WATER QUALITY ASSESSMENT REPORT

Yucca Loma Road/Yates Road/Green Tree Boulevard Transportation Improvement Project

Town of Apple Valley, City of Victorville
County of San Bernardino, California
08-SBD-STPL-5453(011)

Prepared for:

State of California
Department of Transportation, District 8
464 West 4th Street
San Bernardino, CA 92401

and

Town of Apple Valley
14955 Dale Evans Parkway
Apple Valley, California 92307
Contact: Mark Abbott
Project Manager

May 2009

State of California
DEPARTMENT OF TRANSPORTATION

Business, Transportation and Housing Agency

Memorandum

Flex your power!
Be energy efficient!

To: AARON BURTON
OFFICE CHIEF
ENVIRONMENTAL LOCAL ASSISTANCE (MS 1162)

Date: June 18, 2009

File: 08-SBd Apple Valley
Transp Improvement Project
Yucca Loma Rd / Yates Rd /
Green Tree Blvd
EA 965100

From: CATHY JOCHAI
Office Chief
Office of Storm Water Quality, MS 1164

Subject: Water Quality Assessment Report

We have reviewed the Water Quality Assessment Report for the above-referenced project and have the following comment:

- This office has reviewed the document for consistency with NPDES requirements only. Other water quality considerations must be reviewed by appropriate technical specialists in the Environmental Planning Division.

We have no further comments.

If you have any questions, please contact me at Ext. 4948.

c: JGalvan, Design Engineer (MS 1164)
File

Tariq Jouzi / df

EXECUTIVE SUMMARY

The proposed Project will provide a new route across the Mojave River between the Town of Apple Valley, County of San Bernardino, and City of Victorville. The eastern limit of the proposed Project is at the intersection of Yucca Loma Road and Apple Valley Road. The western limit is at the intersection of Green Tree Boulevard and Hesperia Road.

The proposed Project will widen Yucca Loma Road from two to four lanes from Apple Valley Road to its current terminus east of Kasanka Trail. A new bridge crossing over the Mojave River will be constructed extending the roadway to Yates Road. This bridge will be built wide enough for an ultimate build out use of six lanes but will be striped for four lanes. The bridge will also have shoulders and sidewalks. Space for sidewalk will be allowed on both sides of Yucca Loma Road; however, it is anticipated sidewalk will only be built on one side of the street as part of this proposed Project. A new signal with crosswalks is planned at Havasu Road.

Yates Road will be widened from two lanes to four lanes. From Fortuna Lane to Park Road actual roadway widening is necessary. From Park Road to Ridgecrest Road, Yates Road is currently built wide enough for four lanes, but has been striped and used for two lanes of traffic. Pavement rehabilitation and restriping is needed in this area. Yates Road as it connects to Ridgecrest Road will be realigned to the east to allow connection to an extension of Green Tree Boulevard. A pedestrian path is planned along the north side of Yates Road, connecting from the bridge over the Mojave River to Ridgecrest Road and Green Tree Boulevard.

Ridgecrest Road will be realigned, at its current width, from approximately five hundred feet south of Chinquapin Drive to a new intersection of Yates Road and the extension of Green Tree Boulevard. Signals are planned at the new intersection and sidewalks will connect the three streets.

Green Tree Boulevard will be extended with four thru travel lanes from the new Ridgecrest Road/Yates Road intersection to Hesperia Road by following one of two alternate alignments. The Green Tree Boulevard South alignment, Alternative A, is centered on the existing property Section Line boundary and impacts four single family residential parcels located between the railroad right-of-way and Hesperia Road. Alternative B, the Green Tree Boulevard North alignment, shifts the roadway approximately 150 feet to the north, avoiding the four single family residential parcels. New access roads would maintain access to the four parcels. Grading would allow for sidewalk to be built on both sides of the roadway; however, construction of sidewalks is anticipated to occur as development in the area occurs. Both Green Tree Boulevard alignment alternatives require the construction of a new bridge over the BNSF Railroad which will also be striped for four lanes and include sidewalks.

Various utility relocations and realignments will be necessary throughout the proposed Project.

An analysis was conducted to assess the water quality constraints of the proposed Project, the results of which determined that both construction activity and post-construction impacts may affect water quality; however, with implementation of Best Management Practices (BMPs)

these impacts should remain minimal. The temporary and permanent impacts of the proposed Project are summarized below.

Construction of the Bridge will require work in and adjacent to the Mojave River; therefore there is a potential for pollutants from construction work to enter the intermittent water body. The proposed Project's temporary impacts are confined to the portion of the river channel that will be disturbed for placement of posts to support construction falsework. Permanent impacts for the proposed Project include the excavation and placement of piers within the river channel and placement of the abutments on the banks.

The Mojave River is the only major creek, river, or stream within the proposed Project Vicinity. The characteristics of the Mojave River are:

- A high percolation rate of the riverbed material
- A channel that is dry most of the year
- The flow is controlled by United States Army Corps of Engineers (USACE), Los Angeles District

A construction Storm Water Pollution Prevention Plan (SWPPP) will be prepared that identifies the specific Best Management Practices (BMPs) to be implemented during proposed Project construction so as not to cause or contribute to an exceedance of any water quality standards specified in the Water Quality Control Plan for the Lahontan Region (Basin Plan).

Adverse impacts to water quality could result from both construction activity and post-construction impacts. Since the proposed Project will be creating a new bridge and widening Yucca Loma Road and Yates Road, the proposed Project is anticipated to produce approximately 22 acres of new impervious surface and introduce small amounts of additional pollutant loads of runoff into the area, 4 acres will be impacts from the Mojave River Bridge. Yucca Loma Road widening will constitute another 5 acres of the 22 total acres and the Yates Road Widening will contribute the additional 13 acres of impervious surfaces. The proposed Project is required to implement routine structural BMPs to target pollutants of concern. Design Pollution Prevention, Treatment, and Maintenance BMPs will be specified during the design phase of the proposed Project.

If the SWPPP and BMPs are implemented in accordance with National Pollutant Discharge Elimination System (NPDES) permit requirements as stipulated in Mitigation Measures WQ-1 (Obtain General Construction Permit and Prepare SWPPP), WQ-2 (Erosion Control Measures), WQ-3 (Implement a Spill Prevention and Control Program), WQ-4 (Include SWPPP Standards and Criteria), and WQ-6 (Removal of All Temporary Measures), and Biology measures BIO-1 (Protect Water Quality and Prevent Erosion in Wetlands and Drainages), BIO-2 (Implement Water Quality Measures), BIO-3 (Avoidance and Minimization Efforts for Sensitive Natural Communities), BIO-4 and (Avoidance and Minimization Efforts for Aquatic Resources) the requirements would ensure that construction does not cause adverse impacts to water quality.

Also, because the proposed Project consists of a permanent increase in impervious surfaces, there remains potential for a permanent increase in runoff and pollutant loading without

implementation of construction, design, and treatment BMPs. Additional minimization measures WQ-5 (Appropriate Treatment BMPs During Final Design), including measures such as implementation of detention basins and using local standards when feasible, would prevent adverse water quality impacts from post-construction operation of the bridge and improved roadways.

