounding environment; and (2) the potential for a project to encourage and facilitate other activities that could significantly affect the environment, either individually or cumulatively. This second issue involves the potential for a project to induce growth by the expansion or extension of existing services, utilities, or infrastructure. The State CEQA Guidelines further state that "[i]t must not be assumed that growth in any area is necessarily beneficial, detrimental, or of little significance to the environment" (Section 15126.2[d]).

During Project construction, demand for various construction trade skills and labor would increase. It is anticipated that this demand would be met by the local labor force and would not require importation of a substantial number of workers that could cause an increased demand for temporary or permanent housing in this area. The proposed Project would not change the capacity of PWD's system or increase PWD's service area or water provision commitments, but would provide for increased reliability in the existing supply. In addition, the proposed Project would not remove barriers to growth. Therefore, growth inducement would not result from the proposed Project.

5.2 UNAVOIDABLE ADVERSE IMPACTS

Section 15126.2(b) of the State CEQA Guidelines requires the identification of significant impacts that would not be avoided, even with the implementation of feasible mitigation measures. The final determination of significance of impacts and of the feasibility of mitigation measures would be made by PWD's Board of Directors as part of its certification of this EIR. Sections 3.1 through 3.7 of this EIR provide an evaluation of the potentially significant environmental effects and corresponding mitigation measures associated with implementation of the proposed Project. There are no significant and unavoidable impacts identified for the proposed Project. All significant impacts can be reduced to a less than significant level through implementation of mitigation provided in Sections 3.1 through 3.7 of this EIR.

5.3 IRREVERSIBLE ENVIRONMENTAL CHANGES

Section 15126.2(c) of the State CEQA Guidelines requires an evaluation of significant irreversible environmental changes which would be involved should a proposed project be

implemented. Section 15126.2(c) of the State CEQA Guidelines describes significant irreversible environmental changes that would be caused by a proposed project as follows:

> 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 improvement 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.

The proposed Project would entail the commitment of energy and non-renewable resources, such as energy derived from fossil fuels, construction materials (e.g., abrasives, mortar), and labor. Use of these resources would have an incremental effect on the regional consumption of these commodities. While the proposed Project would bank water for use in future years, it would not change the water allocation provided to PWD or further commit additional water resources. The proposed Project would convert the existing vacant site to a recharge basin, but such use would not be irreversible. Furthermore, no environmental accidents or hazards are anticipated to occur as a result of Project implementation, as disclosed in the Chapter 7.0, *Effects Found Not to be Significant*. Therefore, the impact from irreversible environmental changes from the proposed Project would not be significant.

6.0 ALTERNATIVES TO THE PROPOSED PROJECT

6.1 INTRODUCTION

During consideration of a project that could have a significant effect on the environment, CEQA requires that alternatives that could avoid or lessen the project's significant effect(s) be considered. This chapter presents potential alternatives to the proposed Project and evaluates them as required by CEQA. The State CEQA Guidelines also require EIRs to identify the Environmentally Superior Alternative from among the alternatives (including the proposed Project). The environmentally superior alternative is identified in Section 6.8.

6.2 SUMMARY OF PROJECT OBJECTIVES AND SIGNIFICANT IMPACTS

6.2.1 Project Objectives

The proposed Project is intended to meet PWD's long-term water needs through a solution that is reliable, sustainable, cost effective, and drought-resistant. The overarching objective of the proposed Project is to develop a groundwater banking, storage, and extraction program, using a combination of raw imported SWP water and locally produced recycled water delivered to a new recharge basins located on undeveloped land in northeast Palmdale. Additional objectives of the proposed Project include:

- Help to provide a diversified portfolio of ground and surface water;
- Increase reliability of water supply;
- Replenish groundwater supplies;
- Save for future dry periods; and
- Provide a cost-effective solution for long-term water supply.

6.2.2 Significant Environmental Impacts

The proposed Project was determined to have no significant and unmitigated impacts. The proposed Project also would have significant but mitigable impacts related to biological resources, cultural and paleontological resources, geology and soils, hydrology and water quality, and noise. Topics for which the proposed Project would result in significant impacts are the focus of the comparative analysis contained in the subsequent sections; if the alternative would be anticipated to result in additional significant impacts, those also are noted.

6.3 ALTERNATIVES CONSIDERED BUT REJECTED

Section 15126.6(c) of the CEQA Guidelines states that EIRs should identify and briefly evaluate "any alternatives that were considered by the lead agency but were rejected as infeasible during the scoping process...". Several alternatives were considered and rejected during the proposed Project scoping process, including linear recovery wells, a reduced Project scale, recharge directly into Littlerock Creek, and alternatives of off-stream recharge, including in the Buttes subbasin only and within the Buttes and Lancaster subbasins.

6.3.1 Linear Recovery Wells Alternative

The proposed Project was evaluated on its current site, with linear rows of Recovery Wells on the down gradient side of the recharge basins. Initial modeling of the proposed Project found that a linear pattern of Recovery Wells around the Recharge Site would cause excessive drawdown and potentially cause up to one foot of subsidence over a 20-year period.

6.3.2 Reduced Project Scale Alternative

The proposed Project (and alternatives analyzed further below) is designed to meet the ultimate facility sizing needs of PWD, allowing PWD to only require a single recharge project to meet projected needs. Accordingly, a Reduced Project Scale Alternative was not carried forward for detailed evaluation because it would not meet the recharge needs of PWD through the 50-year evaluation period for the Project.

6.3.3 Run-of-River Recharge Alternatives

Two alternatives were considered that assumed surface water from the East Branch of the California Aqueduct would be released directly into Littlerock Creek for groundwater recharge. Both of these alternatives eliminated the need for recharge basins. One of the alternatives also eliminated the need for a raw water conveyance. However, recycled water could not be recharged in either of these alternatives because regulations require that recycled and diluent water recharge must occur in the same area for proper blending. This requirement could not be met in either of the alternatives proposing groundwater recharge within Littlerock Creek because the extent of recharge within the creek cannot be controlled. Additionally, for both of these alternatives, the proximity of the creek to local quarries and the potential for lateral seepage into quarry pits could pose additional hurdles.

6.3.4 Off-Stream Recharge within the Buttes Subbasin Only Alternatives

Three alternatives were considered for off-stream recharge within the Buttes subbasin only. For proposed alternatives that placed the recharge basins entirely within the Buttes subbasin, it was determined that limited information on aquifer transmissivity and hydrogeologic characteristics of the subbasin would be a significant constraint. The alternatives also had constraints associated with proximity to existing development and the need to tie-in to the existing recycled water pipeline owned by Los Angeles County Sanitation District (LACSD).

6.3.5 Off-Stream Recharge within the Buttes and Lancaster Subbasins Alternatives

Three alternatives were considered that included off-stream recharge within the Buttes and Lancaster subbasins. For all scenarios, agreements with either Los Angeles World Airports (LAWA), LACSD, or both would be required for project implementation. Additionally, all alternatives were located within close proximity to an existing nitrate plume which was created by the groundwater recharge of the secondary effluent from LACSD's Palmdale WRP without diluent and prior to the plant upgrade to tertiary treatment and nitrification/de-nitrification for nitrate reduction (KJC 2015a). Additionally, as described for the Buttes subbasin only alternatives, the lack of information on transmissivity and hydrogeologic characteristics for the Buttes subbasin is a significant constraint. Preliminary review of the three alternatives indicate

that they would not lessen significant effects on the environment that would occur as a result of the proposed Project. For this reason, the off-stream recharge alternatives within the Buttes and Lancaster subbasins were rejected and not carried forth for additional analysis.