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1. INTRODUCTION

The Town of Apple Valley (Town), in association with the City of Victorville (City), proposes to provide a new route across the Mojave River including necessary improvements and realignments to Yates Road, Yucca Loma Road, Green Tree Boulevard, and Ridgecrest Road. The proposed Project is located within the Town of Apple Valley and the City of Victorville with the eastern proposed Project limits in Apple Valley at the intersection of Yucca Loma Road and Apple Valley Road and the western limit in Victorville at the intersection of Green Tree Boulevard and Hesperia Road (Figure 1). The purpose of this report is to evaluate impacts of this proposed Project on potentially affected water resources and their beneficial uses. This report is intended to evaluate the existing surface and groundwater resources and the potential effects of the proposed Project on these water resources.

1.1 PROJECT PURPOSE AND NEED

The purpose of the proposed Project is to establish an alternate route between the Town of Apple Valley and the City of Victorville in the County of San Bernardino, California. The Mojave River is a natural barrier between the Town of Apple Valley to the east and the City of Victorville to the west. Significant growth in the area has created traffic "bottle-necks" at the two existing river crossings located at Bear Valley Road and State Route 18. With further population growth and without a new river crossing, conditions are expected to be further aggravated. This proposed Project would provide a new major arterial connection through these three jurisdictions which would provide better access to the existing local residential neighborhoods, to the local freeway system, and to the Mojave Narrows Regional Park.

The proposed Project is designed to reduce traffic volume and congestion on the existing routes connecting the City of Victorville and the Town of Apple Valley (Bear Valley Road to the south and State Route 18 to the north), as well as increase residential, commercial, and industrial development in both the City of Victorville and the Town of Apple Valley. In addition to the reduction of traffic congestion, the proposed Project would also benefit traffic safety and air quality in the region. By reducing stop and go traffic, the potential for traffic related accidents would decrease. The new route would reduce Vehicle Miles Traveled and Vehicle Hours Traveled which would reduce vehicle emissions. The proposed Project includes the construction of a new bridge over the Mojave River which would reduce the existing vehicular impacts to the river bed and surrounding areas during the dry season. Construction of the proposed Project would be an implementation of the General Plans from the City of Victorville, the County of San Bernardino, and the Town of Apple Valley.

1.2 PROJECT DESCRIPTION

The proposed Project will provide a new route across the Mojave River between the Town of Apple Valley, County of San Bernardino, and City of Victorville (Figure 1). The eastern limit of the proposed Project is at the intersection of Yucca Loma Road and Apple Valley Road. The western limit is at the intersection of Green Tree Boulevard and Hesperia Road.

The proposed Project will widen Yucca Loma Road from two to four lanes from Apple Valley Road to its current terminus east of Kasanka Trail. A new bridge crossing over the Mojave River will be constructed extending the roadway to Yates Road. This bridge will be built wide enough for an ultimate build out use of six lanes but will be striped for four lanes. The bridge

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Various utility relocations and realignments will be necessary throughout the proposed Project.

Since the proposed Project is located in three different jurisdictions, it is anticipated construction will occur under multiple construction contracts and during different construction seasons. Construction may begin as early as 2010.

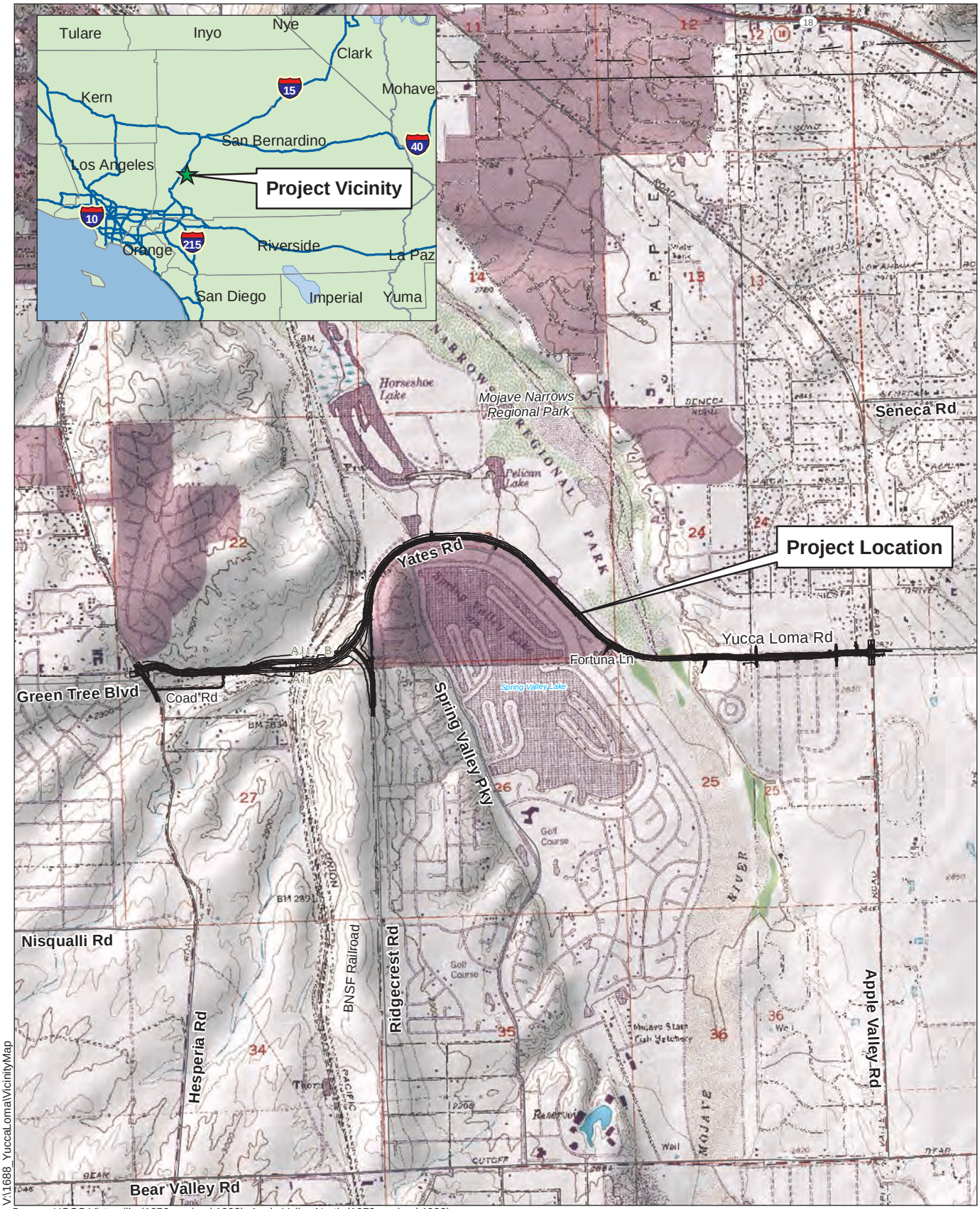
The proposed Project's regional location is shown in Figure 1: Vicinity Map and Figure 2: Locality Map.

Funding sources for the proposed Project include local funds (the Town of Apple Valley, the City of Victorville, the County of San Bernardino and the State of California) as well as federal funds provided by the Surface Transportation Program (Local).

Construction is scheduled to begin in 2010. The proposed Project will be constructed in accordance with Department Standard Construction Specifications, which include measures to reduce noise and air pollution emissions during construction.

1.3 APPROACHES TO WATER QUALITY ASSESSMENT

The purpose of this Water Quality Assessment Report is to determine whether the proposed Yucca Loma Bridge/Yates Road/Green Tree Boulevard Transportation Improvement Project will have an adverse impact on water quality. The determination of impacts is based on the anticipated change in pollutant loads due to construction activities required in the stream channels, the excavation required on land in proximity to the stream banks, pollutant loads anticipated during construction, and changes in impervious area percentage between the existing condition and the post-Project condition. The analysis includes consideration of Best Management Practices (BMPs) to be implemented as part of the proposed Project. This assessment also discusses existing water quality regulations and the methods for complying with those regulations.