6.4 NO PROJECT ALTERNATIVE

6.4.1 No Project Alternative Description

Pursuant to Section 15126.6(e)(3)(B) of the State CEQA Guidelines, the No Project Alternative reflects the "circumstances under which the Project does not proceed." The No Project Alternative assumes that no construction of the proposed Project would occur. PWD would continue its existing water operations, with no additional means of water storage/banking.

6.4.2 Comparison of the Impacts of the No Project Alternative to the Proposed Project

Because the No Project Alternative would not involve any physical improvements, it would avoid significant impacts that would occur from the proposed Project related to biology, cultural and paleontological resources, geology and soils, hydrology and water quality, and noise. This alternative would not, however, meet any of the proposed Project objectives and could potentially result in a deficit in the water supply in future years.

6.5 OFF-SITE 10A ALTERNATIVE

6.5.1 Description

Off-Site Alternative 10A, identified in Figure 6-1, *Off-Site Alternative Locations*, would result in the construction of the project at a location approximately three miles west of the proposed Project. This alternative would include the construction of the same components as the proposed Project, although there are some differences regarding the specifics of some components (as discussed in more detail below). The Off-Site 10A Alternative and would also recharge the Lancaster subbasin (as does the proposed Project). Overall, this alternative would require a shorter Potable Water Pipeline, but a slightly longer Raw Water/Return Water Pipeline than the proposed Project.

- **SWP Turnout:** A new 50-cfs turnout would be constructed at the intersection of the East Branch of the California Aqueduct and 70th Street East. The turnout would be constructed in a similar manner as that identified for the proposed Project.

- **Recharge Site:** The Off-Site 10A Alternative's Recharge Site perimeter would be comprised of East Avenue L to the north, 75th Street to the east, and 70th Street to the west. The Recharge Site would extend approximately 0.5 miles south of East Avenue L (halfway to East Avenue M) and would include eight recharge basins in a two-by-four arrangement, covering approximately 80 acres.

- **Raw Water/Return Water Pipeline:** The Raw Water/Return Water Pipeline supply would be conveyed from the SWP Turnout through 9.2 miles of pipeline along 70th Street East, with 7.7 miles of 30-inch diameter Raw Water Pipeline to East Avenue N, and

1.5 miles of 36-inch diameter combined Raw Water/Return Water Pipeline from East Avenue N to the Recharge Site.

- **Recycled Water Pipeline:** The recycled water would be supplied from LACSD's existing pipeline along Avenue N with a turnout delivering recycled water to the Raw Water/Return Water Pipeline on 70th Street East described above.

- **Recovery Wells:** The Off-Site 10A Alternative would require 16 Recovery Wells at buildout, all with a capacity of 1,200 gpm in the Lancaster subbasin. Two of the Recovery Wells would be spares. The Recovery Wells would be located 4,500 feet from the center of the Recharge Site in a generally radial pattern. Recovery Wells are not able to be constructed in the southwest side of the Off-Site 10A Alternative's due to the presence of Littlerock Creek. As a result, the location of the Recovery Wells would form a horseshoe pattern, and they would be located in closer proximity to each other than the proposed Project. This alternative would include eight Recovery Wells in the preliminary phase, with the additional eight Recovery Wells constructed in a secondary phase, with piping in the preliminary phase sized for ultimate buildout.

- **Distribution Site:** The one-million gallon Storage Tank and pump stations would be located on their own one-acre parcel at the southwest corner of the Off-Site 10A Alternative project area, at the intersection of East Avenue M and 70th Street East.

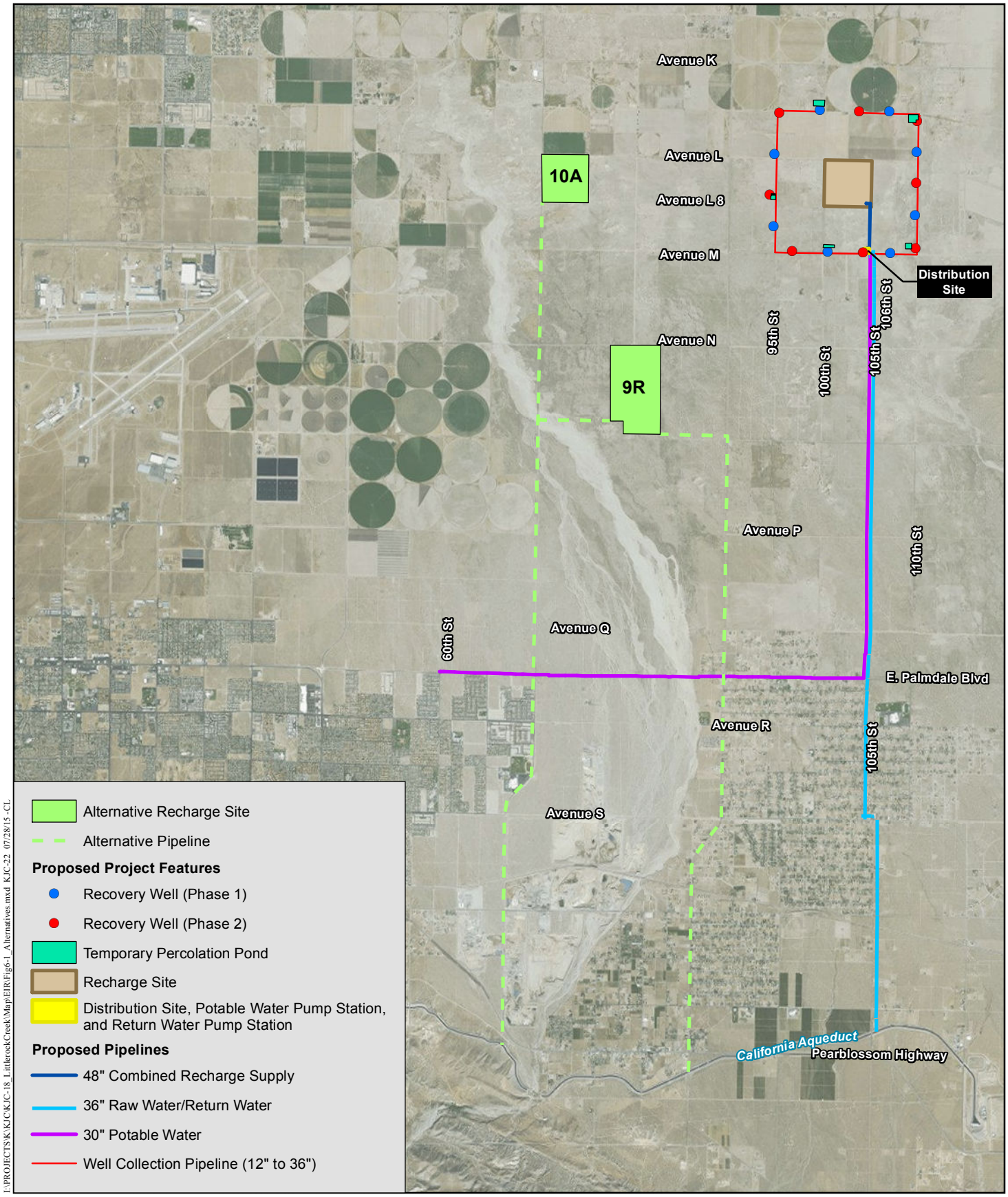
- **Potable Water Pump Station and Potable Water Pipeline:** The transmission system would be a 30-inch Potable Water Pipeline running 4.6 miles south from 70th Street East, then 1 mile west via Palmdale Boulevard.

- **Return Water Pump Station:** The optional Return Water Pump Station for pumping back to the East Branch of the California Aqueduct would be located adjacent to the distribution system Storage Tank and discharge back into the 30-inch diameter Raw Water/Return Water Pipeline. A set of valves on the Raw Water/Return Water Pipeline would allow recharge or pump-back.