V:\1688_YuccaLomaVicinityMap

Source: USGS Victorville (1956, revised 1993), Apple Valley North (1970, revised 1993), Hesparia (1956, photorevised 1980), and Apple Valley South (1956) 7.5 Minute Quadrangles; Dokken Engineering, 2009; Created by: K. Smith

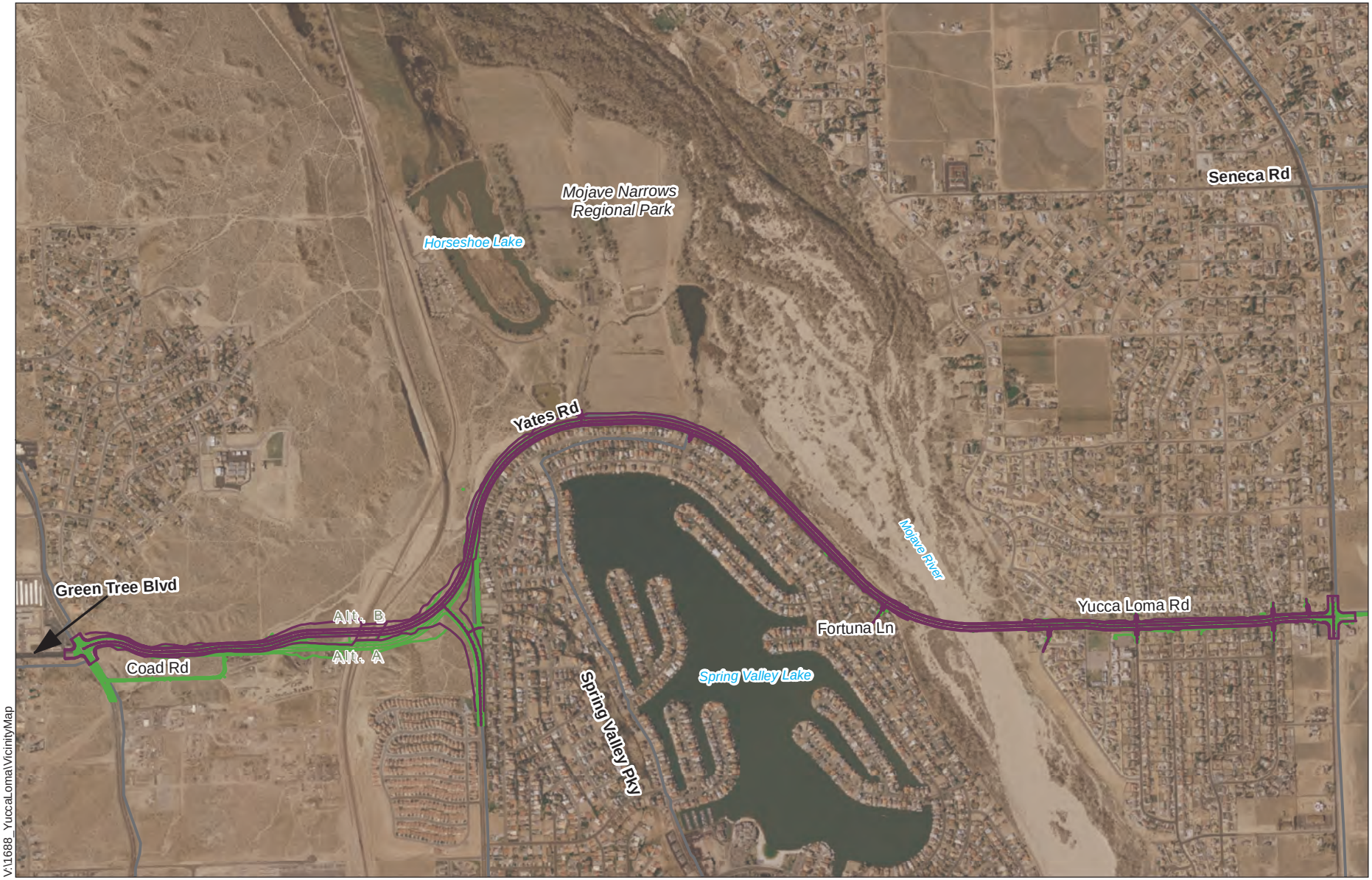
N

0 0.5 1 Miles

FIGURE 1

Project Vicinity

Yucca Loma Road/Yates Road/Greentree Boulevard Transporation Improvement Project
District 8
STPL 5453(011)
Town of Apple Valley, County of San Bernardino, and City of Victorville



Source: GlobalXplorer 3/1/2008; Dokken Engineering, 2009; Created By: K. Smith

0 0.5 1 Miles

FIGURE 2

Project Location

Yucca Loma Road/Yates Road/Greentree Boulevard Transporation Improvement Project
District 8
STPL 5453(011)
Town of Apple Valley, County of San Bernardino, and City of Victorville

2. REGULATORY SETTING

Discharges into waters of the United States are subject to the regulatory authority of the U.S. Army Corps of Engineers (Corps) under Section 404 of the federal Clean Water Act (CWA); the State Water Resources Control Board (SWRCB) and the Southern Lahontan Regional Water Quality Control Board (LRWQCB) under Sections 401, 402, and 303(d) of the CWA and the California Porter-Cologne Water Quality Act, and by the California Department of Fish and Game (CDFG) under Sections 1601-1603 of the California Fish and Game Code.

2.1 FEDERAL REQUIREMENTS

Federal Clean Water Act

Section 404

The Corps regulates discharges or fills into waters of the United States under Section 404 of the CWA via the Nationwide Permit (NWP) or Individual Permit program. There are several categories of NWPs, and these can be used for proposed Projects that fall under specific categories. A Preconstruction Notification (PCN) to the Corps district engineer is required for most activities that result in the loss of greater than 0.04 hectare (0.1 acre) of waters of the U.S. The Corps reviews the PCN on a case-by-case basis to determine whether the adverse effects (on the aquatic environment) of proposed work are minimal. The Corps will also determine whether a particular drainage is considered Waters of the U.S. and whether it is subject to regulation under Section 404.

Section 402

Direct discharges of pollutants into waters of the United States are not allowed, except in accordance with the National Pollution Discharge Elimination System (NPDES) program established in Section 402 of the CWA. The major purpose of the NPDES program is to protect human health and the environment. Pursuant to the NPDES program, permits that apply to storm water discharges from MS4s, specific industrial activities, and construction activities [0.4 hectare (1 acre) or more] have been issued. NPDES permits establish enforceable effluent limitations on discharges, require monitoring of discharges, designate reporting requirements, and require the permittee to perform BMPs. Industrial (point source) storm water permits are required to meet effluent limitations; municipal permits are governed by the Maximum Extent Practicable (MEP) or Best Available Technology (BAT)/Best Control Technology (BCT) application of BMPs.

Section 401

Section 401 of the CWA specifies that any applicant for a federal license or permit to conduct any activity, including but not limited to the construction or operation of facilities that may result in any discharge into navigable waters, shall provide the federal licensing or permitting agency with a certification from the State in which the discharge originates or will originate from the State agency with jurisdiction over those waters (LRWQCB) that the proposed Project will comply with water quality standards, protect beneficial uses, meet water quality objectives, and comply with the State anti-degradation policy.

Section 303

Section 303(d) of the Clean Water Act requires that the State adopt water quality objectives for surface waters. The Basin Plan and Resolution No. 2004 - 0001contain water quality objectives that are considered necessary to protect the specific beneficial uses the Basin Plan identifies. Section 303(d) specifically requires the State to develop a list of impaired water bodies and subsequent numeric Total Maximum Daily Loads (TMDL) for whichever constituents impair a particular water body. These constituents include inorganic and organic chemical compounds, metals, sediment, and biological agents.

The TMDL is the total amount of a constituent that can be discharged while meeting water quality objectives and protecting beneficial uses. It is the sum of the individual load allocations for point source inputs (e.g., an industrial plant), load allocations for nonpoint source inputs (e.g., runoff from urban areas), and natural background, with a margin of safety.

The most recent 303 (d) impaired waters list for the State was approved by the SWRCB in 2006 shows that the Mojave River is not proposed or listed for any known pollutant or stressor. Deep Creek and West Fork Mojave are Mojave tributaries that are also unlisted. Verification that the Mojave River is not listed for impairments or TMDLs can be accessed on the internet on the SWRCB website at:

www.waterboards.ca.gov/tmdl/docs/303dlists2006/final/r6_final303dlist.pdf
www.waterboards.ca.gov/tmdl/docs/303dlists2006/final/statetcl_final303d.pdf.

2.2 STATE REQUIREMENTS

Porter-Cologne Water Quality Control Act

The Porter-Cologne Act establishes a regulatory program to protect water quality and beneficial uses of State waters. It empowers the Regional Boards to formulate and adopt, for all areas within the regions, a Basin Plan that designates beneficial uses and establishes such water quality objectives that in its judgment will ensure reasonable protection of beneficial uses. Each Regional Board establishes water quality objectives that will ensure the reasonable protection of beneficial uses and the prevention of nuisance. The Water Code provides flexibility for some change in water quality, provided that beneficial uses are not adversely affected.

California Fish and Game Code Sections 1601-1603

The CDFG, through provisions of the California Fish and Game Code (Sections 1601-1603), is empowered to issue agreements for any alteration of a river, stream, or lake where fish or wildlife resources may be adversely affected. Streams and rivers are defined by the presence of a channel bed and banks and at least an intermittent flow of water. CDFG typically extends the limits of its jurisdiction laterally beyond the channel banks for streams that support riparian vegetation. In these situations, the outer edge of the riparian vegetation is generally used as the lateral extent of the stream and CDFG jurisdiction.

The California Fish and Game Code Section 1602 requires any person, State or local governmental agency, or public utility to notify the CDFG before beginning any activity that will result in one or more of the following: (1) substantial obstruction or diversion of the natural flow of a river, stream, or lake, (2) substantial change in or use of any material from the bed, channel, or bank of a river, stream, or lake, or (3) deposit or disposal of debris, waste, or other material containing crumbled, flaked, or ground pavement where it can pass into a river, stream, or lake. The Fish and Game Code Section 1602 applies to all perennial, intermittent, and ephemeral rivers, streams, and lakes in the State.

State Requirements under Section 402 of the Federal Clean Water Act

General Construction Activity NPDES Permit (General Permit)

In accordance with National Pollution Discharge Elimination System (NPDES) regulations, the State requires that any construction activity disturbing 1 acre or more of soil comply with the State General Construction Permit (NO. CAS000002). In order to obtain authorization for proposed storm water discharge pursuant to this permit, the landowner (discharger) is required to submit a Notice of Intent to the SWRCB, prepare a SWPPP, and implement BMPs detailed in the SWPPP during construction activities. Dischargers are required to implement BAT and BCT to reduce or eliminate storm water pollution. The purpose of the SWPPP is to prevent all construction pollutants from contacting storm water and to keep all products of erosion from moving off site into receiving waters. The proposed Project is subject to the requirements of this permit because it will disturb more than 1 acre of soil.

2.3 LOCAL REQUIREMENTS

Local Requirements under Section 402 of the Federal Clean Water Act

Municipal NPDES Permit

The Town of Apple Valley, County of San Bernardino, and Cities of Victorville and Hesperia are all covered under the same NPDES MS4 Permit (WQ Order No. 2003-0005-DWQ) program as individual Urbanized Areas as designated by the Bureau of Census. The Mojave Watershed Stormwater Management Plan (SWMP) required for the City under Phase II of the NPDES Stormwater Program. The MS4 permit requires the discharger to develop and implement a Storm Water Management Plan/Program with the goal of reducing the discharge of pollutants to the maximum extent practicable (MEP). MEP is the performance standard specified in Section 402(p) of the Clean Water Act. The management programs specify what Best Management Practices (BMPs) will be used to address certain program areas. The program areas include public education and outreach; illicit discharge detection and elimination; construction and post-construction; and good housekeeping for municipal operations. In general, medium and large municipalities are required to conduct chemical monitoring, though small municipalities are not. The management measures outlined in the SWMP are intended to be regionally integrated by each individual participant and are pertinent to the current proposed Project.

Basin Plan Beneficial Uses

Beneficial uses of the Upper Mojave River Watershed are outlined in the Basin Plan. Beneficial uses of water are those necessary for the survival or well-being of humans, plants, and wildlife. Examples of beneficial uses include drinking water supplies, swimming, industrial and agricultural water supply, and the support of freshwater and marine habitats and their organisms.

Beneficial Uses for Surface Waters

The designated beneficial uses for the Mojave River and the West Fork of the Mojave River are listed in Table 1.

Table 1: Beneficial Uses

Category		Definition
Municipal and Domestic Supply	MUN	Uses of water for community, military, or individual water supply systems including, but not limited to, drinking water supply.
Agricultural Supply	AGR	Uses of waters for farming, horticulture, or ranching including, but not limited to, irrigation, stock watering, or support of vegetation for range grazing.
Ground Water Recharge	GWR	Uses of waters used for natural or artificial recharge of ground water for purposes of future extraction, maintenance of water quality, or halting of saltwater intrusion into freshwater aquifers. Ground water recharge includes recharge of surface water underflow.
Water Contact Recreation	REC-1	Uses of waters for recreational activities involving body contact with water, where ingestion of water is reasonably possible. These uses include, but are not limited to, swimming, wading, water-skiing, skin and scuba diving, surfing, white water activities, fishing, or use of natural hot springs.
Non-Contact Water Recreation	REC-2	Uses of waters for recreational activities involving proximity to water, but not normally involving body contact with water, where ingestion of water is reasonably possible. These uses include, but are not limited to, picnicking, sunbathing, hiking, beachcombing, camping, boating tidepool and marine life study, hunting, sightseeing, or aesthetic enjoyment in conjunction with the above activities.
Commercial and Sport Fishing	COMM	Uses of waters for commercial or recreational collection of fish, shellfish, or other organisms including, but not limited to, uses involving organisms intended for human consumption or bait purposes.
Warm Fresh Water Habitat	WARM	Uses of waters that support warm water ecosystems including, but not limited to, preservation or enhancement of aquatic habitats, vegetation, fish, or wildlife, including invertebrates.
Cold Fresh Water Habitat	COLD	Uses of waters that support cold water ecosystems including, but not limited to, preservation or enhancement of aquatic habitats, vegetation, fish or wildlife, including invertebrates.
Wildlife Habitat	WILD	Uses of waters that support terrestrial ecosystems including, but not limited to, preservation and enhancement of terrestrial habitats, vegetation, wildlife (e.g., mammals, birds, reptiles, amphibians, invertebrates), or wildlife water and food sources.