6.5.2 Comparison of Effects

Air Quality

The design of the Off-Site 10A Alternative is substantially similar to the proposed Project and would require similar-type construction and operational activities. The Off-Site 10A Alterative does include an approximately 10-mile reduction in required pipeline as compared to the proposed Project; thus, construction activities and duration, as well as accompanying construction emissions associated with this alternative would be incrementally reduced as compared to the proposed Project. The Off-Site 10A Alternative would result in short-term generation of pollutants during construction activities and long-term generation of pollutants during the operation of the Project. Based on the similarity of components and area between the Off-Site 10A Alternative and the proposed Project, the operational emissions associated with the Off-Site 10A Alternative are anticipated to be similar to the proposed Project, and also less than significant. The Off-Site 10A Alternative would also be required to implement measures to



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Off-Site Alternative Locations

PALMDALE REGIONAL GROUNDWATER RECHARGE AND RECOVERY PROJECT

HELIX Environmental Planning

N 0 7,500 Feet

Figure 6-1

comply with AVAQMD's Rule 403 to reduce fugitive dust emissions. In addition, this alternative would be consistent with the Air Quality Management Plan (AQMP).

Biological Resources

The Off-Site 10A Alternative is expected to have similar impacts associated with sensitive species as the proposed Project, except that the Off-Site 10A Alternative site is also expected to contain potential habitat for sagebrush loeflingia, which is designated by the CNPS as being considered rare, threatened, or endangered in California. Development of this alternative would require focused surveys for this species at the site and could potentially result in a significant impact associated with this species. The Off-Site 10A Alternative contains similar vegetation communities as the proposed Project site, including desert saltbrush scrub, although the Off-Site 10A Alternative also contains some non-native grassland. This alternative would have similar potentially significant impacts to burrowing owl and nesting birds, and would have potentially significant impacts to desert tortoise if present on site. As with the proposed Project, impacts would be expected to be reduced to below a level of significance through implementation of mitigation.

Cultural and Paleontological Resources

Similar to the proposed Project, Off-Site 10A Alternative would not result in significant impacts to the historic integrity of the East Branch of the California Aqueduct. This alternative would differ slightly as to which known cultural resources, and the extent of unknown cultural and paleontological resources, would be impacted by Project grading. Overall, however, impacts would be similar to those that would occur under the proposed Project. Impacts to historical resources would be less than significant, and impacts to unknown archaeological and paleontological resources would be potentially significant and mitigable, similar to the proposed Project.

Geology/Soils

As with the proposed Project, impacts associated with geology and soils under the Off-Site 10A Alternative would be potentially significant due to the risk to development posed by seismic ground shaking, landslides/slope instability, ground subsidence/settlement, expansive or corrosive soils, groundwater seepage/saturation, foundation/footing/pavement/retaining wall design, and excavation instability. Geology/soils impacts would be reduced to a less-than-significant level through the preparation of a detailed technical study and through the implementation of measures identified in that study, similar to the proposed Project.

Greenhouse Gas Emissions

The design of the Off-Site 10A Alternative is substantially similar to the proposed Project and would require similar-type construction and operational activities; however, the Off-Site 10A Alterative does include an approximately 10-mile reduction in required pipeline as compared to the proposed Project. Thus, construction activities and duration, as well as accompanying GHG emissions from construction activity would reduced as compared to the proposed Project. The Off-Site 10A Alternative would result in long-term generation of pollutants during the operation, and would result in similar levels of GHG emissions as the proposed Project. The GHG

emissions would be expected to be less than the AVAQMD significance threshold and would be less than significant. The Off-Site 10A Alternative is not expected to conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing GHG emissions.

Hazards

The Off-Site 10A Alternative is located within five miles of Air Force Plant 42 and, thus, is within a supplemental zone of five miles of the runway and would require appropriate wildlife hazard mitigation techniques to reduce hazard impacts. This would be a significant but mitigable impact. Additionally, this impact does not occur with the proposed Project.

Hydrology and Water Quality

The Off-Site 10A Alternative is located approximately 1.9 miles from an identified nitrate groundwater plume, within an area of influence of the plume. The nitrate plume is estimated to potentially reach the recharge area associated with Off-Site 10A Alternative within 20 years (KJC 2015a), causing potentially significant water quality issues. This alternative, like the proposed Project, could potentially significantly impact water quality related to increased erosion/sedimentation, generation of urban contaminants from project operation and maintenance, and the transport of water-borne contaminants to downstream receiving waters. These impacts would be reduced below a level of significance through measures similar to those described for the proposed Project.

Noise

Off-Site 10A Alternative would be located within the cities of Palmdale and Lancaster, and unincorporated Los Angeles County. Noise-generating activities from construction and operation of the Off-Site 10A Alternative would be generally the same as compared to the proposed Project. Construction noise would be generated from equipment and activity at the Recharge and Distribution Sites, Recovery Wells, pipeline alignments, and SWP Turnout, as well as construction traffic. Operational noise would be generated from equipment at the Recharge and Distribution Sites, Recovery Well operation, and traffic trips associated with routine maintenance. Similar to the proposed Project, the Recharge and Distribution Sites and associated Recovery Wells would be located in an undeveloped area, with no sensitive noise receivers in the immediate vicinity. Also similar to the proposed Project, the Off-Site 10A Alternative pipeline alignments would traverse through both undeveloped and developed areas, with pipeline construction occurring within developed roadways. Noise exposures during pipeline construction would be similar to those identified for the proposed Project, and less than significant. The Off-Site 10A Alternative would result in potentially significant noise impacts associated with the operation of Recovery Wells in the City of Lancaster and unincorporated Los Angeles County, but would result in less than significant noise impacts following implementation of mitigation.

6.6 OFF-SITE 9R ALTERNATIVE

6.6.1 Description

Off-Site 9R Alternative, identified in Figure 6-1, would result in the construction of the project at a location approximately three miles southwest of the proposed Project. Off-Site 9R Alternative straddles the Buttes and Lancaster subbasins with approximately half its recharge area in each subbasin. This design allows flexibility as to which subbasin receives recharge: Buttes, Lancaster, or both. This alternative would include the construction of the same components as the proposed Project, although there are some differences regarding the specifics of some components (as discussed in more detail below).

- **SWP Turnout:** A new 50-cfs turnout would be constructed at the intersection of the aqueduct and 70th Street East or 87th Street East.

- **Recharge Site:** The proposed 175-acre Recharge Site would be located within the LAWA property and would be bounded by Avenue N to the north, Avenue N-8 to the south, and 78th Street East to the west. A property line approximately 0.6 mile west of 90th Street East would define the eastern border.

- **Raw Water/Return Water Pipeline:** The Raw Water/Return Water Pipeline would be conveyed from the new SWP Turnout north along 70th Street East or 87th Street East/ 90th Street East. The pipeline length varies for the two alignments. The 70th Street East alignment would be a 30-inch diameter Raw Water/Return Water Pipeline running 7.6 miles north to East Avenue N, east approximately 0.9 mile to a point that aligns with a future 79th Street East, then south 0.5 mile as a combined 36-inch diameter Raw Water/Return Water Pipeline to the Recharge Site diversion structure. The 90th Street East alignment would be a 30-inch diameter Raw Water/Return Water Pipeline running 7.9 miles north to East Avenue N, then west 1.1 miles to the same point described for the 70th Street East alignment and south in a combined pipeline.

- **Recycled Water Pipeline:** The Recycled Water Pipeline would be supplied from LACSD's existing pipeline along Avenue N through a 24-inch turn-out. For either the 70th Street East or 90th Street East Raw Water Pipeline alignment, a common 36-inch pipeline would run south 0.5 miles to the Recharge Site diversion structure.