Beneficial Uses for Ground Waters

Ground water throughout the Mojave Basin is suitable for agricultural water supply, municipal and domestic water supply, freshwater replenishment, aquaculture, and industrial use.

Water Quality Objectives

As required by the Porter-Cologne Act, the LRWQCB has developed water quality objectives for waters within its jurisdiction to protect the beneficial uses of those waters and has published them in the Basin Plan. The Basin Plan also establishes implementation programs to achieve these water quality objectives and requires monitoring to evaluate the effectiveness of these programs. Water quality objectives must comply with the State anti-degradation policy (State Board Resolution No. 68-16), which is designed to maintain high-quality waters while allowing some flexibility if beneficial uses are not unreasonably affected.

Surface Water Quality Objectives

Surface water quality objectives for all waters established in the Basin Plan are listed in Tables 2 to 4 and include both general objectives and objectives specific to pertinent specific hydrologic units. Surface water monitoring stations within the Mojave Hydrologic Unit are shown in Figures 3 and 4.

Table 2: General Surface Water Quality Objectives

Constituent	Concentration
Ammonia	The neutral, unionized ammonia species (NH3) is highly toxic to freshwater fish. The fraction of toxic NH3 to total ammonia species (NH4 + + NH3) is a function of temperature and pH. Tables 3-1 to 3-4 were derived from USEPA ammonia criteria for freshwater. Ammonia concentrations shall not exceed the values listed for the corresponding conditions in these tables.
Bacteria, Coliform	Waters shall not contain concentrations of coliform organisms attributable to anthropogenic sources, including human and livestock wastes. The fecal coliform concentration during any 30-day period shall not exceed a log mean of 20/100 ml, nor shall more than 10 percent of all samples collected during any 30-day period exceed 40/100 ml.
Biostimulatory Substances	Waters shall not contain biostimulatory substances in concentrations that promote aquatic growths to the extent that such growths cause nuisance or adversely affect the water for beneficial uses.
Chemical Constituents	Waters designated as MUN shall not contain concentrations of chemical constituents in excess of the maximum contaminant level (MCL) or secondary maximum contaminant level (SMCL) based upon drinking water standards specified in the following provisions of Title 22 of the California Code of Regulations which are incorporated by reference into the Basin Plan: Table 64431-A of Section 64431 (Inorganic Chemicals), Table 64431-B of Section 64431 (Fluoride), Table 64444-A of Section 64444 (Organic Chemicals), Table 64449-A of Section 64449 (Secondary Maximum Contaminant Levels- Consumer Acceptance Limits), and Table 64449-B of Section 64449 (Secondary Maximum Contaminant Levels-Ranges). The incorporation-by-reference is prospective including future changes to the incorporated provisions as the changes take effect. Waters designated as AGR shall not contain concentrations of chemical constituents in amounts that adversely affect the water for beneficial uses (i.e., agricultural purposes). Waters shall not contain concentrations of chemical constituents in amounts that adversely affect the water for beneficial uses.
Chlorine, Total Residual	For the protection of aquatic life, total chlorine residual shall not exceed either a median value of 0.002 mg/L or a maximum value of 0.003 mg/L. Median values shall be based on daily measurements taken within any six-month period.
Color	Waters shall be free of coloration that causes nuisance or adversely affects the water for beneficial uses.

Constituent	Concentration
Dissolved Oxygen	The dissolved oxygen concentration, as percent saturation, shall not be depressed by more than 10 percent, nor shall the minimum dissolved oxygen concentration be less than 80 percent of saturation. For waters with the beneficial uses of COLD, COLD with SPWN, WARM, and WARM with SPWN, the minimum dissolved oxygen concentration shall not be less than that specified in Table 3-6 of the Basin Plan.
Floating Materials	Waters shall not contain floating material, including solids, liquids, foams, and scum, in concentrations that cause nuisance or adversely affect the water for beneficial uses. For natural high quality waters, the concentrations of floating material shall not be altered to the extent that such alterations are discernable at the 10 percent significance level.
Oil and Grease	Waters shall not contain oils, greases, waxes or other materials in concentrations that result in a visible film or coating on the surface of the water or on objects in the water, that cause nuisance, or that otherwise adversely affect the water for beneficial uses. For natural high quality waters, the concentration of oils, greases, or other film or coat generating substances shall not be altered.
Nondegradation of Aquatic Communities and Populations	All wetlands shall be free from substances attributable to wastewater or other discharges that produce adverse physiological responses in humans, animals, or plants; or which lead to the presence of undesirable or nuisance aquatic life. All wetlands shall be free from activities that would substantially impair the biological community as it naturally occurs due to physical, chemical and hydrologic processes.
Pesticides	For the purposes of this Basin Plan, pesticides are defined to include insecticides, herbicides, rodenticides, fungicides, piscicides and all other economic poisons. An economic poison is any substance intended to prevent, repel, destroy, or mitigate the damage from insects, rodents, predatory animals, bacteria, fungi or weeds capable of infesting or harming vegetation, humans, or animals (CA Agriculture Code. 12753). Pesticide concentrations, individually or collectively, shall not exceed the lowest detectable levels, using the most recent detection procedures available. There shall not be an increase in pesticide concentrations found in bottom sediments. There shall be no detectable increase in bioaccumulation of pesticides in aquatic life. Waters designated as MUN shall not contain concentrations of pesticides or herbicides in excess of the limiting concentrations specified in Table 64444-A of Section 64444 (Organic Chemicals) of Title 22 of the California Code of Regulations which is incorporated by reference into the Basin Plan. The incorporation-by-reference is prospective including future changes to the incorporated provisions as the changes take effect.
pH	In fresh waters with designated beneficial uses of COLD or WARM, changes in normal ambient pH levels shall not exceed 0.5 pH units. For all other waters of the Region, the pH shall not be depressed below 6.5 nor raised above 8.5. The Regional Board recognizes that some waters of the Region may have natural pH levels outside of the 6.5 to 8.5 range. Compliance with the pH objective for these waters will be determined on a case-by-case basis.
Radioactivity	Radionuclides shall not be present in concentrations which are deleterious to human, plant, animal, or aquatic life or which result in the accumulation of radionuclides in the food web to an extent which presents a hazard to human, plant, animal, or aquatic life. Waters designated as MUN shall not contain concentrations of radionuclides in excess of the limits specified in Table 4 of Section 64443 (Radioactivity) of Title 22 of the California Code of Regulations which is incorporated by reference into the Basin Plan. The incorporation-by-reference is prospective including future changes to the incorporated provisions as the changes take effect.
Sediment	The suspended sediment load and suspended sediment discharge rate of surface waters shall not be altered in such a manner as to cause nuisance or adversely affect the water for beneficial uses.
Settleable Materials	Waters shall not contain substances in concentrations that result in deposition of material that causes nuisance or that adversely affects the water for beneficial uses. For natural high quality waters, the concentration of settleable materials shall not be raised by more that 0.1 milliliter per liter.

Constituent	Concentration
Suspended Materials	Waters shall not contain suspended materials in concentrations that cause nuisance or that adversely affects the water for beneficial uses. For natural high quality waters, the concentration of total suspended materials shall not be altered to the extent that such alterations are discernible at the 10 percent significance level.
Taste and Odor	Waters shall not contain taste or odor-producing substances in concentrations that impart undesirable tastes or odors to fish or other edible products of aquatic origin, that cause nuisance, or that adversely affect the water for beneficial uses. For naturally high quality waters, the taste and odor shall not be altered.
Temperature	The natural receiving water temperature of all waters shall not be altered unless it can be demonstrated to the satisfaction of the Regional Board that such an alteration in temperature does not adversely affect the water for beneficial uses. For waters designated WARM, water temperature shall not be altered by more than five degrees Fahrenheit (5°F) above or below the natural temperature. For waters designated COLD, the temperature shall not be altered. Temperature objectives for COLD interstate waters and WARM interstate waters are as specified in the "Water Quality Control Plan for Control of Temperature in The Coastal and Interstate Waters and Enclosed Bays and Estuaries of California" including any revisions. This plan is summarized in Chapter 6 of the Basin Plan (Plans and Policies), and included in Appendix B of the Basin Plan.
Toxicity	All waters shall be maintained free of toxic substances in concentrations that are toxic to, or that produce detrimental physiological responses in human, plant, animal, or aquatic life. Compliance with this objective will be determined by use of indicator organisms, analyses of species diversity, population density, growth anomalies, bioassays of appropriate duration and/or other appropriate methods as specified by the Regional Board. The survival of aquatic life in surface waters subjected to a waste discharge, or other controllable water quality factors, shall not be less than that for the same water body in areas unaffected by the waste discharge, or when necessary, for other control water that is consistent with the requirements for "experimental water" as defined in Standard Methods for the Examination of Water and Wastewater (American Public Health Association, et al. 1998).
Turbidity	Waters shall be free of changes in turbidity that cause nuisance or adversely affect the water for beneficial uses. Increases in turbidity shall not exceed natural levels by more than 10 percent.

Table 3: Certain Water Bodies- Mojave Hydrologic Unit, Water Quality Objectives

See Fig. 3	Surface Waters (Station 2)Ground Water (Stations 1, 3, 4, 5, & 6)	Objectives (mg/L) (Max.)	
		TDS	NO_3 as NO_3
1[b]	West Fork Mojave River	245	6
2[a]	West Fork Mojave River (at Lower Narrows)	312	5
3[b]	Mojave River (at Barstow)	445	6
4[b]	Mojave River (upstream side of Waterman Fault)	560	11
5[b]	Mojave River (upstream side of Calico-Newberry Fault)	340	4
6[b]	Mojave River (just upstream of Camp Cady Ranch Building Complex)	300	1

[a] Objectives for reaches of the Mojave River which normally flow underground, but under high flow conditions will surface.

[b] Objectives for reaches of the Mojave River which flow underground in a confined channel.

Table 4: Water Bodies- San Bernardino Mountains Area, Mojave Hydrologic Unit Water Quality Objectives

See Fig. 4	Surface Waters	Objectives (mg/L)[1,2]							
		TDS	Cl	SO_4	F	B	NO_3-N	N	PO_4
16	E.F. of W.F. Mojave	140	12.7	10.7	0.23	0.06	--	--	--
		200	22.0	17.0	0.40	0.10	--	--	--
17	Silverwood Reservoir	220	55	20	--	--	--	--	--
		440	110	110	--	--	--	--	--
18	Mojave River (at Forks)	--	55	35	1.5	0.2	--	--	--
		--	100	100	2.5	0.3	--	--	--
19	Mojave River (at Victorville)	--	75	40	0.2	0.2	--	--	--
		--	100	100	1.5	0.3	--	--	--

[1] Annual average value/90th Percentile value

[2] Objectives are as mg/L and are defined as follows:

B	Boron
Cl	Chloride
F	Fluoride
N	Nitrogen
NO_3-N	Nitrogen as Nitrate
SO4	Sulfate
PO4	Dissolved Orthophosphate
TDS	Total Dissolved Solids (total Filterable Residue)