- **Recovery Wells:** The Off-Site 9R Alternative would require 21 Recovery Wells at buildout, 10 Recovery Wells with a capacity of 600 gpm in the Buttes subbasin, and 11 Recovery Wells with a capacity of 1,200 gpm in the Lancaster subbasin. One Recovery Well in the Lancaster subbasin would be a spare. The Recovery Wells in each subbasin would be located 4,500 feet from the center of the Recharge Site. The first phase of the Off-Site 9R Alternative would require six Recovery Wells in the Buttes subbasin and six Recovery Wells in the Lancaster subbasin. The remaining four Recovery Wells in the Buttes subbasin and five Recovery Wells in the Lancaster subbasin would be constructed in the second phase of the Off-Site 9R Alternative. The piping for the first phase would be sized, and upsized where necessary to deliver water from the Recovery Wells in both phases to the storage reservoir.

- **Distribution System Location:** The one-million-gallon Storage Tank and pump stations would be located at the northern center of the project site along East Avenue N.

- **Potable Water Pump Station and Potable Water Pipeline:** The Potable Water Pipeline would be a 30-inch alignment running 1.3 miles west on East Avenue N, 3.5 miles south down 70th Street East, then 1 mile west via East Palmdale Boulevard.

- **Return Water Pump Station:** The optional Return Water Pump Station for pumping back to the East Branch of the California Aqueduct would be located adjacent to the distribution system Storage Tank and discharge back into the 30-inch diameter Raw Water/Return Water Pipeline.

6.6.2 Comparison of Effects

Air Quality

The design of the Off-Site 9R Alternative is substantially similar to the proposed Project and would require similar-type construction and operational activities. The Off-Site 9R Alternative would result in disturbance of greater area versus the proposed Project, due to a slightly larger Recharge Site area and the need for 21 Recovery Wells. The Off-Site 9R Alternative would result in short-term generation of pollutants during construction activities and long-term generation of pollutants during the operation of the Project. Based on the similarity of Project components and only a slight increase in Project area between the Off-Site 9R Alternative and the proposed Project, the construction and operational emissions associated with the Off-Site 9R Alternative are anticipated to be similar to the proposed Project, and also less than significant. The Off-Site 9R Alternative would also be required to implement measures to comply with AVAQMD's Rule 403 to reduce fugitive dust emissions. In addition, this alternative would be consistent with the AQMP.

Biological Resources

The Off-Site 9R Alternative is expected to have similar impacts associated with sensitive species and vegetation as the proposed Project, although the vegetation impacted might be different than those identified for the proposed Project. This alternative would have similar potentially significant impacts to burrowing owl and nesting birds, and potentially desert tortoise if present on site. As with the proposed Project, impacts would be expected to be reduced to below a level of significance through implementation of mitigation.

Cultural and Paleontological Resources

The Off-Site 9R Alternative site contains a cultural resource noted as an isolated well cement cover, which provides evidence of possible past agricultural use and cultural significance (KJC 2015a). This Off-Site 9R Alternative would also have the potential for unearthing unknown cultural and paleontological resources, similar to the proposed Project. Overall, however, impacts would potentially be greater to those that would occur under the proposed Project due to the presence of a known cultural resource and similar to the proposed Project for unknown resources. Impacts to historical resources would be significant and potentially

unmitigable, and impacts to archaeological and paleontological resources would be significant and mitigable, similar to the proposed Project.

Geology/Soils

As with the proposed Project, impacts associated with geology and soils under the Off-Site 9R Alternative would be significant due to the risk to development posed by seismic ground shaking, landslides/slope instability, ground subsidence/settlement, expansive or corrosive soils, groundwater seepage/saturation, foundation/footing/pavement/retaining wall design, and excavation instability. Geology/soils impacts would be reduced to a less-than-significant level through the preparation of a detailed technical study and through the implementation of measures identified in that study, similar to the proposed Project.

Greenhouse Gas Emissions

The design of the Off-Site 9R Alternative is substantially similar to the proposed Project and would require similar-type construction and operational activities. This alternative does include a slightly larger area as compared to the proposed Project and thus, would result in a slight increase in the generation of GHGs during construction activities. The Off-Site 9R Alternative would result in short-term generation of pollutants during construction activities and long-term generation of pollutants during the operation of the Project, and would result in similar levels of GHG emissions as the proposed Project. The GHG emissions would be expected to be less than the AVAQMD significance threshold and would be less than significant. The Off-Site 9R Alternative is not expected to conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing GHG emissions.

Hazards

The Off-Site 9R Alternative is located within five miles of Air Force Plant 42, and thus, is within a supplemental zone of five miles of the runway and would require appropriate wildlife hazard mitigation techniques to reduce hazard impacts. This would be a significant but mitigable impact. Additionally, this impact does not occur with the proposed Project.

Hydrology and Water Quality

The Off-Site 9R Alternative is located approximately 2.5 miles from an identified nitrate groundwater plume, within an area of influence of the plume (KJC 2015a), causing potentially significant water quality issues. This alternative, like the proposed Project, could potentially significantly impact water quality related to increased erosion/sedimentation, generation of urban contaminants from project operation and maintenance, and the transport of water-borne contaminants to downstream receiving waters. These impacts would be reduced below a level of significance through measures similar to those described for the proposed Project.

Noise

Off-Site 9R Alternative would be located within the City of Palmdale and unincorporated Los Angeles County. Noise-generating activities from construction and operation of the Off-Site 9R Alternative would be generally the same as compared to the proposed Project. Construction

noise would be generated from equipment and activity at the Recharge and Distribution Sites, Recovery Wells, pipeline alignments, and SWP Turnout, as well as construction traffic. Operational noise would be generated from equipment at the Recharge and Distribution Sites, Recovery Well operation, and traffic trips associated with routine maintenance. Similar to the proposed Project, the Recharge and Distribution Sites and associated Recovery Wells would be located in an undeveloped area, with no sensitive noise receivers in the immediate vicinity. Also similar to the proposed Project, the Off-Site 9R Alternative pipeline alignments would traverse through both undeveloped and developed areas, with pipeline construction occurring within developed roadways. Noise exposures during pipeline construction would be similar to those identified for the proposed Project, and less than significant. While this alternative would still have potentially significant, but mitigable, operational noise impacts for the Recovery Wells located within incorporated Los Angeles County, the potentially significant, mitigable, operational noise impacts for the Recovery Wells would not occur in the City of Lancaster, as the Off-Site 9R Alternative is not located within Lancaster. The Off-Site 9R Alternative would result in less than significant noise impacts following implementation of mitigation.

6.7 SUMMARY OF ALTERNATIVES ANALYSIS

Table 6-1, *Comparison of Project Alternative Impacts to Proposed Project Impacts*, provides a comparison of the impacts resulting from the proposed Project and the alternatives. In summary, the No Project Alternative would result in no impacts to all environmental issues. Compared to the proposed Project, the Off-Site 10A Alternative would result in some reduction of impacts associated with air quality and GHG emissions, but an increase in impacts associated with biological resources and hydrology/water quality. The Off-Site 9R Alternative would result in increased or equitable impacts as the proposed Project. Both Off-Site Alternatives would result in new significant, but mitigable, hazards associated with the potential for bird strikes due to proximity of each site to the runway at Air Force Plant 42.

Table 6-1
COMPARISON OF PROJECT ALTERNATIVE IMPACTS TO PROPOSED PROJECT IMPACTS

Environmental Issue	Proposed Project	No Project Alternative	Off-Site 10A Alternative	Off-Site 9R Alternative
Air Quality	LTS	NI	LTS(-)	LTS(+)
Biological Resources	SM	NI	SM(+)	SM(=)
Cultural and Paleontological Resources	SM	NI	SM(=)	SU(+)
Geology/Soils	SM	NI	SM(=)	SM(=)
GHG Emissions	LTS	NI	LTS(-)	LTS(+)
Hazards	LTS	NI	SM(+)	SM(+)
Hydrology and Water Quality	SM	NI	SM(+)	SM(+)
Noise	SM	NI	SM(-)	SM(=)

NI = no impact; LTS = less than significant impact; SM = significant and mitigable impact;
SU = significant and unmitigated impact; (-) = decreased impact; (+) = increased impact;
(=) = same degree of impact

6.8 SUMMARY OF ALTERNATIVES ANALYSIS AND IDENTIFICATION OF THE ENVIRONMENTALLY SUPERIOR ALTERNATIVE

Although the No Project Alternative would result in substantially reduced environmental impacts, Section 15126.6(e)(2) of the State CEQA Guidelines requires identification of an alternative other than the No Project Alternative as the environmentally superior alternative. Although Off-Site 10A Alternative has a shorter Potable Water Pipeline, and thus, some reduced impacts, the Off-Site 10A Alternative has a slightly longer Raw Water/Return Pipeline and would also have new, potentially significant impacts associated with bird strike hazards. The new potentially significant impact associated with Off-Site 10A Alternative would likely outweigh the benefits of a shorter Potable Water Pipeline. As such, the proposed Project is considered the environmentally superior alternative.

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7.0 EFFECTS FOUND NOT TO BE SIGNIFICANT

This section of the EIR identifies and explains those environmental issues from the CEQA Environmental Checklist (State CEQA Guidelines Appendix G) for which no significant environmental impacts are anticipated and for which detailed analysis is not necessary. Section 15128 of the State CEQA Guidelines requires that an EIR contain a brief statement of the reasons that certain issues have been identified during the environmental review process as having no, or no significant, project-related impacts and are, therefore, not addressed in detail in the EIR. Issues that were not considered significant for the proposed Project, and the reasons for the finding of no significance for each of these issues, are provided below.

7.1 AESTHETICS

The largest component of the proposed Project, in terms of area and visual prominence, would be the 160-acre Recharge Site. The basins at the Recharge Site would consist of four 20-acre basins. The land surrounding the Recharge and Distribution Sites, Recovery Wells, and portions of the 36-inch Raw Water/Return Water Pipeline consists primarily of undeveloped land. Viewsheds of scenic backdrops both to and from the City of Palmdale are defined by City of Palmdale General Plan as "significant ridgelines of the San Gabriels, the Sierra Pelona and the Ritter and Portal Ridges" (City of Palmdale 1993). Due to the low-profile and underground nature of the proposed Project's features, the proposed Project would not hinder scenic vistas, particularly in the undeveloped areas of the proposed Project site, described above, which lack a significant amount of viewers (residences, businesses, schools, etc.). Impacts to scenic vistas would be less than significant.

Highways 138 and 14 are not designated by the State of California as scenic highways (Caltrans 2015). As such, the proposed Project would not be visible from officially California designated scenic highways, nor would it damage scenic resources within a state-designated scenic highway. No impact to scenic vistas would occur.

The proposed Project would result in temporary and long-term changes at the Recharge and Distribution Sites and the Recovery Well sites. Visual changes would include temporary construction equipment and activity during proposed Project construction and the new recharge basins, Recovery Wells, structures at the Distribution Site, and soil stockpiling on the Recharge Site. Due to the distance of the Recharge and Distribution Sites from nearby developed areas, changes at these locations would be difficult to discern for viewers in surrounding developed areas. The nearest largely developed area to the Recharge and Distribution Sites is located approximately five miles to the south. A few scattered homes and buildings lie directly south of the Recharge and Distribution Sites and would have generally unobstructed views of the proposed Project due to their proximity. Views of the proposed Recharge Site from the described homes are not expected to result in significant aesthetic/visual resource impacts, however, based on the small number of affected viewers, and the spread-out nature of the Project components in the area. Visual changes for the pipeline alignments would be limited to those changes occurring during construction of the pipelines. Visual impacts associated with pipeline construction would include construction equipment, signage, and vehicles, and soil stockpiles along the Project alignments, which would be visible to nearby residents and those traveling along the roads in which the pipelines would be installed. Upon completion of construction, no

permanent changes to visual character or quality of the pipeline alignments would occur, as they would be located below ground. The SWP Turnout would be located where the 36-inch Raw Water/Return Water Pipeline meets the East Branch of the California Aqueduct. This turnout is a gate which would allow water from the aqueduct to flow into an underground vault. No impacts to aesthetic/visual resources are anticipated with the SWP Turnout due to its visual similarities to the existing aqueduct and the underground nature of the vault. Impacts associated with visual changes for the proposed Project would be less than significant.

Outside site lighting would be provided at points throughout the Project site, and would be intended for occasional maintenance activity. The lighting would be located at the SWP Turnout, Distribution Site, each of the recharge basins (one on each inlet and outlet for a total of eight), the Splitter Box, and each of the 16 Recovery Well sites. These lights would not normally be on; they would be turned on when needed for maintenance activities and would potentially have lockable light switches. Lighting installed for the proposed Project would comply with local lighting regulations. Because the lighting would be provided for maintenance, it would not be lit continuously throughout the night. Construction lighting associated with nighttime activities (potentially for pipeline installation in busy roadways and during well drilling) would be directed toward the construction site and would be shielded from nearby residences. Therefore, the proposed Project would not result in a substantial adverse effect on nighttime views. Impacts would be less than significant.

7.2 AGRICULTURAL RESOURCES

The portion of the Project site that is within the City of Lancaster (two of the Recovery Wells) is zoned Rural Residential (RR-2.5). The portions of the Project site within the City of Palmdale (the Recharge and Distribution Sites, nine Recovery Wells, and portions of the 30-inch Potable Water and 36-inch Raw Water/Return Water Pipeline) are zoned Planned Industrial (M-4,), while Project site zoning within the unincorporated County of Los Angeles includes Light Agriculture (A-1-1), Heavy Agriculture (A-2, A-2-1 and A-2-2), Commercial Recreation (C-R-U), and Light Manufacturing (M-1). The portions of the Project site located within the City of Palmdale would be located on land that is zoned for Industrial uses and is not zoned or designated for agricultural use. The portion of the proposed Project within the City of Lancaster (two Recovery Wells) and many of the areas surrounding the Recovery Wells north of Avenue L are mapped as Prime Farmlands (California Department of Conservation, Division of Land Resource Protection 2012). This land is zoned by the City of Lancaster for residential use and its General Plan land designation is also residential. The proposed Recovery Wells involve relatively small areas and would not prevent the adjacent and surrounding areas from supporting agricultural activity as an interim land use until rural residential uses, which are envisioned by the City of Lancaster based on designated land uses. While portions of the proposed Project within unincorporated Los Angeles County proposed for Recovery Wells contain agricultural zoning designations, they are not designated as important farmland by the State of California. The Distribution and Recharge Sites would not be located on lands designated for agricultural use nor would they affect any nearby lands designated as Prime Farmland. The SWP Turnout would be constructed at the intersection of the East Branch of the California Aqueduct and 106th Street East and would be located in an area that would not be subject to or available for agricultural use. The 30-inch Potable Water and 36-inch Raw Water/Return Water Pipelines would follow along existing road right-of-ways that are not subject to or available for

agricultural use. The Recycled Water Pipeline would also follow along existing rights-of-way that are not subject to or available for agricultural use. Impacts to Prime Farmland, Unique Farmland, or Farmland of Statewide Importance would be less than significant. For the reasons described above, no significant impacts related to agricultural resources or activities are anticipated from implementation of the proposed Project. The proposed Project would not conflict with existing zoning for agricultural use or a Williamson Act contract. The proposed Project site does not contain forest land or timberland, nor would it result in the loss of forest land or conversion of forest land to non-forest use. No impact to forestland or timberland would occur.