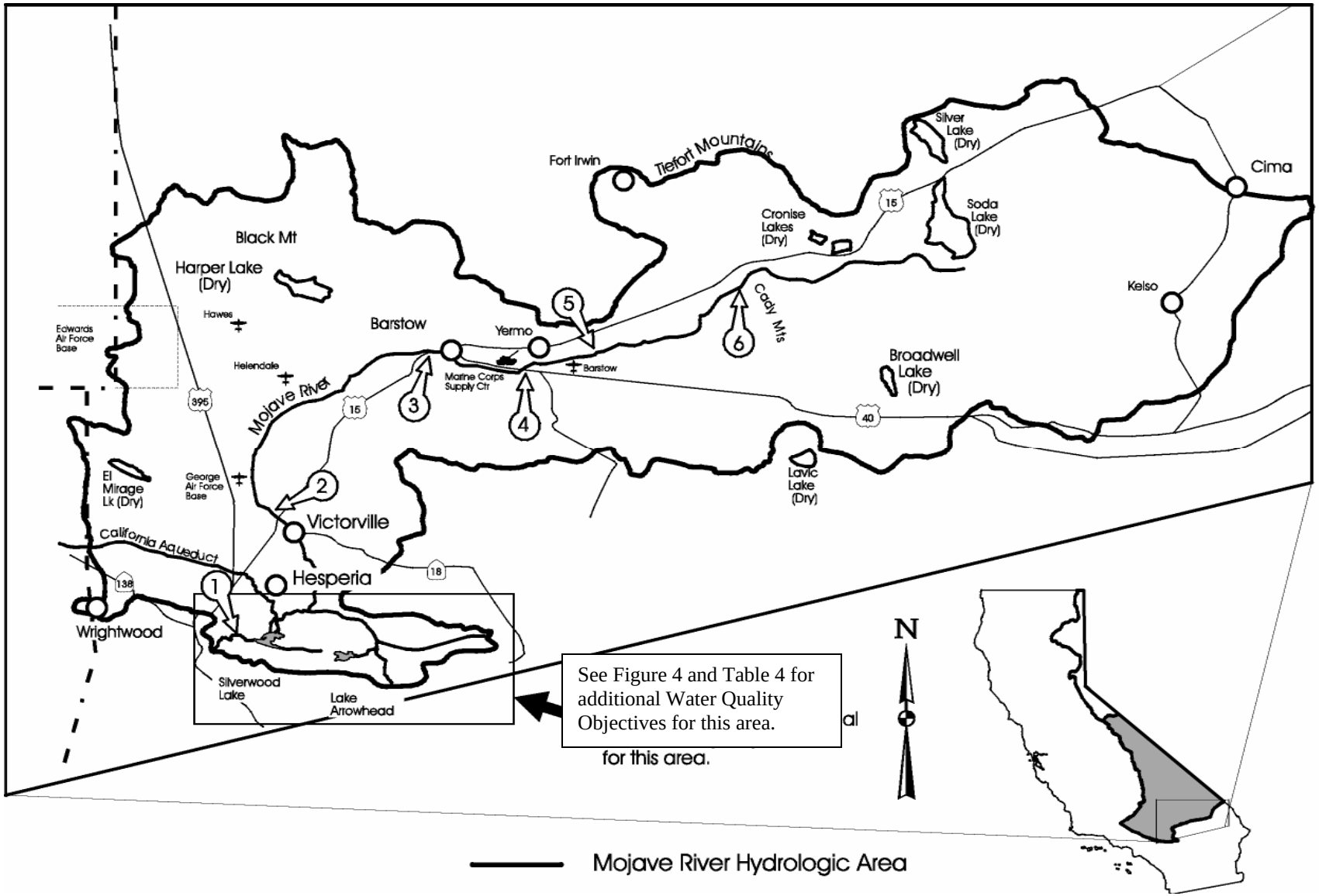


Figure 3: Mojave Hydrologic Area

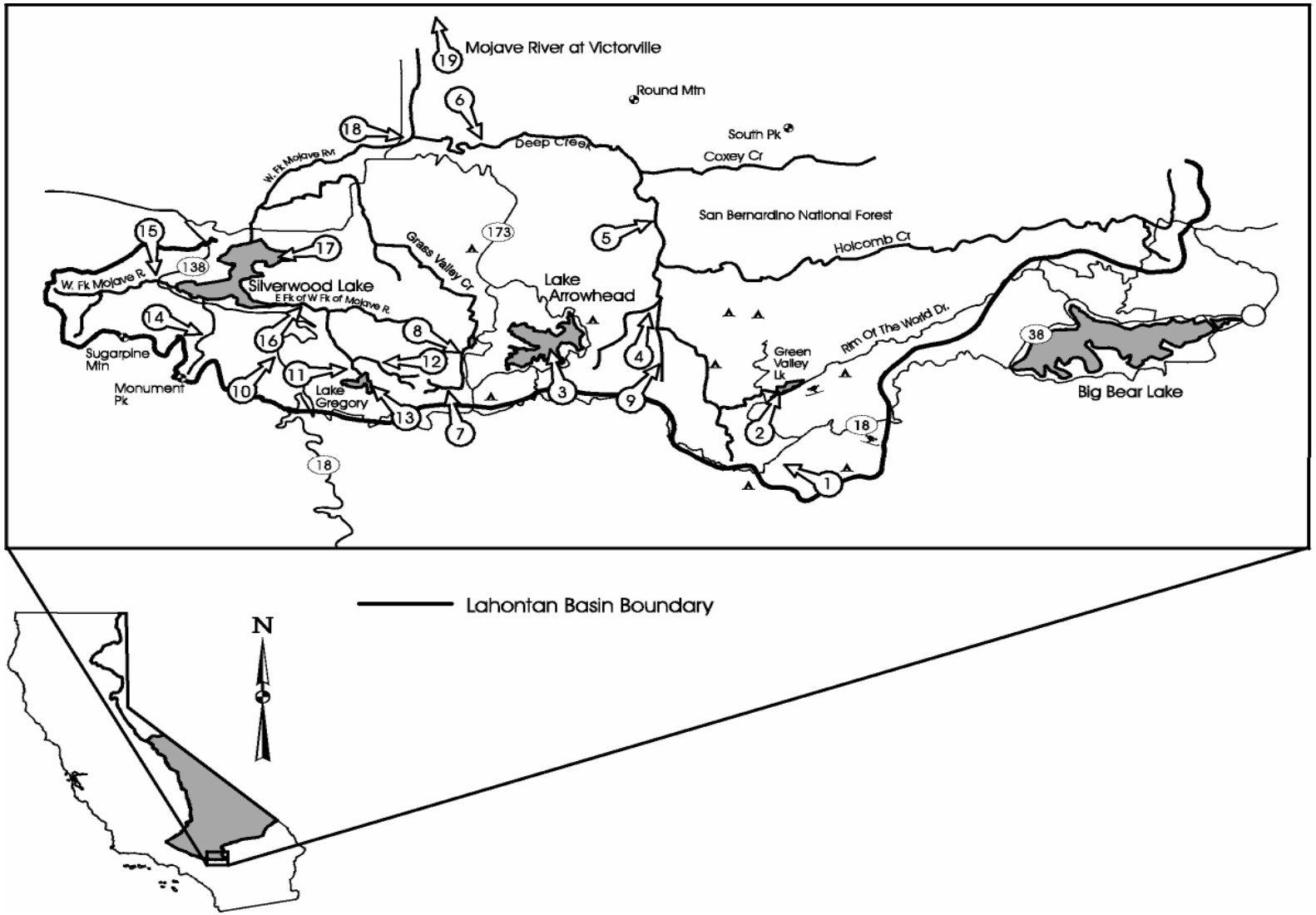


Figure 4: Mojave Hydrologic Unit San Bernardino Mountains Area

Groundwater Quality Objectives

Groundwater quality objectives established in the Basin Plan are listed in Table 5 and include general groundwater quality objectives. Groundwater monitoring stations within the Mojave Hydrologic Unit are shown in Figures 5.

Table 5: General Objectives for Groundwater

Constituent	Concentration
Bacteria, Coliform	In ground waters designated as MUN, the median concentration of coliform organisms over any seven-day period shall be less than 1.1/100 milliliters.
Chemical Constituents	Ground waters designated as MUN shall not contain concentrations of chemical constituents in excess of the maximum contaminant level (MCL) or secondary maximum contaminant level (SMCL) based upon drinking water standards specified in the following provisions of Title 22 of the California Code of Regulations which are incorporated by reference into the Basin Plan: Table 64431-A of Section 64431 (Inorganic Chemicals), Table 64431-B of Section 64431 (Fluoride), Table 64444-A of Section 64444 (Organic Chemicals), Table 64449-A of Section 64449 (Secondary Maximum Contaminant Levels-Consumer Acceptance Limits), and Table 64449-B of Section 64449 (Secondary Maximum Contaminant Levels-Ranges). The incorporation-by-reference is prospective including future changes to the incorporated provisions as the changes take effect. Waters designated as AGR shall not contain concentrations of chemical constituents in amounts that adversely affect the water for beneficial uses (i.e., agricultural purposes). Ground waters shall not contain concentrations of chemical constituents that adversely affect the water for beneficial uses.
Radioactivity	Ground waters designated as MUN shall not contain concentrations of radionuclides in excess of the limits specified in Table 4 of Section 64443 (Radioactivity) of Title 22 of the California Code of Regulations which is incorporated by reference into the Basin Plan. The incorporation-by-reference is prospective including future changes to the incorporated provisions as the changes take effect.
Taste and Odor	Ground waters shall not contain taste or odor-producing substances in concentrations that cause nuisance or that adversely affect beneficial uses. For ground waters designated as MUN, at a minimum, concentrations shall not exceed adopted secondary maximum contaminant levels specified in Table 64449-A of Section 64449 (Secondary Maximum Contaminant Levels-Consumer Acceptance Limits), and Table 64449-B of Section 64449 (Secondary Maximum Contaminant Levels- Ranges) of Title 22 of the California Code of Regulations which is incorporated by reference into the Basin Plan. The incorporation-by-reference is prospective including future changes to the incorporated provisions as the changes take effect.