7.3 HAZARDS AND HAZARDOUS MATERIALS

The proposed Project would not be not be associated with the routine transport, use, or disposal of hazardous materials or wastes and would therefore result in no associated impacts. During the proposed Project construction period, hazardous substances used to maintain and operate construction equipment (such as fuel, lubricants, adhesives, solvents, and asphalt) would be present. Additionally, as discussed in Section 2.5.3, *Operational Activities*, small amounts of oil would potentially be present at the Distribution Site for use in maintaining and operating motors and generators at the Potable Water Pump Station. These materials would be present in small quantities and would be handled in accordance with federal, State, and local requirements, both in the construction and operational phase of the proposed Project. Sodium hypochlorite used at the Distribution Site would be stored at a non-hazardous concentration of 0.8 percent, would be contained within the Potable Water Pump Station Building, and would be stored consistent with applicable requirements, including the provision of secondary containment to contain the material in the event of an accidental release. Based on these factors, the presence of sodium hypochlorite would not result in impacts associated with hazardous materials. As such, the proposed Project would not create a significant hazard to the public through the routine transport, use, or disposal of hazardous materials or through a reasonably foreseeable upset and accident condition involving the release of hazardous material into the environment.

The proposed pipeline alignments traverse adjacent to an elementary and high school (Daisy Gibson Elementary School and Littlerock High School), within developed roadways. The proposed Project would not result in the handling or emission of acutely hazardous materials, substances, or wastes along the pipeline alignments and within 0.25 mile of a school. No impact would occur.

Government Code Section 65962.5 requires that the Department of Toxic Substances Control (DTSC). The SWRCB's GeoTracker database and the DTSC Envirostor database provide information on hazardous materials sites. No such properties were found to be located directly adjacent to the proposed Project site; thus, the proposed Project is not located on a site containing hazardous materials listed by the DTSC, and no associated impacts would occur.

The nearest airport is the Los Angeles/Palmdale Regional Airport, located approximately 6 miles west of the proposed Recharge Site, and approximately 3.5 miles northwest of the proposed 30-inch Potable Water Pipeline. Air Force Plant 42 is a U.S. Government aircraft industrial facility, with a runway that is shared with the Los Angeles/Palmdale Regional Airport. The proposed Project site is not within the land use plan for either of these facilities. There are no

private airstrips within the nearby vicinity of the proposed Project site, with the closest such facilities located approximately 6.5 miles to the southeast (Crystal Airport), 6.5 miles to the east (Nichols Farms Airport), 8.4 miles to the northwest (Sterks Ranch Airport), and 10 miles to the east (Brian Ranch Airport). No impact associated with public or private airport hazards would occur.

Although proposed Project construction would include the placement of new pipelines along segments of area roadways, pipeline placement would not require full road closure. Many of the roadway segments within the proposed Project area would be subject to temporary lane closures during proposed Project construction; however, most closures would maintain one lane of travel at all times. If road closures would be necessary, they would last for no more than a few days on the affected road segment, and alternate routes/detours would be established to accommodate diverted traffic. Construction activities at the Recharge and Distribution Sites and the Recovery Wells would not result in impacts to area roadways, and thus, would not impair implementation of or physically interfere with an adopted emergency response or evacuation plan. Accordingly, potential impacts to emergency response or evacuation plans from the proposed Project would be less than significant.

The Recharge and Distribution Sites and Recovery Wells are located in undeveloped, desert areas and are not subject to wildland fires. Additionally, the proposed pipeline alignments occur within developed roadways, and would not result in impacts associated with wildland fires. No impact would occur.

7.4 LAND USE AND PLANNING

The Recharge Site, Distribution Site, and Recovery Wells are located within the City of Palmdale, City of Lancaster, and the County of Los Angeles. The portion of the proposed Project site that is within the City of Lancaster (two of the Recovery Wells) is zoned Rural Residential (RR-2.5). The portions of the Project site within the City of Palmdale are zoned Planned Industrial (M-4,), while Project site zoning within the unincorporated County of Los Angeles includes Light Agriculture (A-1-1), Heavy Agriculture (A-2, A-2-1 and A-2-2), Commercial Recreation (C-R-U), and Light Manufacturing (M-1). The proposed Project would not conflict with a land use plan adopted for the sole purpose of mitigating or avoiding environmental effects. The Recharge and Distribution Sites and Recovery Wells are not located within or between existing developments and would not divide any existing communities. The proposed pipelines would be sited within existing road right-of-ways and would not create community divisions. A portion of the 30-inch Potable Water Pipeline traverses through the County of Los Angeles' proposed Antelope Valley Significant Ecological Areas (SEA). An SEA is an officially designated area within the County identified for biological value. SEAs would require special management due to the ecological resources which could be located there. They are not designated as a wildlife preserve, and development is allowed. While the proposed Project could be located within a future SEA depending on approval of the SEA Program Update, it would not, as designed, be located within an existing SEA. The proposed Project would not conflict with an applicable habitat conservation plan.

7.5 MINERAL RESOURCES

The proposed Project site is not currently being utilized for mineral extraction. Mineral resources are regionally significant and commercially viable deposits of aggregate or minerals. This includes sand, gravel, and other construction aggregate. No mineral resource zones (MRZ) exist within the portion of the proposed Project located within the City of Lancaster (City of Lancaster 2009). Two MRZs are identified in the Palmdale General Plan: the Littlerock Creek Sector and the Big Rock Creek Sector (City of Palmdale 1993). Littlerock Creek Fan is identified within the County of Los Angeles General Plan. The Littlerock Creek Fan production region holds up to 250 million tons of aggregate reserves, with an estimated depletion year of 2046 (Los Angeles County 2015b). The 30-inch Potable Water Pipeline traverses through this MRZ along the East Palmdale Boulevard right of way. At its closest point, the 36-inch Raw Water/Return Water Pipeline lies approximately two miles west of the Big Rock Creek Sector as shown in the City of Palmdale General Plan (1993). Neither pipeline would impact an MRZ. The Potable Water Pipeline would be placed within an existing road right-of-way, and would therefore not result in impacts to the MRZ. The Raw Water/Return Water Pipeline, Recharge and Distribution Sites, and Recovery Wells do not lie within MRZs and would therefore, not impact mineral resources. No impact to mineral resources would occur.

7.6 POPULATION AND HOUSING

As described in Chapter 5.0, *Other CEQA Considerations*, the proposed Project would not induce growth within the Palmdale area or elsewhere within the PWD service area. Based on current water supply and growth projections, water supply for the PWD service area could be running at a deficit by 2021. Therefore, the proposed Project is proposed to meet existing and projected water use, and would not induce additional demand. The proposed Project area is accessible from much of southern California and proposed Project construction can be accomplished by the existing labor pool within this region. Accordingly, construction of proposed Project facilities would not be expected to draw new construction workers to live in the area. Based on these factors, the proposed Project would not create a need for new housing. In addition, construction of the proposed Project would not require the demolition of existing housing or otherwise displace residents. Because the proposed Project would neither draw new residents to the area nor displace existing residents, no impact is associated with population and housing would occur.

7.7 PUBLIC SERVICES

The proposed Project is located in a predominantly undeveloped area, previously used for agricultural uses. Scattered rural residential uses are located in the area. The nearby developed areas are currently served by fire, police and related emergency services. Although proposed Project facilities, such as the Recovery Wells and Distribution Site, would be within the service areas of these agencies and could generate the need for an emergency response, these facilities generally would have negligible service requirements. As noted in Section 7.6, the proposed Project would not increase the number of local residents or the demand for housing. Accordingly, the proposed Project would not result in population-related effects on schools, parks or libraries, nor would it increase the number of residences or businesses that need fire, police, and other emergency services.

Construction of the proposed facilities would be coordinated with other appropriate agencies to ensure that local infrastructure is not adversely affected. The focus of this effort would be primarily on the Raw Water/Return Water and Potable Water Pipelines construction (the pipelines would traverse several roads that may contain buried utilities). The Recovery Wells would be sited such that drilling the Recovery Wells would not affect pipelines or buried communication lines (e.g., phone, cable). PWD would initiate early and detailed coordination with utilities agencies as well as the cities of Palmdale, Lancaster, and the County of Los Angeles to avoid physical or operational impacts to applicable facilities, and to ensure proposed Project compatibility with local utility operations. Impacts associated with public utilities would be less than significant.

7.8 RECREATION

The proposed Project would not include the construction of housing and/or businesses and thus would not induce a direct increase in the local or regional population. As such, the proposed Project would not result in increased usage of existing parks and recreational facilities. Proposed Project construction and implementation would not affect existing recreational facilities. The proposed Project does not include recreational facilities, nor would it require the construction or expansion of recreational facilities. No impact would occur.

7.9 TRANSPORTATION AND TRAFFIC

Only a nominal long-term increase in traffic generation would occur as a result of the proposed Project, as only minimal maintenance activity is anticipated for proposed Project operations. The 30-inch Potable Water and 36-inch Raw Water/Return Water Pipelines traverse along existing roadways. Project-related traffic increases that may occur would be temporary and associated with proposed Project construction only. Such traffic would be minor, including deliveries of equipment and materials, construction employee travel to and from the work site, and hauling of demolition and excavation material off site, and would not have a significant impact on level of service (LOS).

Many of the roadway segments within the proposed Project area would be subject to temporary lane closures during pipeline trenching and construction; however, most closures would maintain one lane of travel at all times. If road closures would be necessary, they would last for no more than a few days on the affected road segment, and alternate routes/detours would be established to accommodate diverted traffic. Driveway closures would be kept to a minimum, with blockages likely occurring for no more than a few hours at a time. Residents would be notified well in advance of impending closures or blockages related to pipeline construction for the proposed Project. No substantial increase in traffic on area roadways is anticipated following construction.

The intermittent operational traffic for proposed Project maintenance would be a nominal amount of trips. The short-term construction traffic and operational traffic resulting from the proposed Project would not exceed, either individually or cumulatively, a level of service standard for designated roads or highways. Based on these factors, less-than-significant impacts would occur as a result of proposed Project implementation.

The proposed Project would not involve structures that would conflict with air traffic or airport operations. Similarly, following the completion of construction, the proposed Project would neither create the need for transportation nor affect existing transportation systems; accordingly, it would not conflict with adopted policies supporting alternative transportation. For these reasons, the above-listed transportation topics were determined to be less than significant.

7.10 UTILITIES AND SERVICE SYSTEMS

Pursuant to the Environmental Checklist questions presented in Appendix G of the State CEQA Guidelines, it should be noted that the proposed Project would not conflict with any existing utilities and service systems. The proposed Project would provide for future water needs within the PWD service area through a groundwater banking program. Therefore, the proposed Project would not require or result in the construction of outside water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects. New hardscape associated with the proposed Project includes pavement and structures at the approximately two-acre Distribution Site, and buildings at the sixteen Recovery Wells (measuring approximately 100 feet by 100 feet, each). Small amounts of hardscape would also be present at the Recharge Site, in the form of the emergency spillways and access road. The proposed Project would not significantly increase the amount of permeable area in the Antelope Valley, or within the cities of Palmdale and Lancaster, so there would be no need for new storm water drainage facilities or expansion of existing facilities. The proposed Project consists of facilities which would help treat recycled wastewater for reuse. The proposed Project's sole bathroom would utilize an on-site septic tank and leach field. It would not create wastewater to exceed treatment requirements of the RWQCB. Because the proposed Project would provide future water supplies and does not include components that would require new water service, no new water supplies would be needed to serve the proposed Project. The proposed Project is not expected to generate significant amounts of refuse during operation. Refuse generated by the proposed Project during or after construction would be adequately served by a landfill with sufficient permitted capacity to accommodate the proposed Project and would comply with federal, state, and local statutes and regulations related to solid waste. Impacts associated with utilities and service systems would be less than significant.

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8.0 REFERENCES

Antelope Valley Air Quality Management District (AVAQMD). 2015. AVAQMD Designations and Classifications. Lancaster, CA: AVAQMD. http://www.avaqmd.ca.gov/index.aspx?page =289.

2011 (August). Antelope Valley AQMD California Environmental Quality Act (CEQA) and Federal Conformity Guidelines. Lancaster, CA: AVAQMD. http://www.avaqmd.ca.gov/Modules/ShowDocument.aspx?documentid=2911.

2008 AVAQMD Federal 8-Hour Ozone Attainment Plan (Western Mojave Desert Non-attainment Area). Lancaster, CA: AVAQMD. http://www.avaqmd.ca.gov/Modules/ ShowDocument.aspx?documentid=923.

2006 (August). 8-Hour Reasonably Available Control Technology – State Implementation Plan Analysis (RACT SIP Analysis). Lancaster, CA: AVAQMD. http://www.avaqmd.ca.gov/Modules/ShowDocument.aspx?documentid=920 .

2005 (August). List and Implementation Schedule for District Measures to Reduce PM Pursuant to Health & Safety Code §39614(d). Lancaster, CA: AVAQMD. http://www.avaqmd.ca.gov/Modules/ShowDocument.aspx?documentid=919 .

2004 (April). AVAQMD 2004 Ozone Attainment Plan (State and Federal). Lancaster, CA: AVAQMD. http://www.avaqmd.ca.gov/Modules/ShowDocument.aspx?documentid=922.

1976 (as amended through 2010). Rule 403: Fugitive Dust. Lancaster, CA: AVAQMD. http://www.avaqmd.ca.gov/Modules/ShowDocument.aspx?documentid=867.

Antelope Valley Regional Water Management Group. 2013. Final Antelope Valley Integrated Regional Water Management Plan. 2013 Update. Available at: http://www.avwaterplan.org/.

Applied Earthworks. 2015. Phase I Cultural Resource Assessment for the Palmdale Regional Groundwater Recharge and Recovery Project, City of Palmdale, Los Angeles County, California. October.

California Air Resources Board (CARB). 2014. May. First Update to the Climate Change Scoping Plan: Building on the Framework. Available at: http://www.arb.ca.gov/cc/scopingplan/2013_update/first_update_climate_change_scoping_plan.pdf.

2013 Ambient Air Quality Standards. June 4. Available at: http://www.arb.ca.gov/research/aaqs/aaqs2.pdf.

California Department of Conservation, Division of Land Resource Protection. 2012. Farmland Mapping and Monitoring Program. Los Angeles County Important Farmland. Available at: http://www.conservation.ca.gov/dlrp/fmmp/Pages/county_info.aspx.

California Department of Fish and Wildlife (CDFW). 2012. Staff Report on Burrowing Owl Mitigation. State of California, The Natural Resources Agency. March 7.

California Department of Transportation (Caltrans). 2015. California Scenic Highway Mapping System website. Available at: http://www.dot.ca.gov/hq/LandArch/scenic_highways/. Site accessed September 2.

2004 Caltrans Technical Noise Supplement (TENS). November.

California Department of Water Resources (DWR). 2004. California's Groundwater. Bulletin 118. February.

California Environmental Protection Agency/Office of Environmental Health Hazard Assessment (CalEPA/OEHHA). 2014. Health Advisory and Guidelines for Eating Fish From Littlerock Reservoir (Los Angeles County). March. Available at: http://oehha.ca.gov/fish/so_cal/pdf_zip/AdvisoryLittleRockReservoir032514.pdf.

California Geological Survey (CGS). 2010. Fault Activity Map of California. Geologic Data Map No. 6.

2007 Fault-Rupture hazard Zones in California. Special Publication 42.

2003 Seismic Hazard Zone Report for the Littlerock 7.5-Minute Quadrangle, Los Angeles County, California.

California Governor's Office of Planning and Research (OPR). 2008 (June 18). CEQA and Climate Change: Addressing Climate Change through California Environmental Quality Act (CEQA) Review. Sacramento, CA: OPR. http://www.opr.ca.gov/ceqa/pdfs/june08-ceqa.pdf.

California Stormwater Quality Association (CASQA). 2012. Stormwater Best Management Practices Construction Handbook. November.

Federal Emergency Management Agency (FEMA). 2008a. Flood Insurance Rate Map (FIRM), Los Angeles County, California and Incorporated Areas, Panel No. 06037C0462F. September 26.

2008b Flood Insurance Rate Map (FIRM), Los Angeles County, California and Incorporated Areas, Panel No. 06037C0464F. September 26.

2008c Flood Insurance Rate Map (FIRM), Los Angeles County, California and Incorporated Areas, Panel No. 06037C0466F. September 26.

Federal Emergency Management Agency (FEMA) (cont.)

2008d Flood Insurance Rate Map (FIRM), Los Angeles County, California and Incorporated Areas, Panel No. 06037C0468F. September 26.

2008e Flood Insurance Rate Map (FIRM), Los Angeles County, California and Incorporated Areas, Panel No. 06037C0702F. September 26.

2008f Flood Insurance Rate Map (FIRM), Los Angeles County, California and Incorporated Areas, Panel No. 06037C0703F. September 26.

2008g Flood Insurance Rate Map (FIRM), Los Angeles County, California and Incorporated Areas, Panel No. 06037C0704F. September 26.

2008h Flood Insurance Rate Map (FIRM), Los Angeles County, California and Incorporated Areas, Panel No. 06037C0715F. September 26.

HELIX Environmental Planning, Inc. (HELIX). 2015a. Palmdale Regional Groundwater Recharge and Recovery Project, Biological Technical Report. November.

2015b Palmdale Regional Groundwater Recharge and Recovery Project, Acoustical Analysis Report. October.

Intergovernmental Panel on Climate Change (IPCC). 2007 (February). Climate Change 2007: The Physical Science Basis, Summary for Policy Makers (Working Group Fourth Assessment Report). Available at: http://www.ipcc.ch/SPM2feb07.pdf.

Kennedy/Jenks Consultants (KJC). 2015a. Palmdale Water District Littlerock Creek Groundwater Recharge and Recovery Project Feasibility Study. Volume I Final Report and Appendices. February 6.

2015b Palmdale Regional Groundwater Recharge and Recovery Project Preliminary Design Report. November 9.

2015c Technical Memorandum, Task 3 – Updated Groundwater Model. September 4.

2015d Personal communication via email between Mr. David Ferguson of KJC, and Ms. Sheryl Horn of HELIX. October 6.

Lancaster, City of. 2015a. Residential Development Summary. City of Lancaster Planning Department. Updated June.

2015b Commercial/Industrial Development Summary Report. City of Lancaster Development Services Department, Community Development Division. Updated July.

2009 City of Lancaster General Plan 2030. July 14.

Lancaster, City of (cont.)

2006 Paleontological Resources Overview Report, City of Lancaster General Plan Update. October 6.

2003 City of Lancaster Storm Water Management Program (SWMP). August.

Los Angeles, County of. 2015a. Department of Regional Planning, Systems Analysis. Cumulative Project Report. Created on August 31.

2015b Public Review Draft General Plan. Los Angeles County. March.

2014a Antelope Valley Area Plan Draft EIR, SCH No. 2014061043. August.

2014b Salt and Nutrient Management Plan for the Antelope Valley. Department of Public Works, Waterworks District No. 40, and Sanitation Districts Nos. 14 and 20. May. Available at: http://www.avwaterplan.org/.

2014c County of Los Angeles Department of Public Works, Low Impact Development Standards Manual. February.

2013 Final Antelope Valley Integrated Regional Water Management Plan.

2004 Los Angeles County Airport Land Use Plan. December 1.

1990 County of Los Angeles General Plan Safety Element.

Melissadata.com. 2015. Climate Averages for zip code 93552. Available at: http://www.melissadata.com/lookups/ZipWeather.asp?ZipCode=93552&submit1=Submit

Palmdale, City of. 2015. Palmdale Development Summary, June 2014 – July 2015.

2009 "Early Palmdale." http://www.cityofpalmdale.org/library/early_palmdale.html. Accessed August 27.

1993 City of Palmdale General Plan. January 25.

1992 Draft Program Environmental Impact Report for the City of Palmdale Draft General Plan. August.

1991 The City of Palmdale, California, Engineering Design Standards. January.

Palmdale Water District (PWD). 2015. Personal Communication between Messrs. Matt Knudson of the PWD, and Dennis Marcin of HELIX Environmental Planning, Inc. August 31.

2011 2010 Urban Water Management Plan. Available at: http://www.palmdalewater.org/wp-content/uploads/2014/08/Final_2010_UWMP.pdf.

RBF Consulting. 2008. Lancaster General Plan 2030, Hydrology and Water Quality Technical Appendix. Revised through October.

Regional Water Quality Control Board, Lahontan Region (RWQCB). 1995. Water Quality Control Plan for the Lahontan Region, North and South Basins (Basin Plan). As amended through 2014.

South Coast Air Quality Management District (SCAQMD). 2013. California Emission Estimator Model (CalEEMod) Version 2013.2.2. Released October.

State Surface Water Ambient Monitoring Program (SWAMP). 2007. Surface Water Ambient Monitoring Program (SWAMP) at the Lahontan Region: Summary of Results for Years 2000-2005. July.

State Water Resources Control Board (SWRCB). 2015. Clean Water Act Section 303(d) List of Water Quality Limited Segments (including potential sources). Available at: http://www.waterboards.ca.gov/water_issues/programs/tmdl/integrated2010.shtml.

United States Bureau of Land Management. 2006. Record of Decision. West Mojave Plan Amendment to the California Desert Conservation Area Plan. March. http://www.blm.gov/style/medialib//blm/ca/pdf/pdfs/cdd_pdfs/wemo_pdfs.Par.4dfb777f.File.pdf/wemo_rod_3-06.pdf

2005 Final Environmental Impact Report and Statement for the West Mojave Plan. A Habitat Conservation Plan and California Desert Conservation Area Plan Amendment. Vol.1. January. http://www.blm.gov/ca/pdfs/cdd_pdfs/wemo_pdfs/plan/wemo/Vol-1-Chapter1_Bookmarks.pdf

United States Department of Agriculture Natural Resources Conservation Service. 2015. Soil Survey Geographic Database (SSURGO).

U.S. Department of Agriculture/Soil Conservation Service (UDSA/SCS). 1970. Soil Survey Antelope Valley Area, California. January.

U.S. Environmental Protection Agency (USEPA). 2015. National Menu of Best Management Practices for Storm Water Phase II - Construction. Available at: http://water.epa.gov/polwaste/npdes/swbmp/Construction-Site-Stormwater-Run-Off-Control.cfm.

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