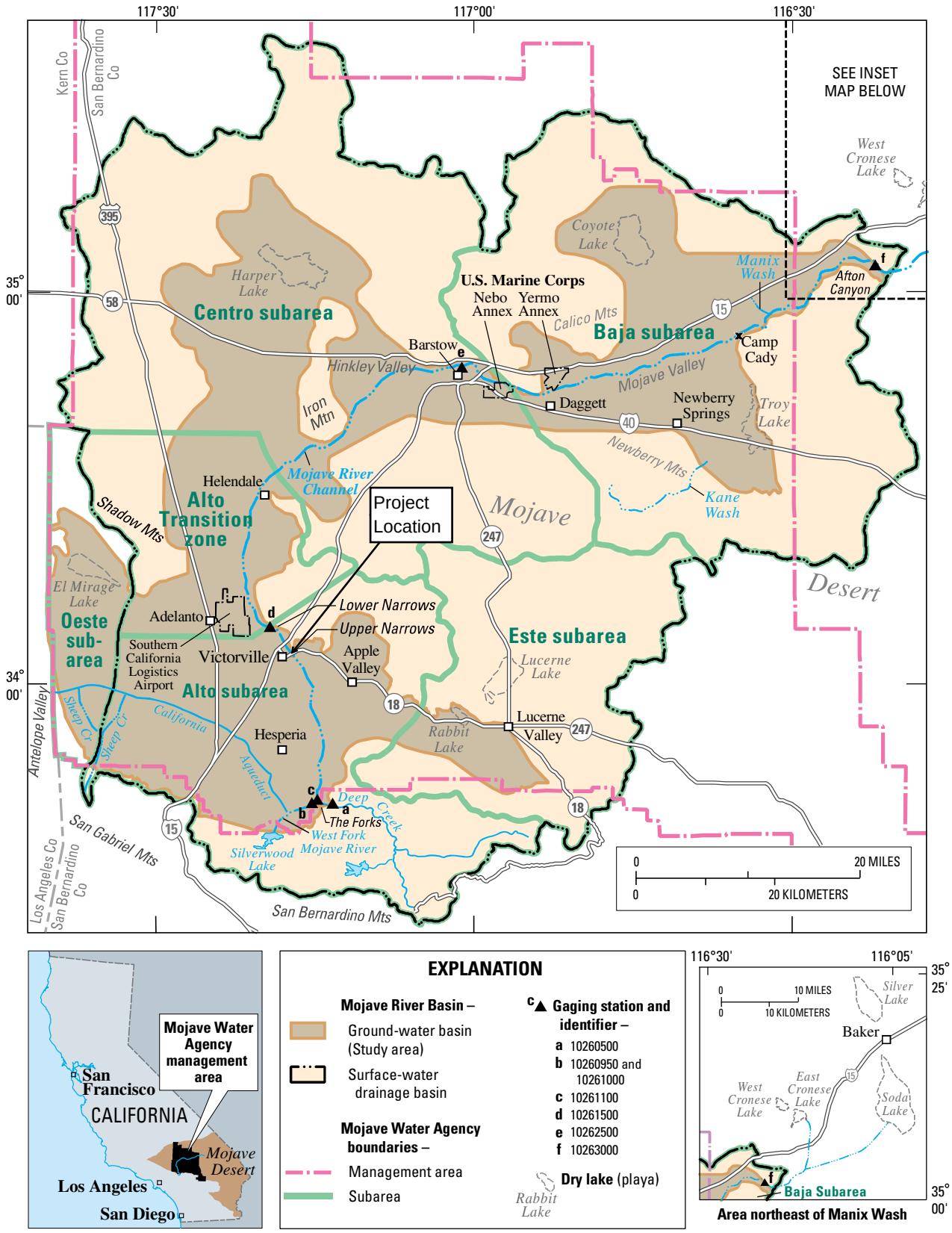


Figure 5: Mojave Groundwater Basin

3. AFFECTED ENVIRONMENT

3.1 SURFACE WATER RESOURCES

The proposed Project is located in the Mojave River Watershed. Specifically, the proposed Project is in the South Lahontan Hydrologic Region (hr) within the Upper Mojave Hydrologic Area (ha) in the Mojave Hydrologic Unit (hu), and in the Alto subarea (Figure 3 and 4). The Mojave Watershed encompasses approximately 4,500 square miles and is located entirely within the County of San Bernardino. The Watershed includes the incorporated cities of Victorville, Hesperia, Apple Valley, and Adelanto (LRWQCB, 2005). The proposed Project site is comprised of three water courses; the westerly system in the City of Victorville, the easterly system in the Town of Apple Valley, and the Mojave River. The westerly watershed courses along the railroad tracks, with a convergence near the proposed roadway crossing, outlets into the Mojave Narrows Regional Park (Apple Valley, 1995). The easterly watershed courses along Yucca Loma Road and outlets directly into the Mojave River. The third watercourse, the Mojave River, was studied as part of the river engineering observation.

The Mojave River is formed by the confluence of two smaller streams, West Fork Mojave River and Deep Creek, at a location known as The Forks. These streams originate in the San Bernardino Mountains, where peaks reach elevations of 8,535 ft above sea level, and they join at The Forks, which is at an altitude of about 3,000 ft above sea level and the tributaries annually receive greater than 40 inches of precipitation at their highest elevations (USGS, 2001). Much of the winter precipitation in the San Bernardino Mountains falls in the form of snow that provides spring recharge to the Mojave River system. Historically, the annual recharge from the headwaters is approximately 75,000 acre-feet. The Mojave River channel, through both surface and subsurface flow, transects the watershed a linear distance of approximately 120 miles to its terminus at Silver Dry Lake near the Community of Baker. Aside from intense storm events, the Mojave River channel is typically dry downstream of the Mojave Forks Dam except in select locations where ground water is forced to the surface by geologic structures and meteorological conditions. (LRWQCB, 2005)

3.2 GROUNDWATER RESOURCES

According to the California Department of Water Resources, the proposed Project is within the Upper Mojave River Valley Groundwater Basin which has a surface area of 413,000 acres (645 square miles) (Figure 5). The Basin is bounded on the north by a roughly east-west line from basement rock outcrops near Helendale to those in the Shadow Mountains. The southern boundary is the contact between Quaternary sedimentary deposits and unconsolidated basement rocks of the San Bernardino Mountains. The basin is bounded on the southeast by the Helendale fault and on the east by basement exposures of the mountains surrounding Apple Valley. In the west, the boundary is marked by a surface drainage divide between this basin and El Mirage Valley Basin, and a contact between alluvium and basement rocks that form the Shadow Mountains. (CDWR, 2004)

Natural recharge of the basin is from direct precipitation, intermittent stream flow, infrequent surface flow of the Mojave River, and underflow of the Mojave River into the basin from the southwest (Eccles 1981; Stamos and Predmore 1995; Lines 1996). Treated wastewater effluent, septic tank effluent, effluent from two fish hatchery operations, and irrigation waters are allowed to percolate into the ground and recharge the groundwater system (Eccles 1981;

Lines 1996). A large, but sporadic contribution to recharge occurs when the Mojave River is flowing, with 40 feet of rise in the water table observed during 1969 and 16 to 48 feet of rise observed in 1993 (Hardt 1969; Robson 1974; Lines 1996). The general groundwater flow is toward the active channel of the Mojave River and then it follows the course of the river through the valley (Stamos and Predmore 1995; Lines 1996). The Helendale fault forms a barrier to groundwater flow in the southeast corner of the basin. This barrier causes groundwater to flow northwestward under a surface drainage divide into the Mojave River drainage instead of northeastward into Lucerne Lake (dry) in the Lucerne Valley Basin (CDWR, 2004).

3.3 TOPOGRAPHY

Regionally, the proposed Project area is located within the Victor Valley and on the southern edge of the Mojave Desert. Topography of the proposed Project area is consistent with that of high desert areas with terrain that varies from the plains adjacent to the Mojave River to steep knolls and mountains such as Bell Mountain. The Mojave River creates a greenbelt through the otherwise dry community providing seasonal surface water.

The proposed Project site lies approximately 10 miles downstream of the Mojave River headwaters in an alluvial plain. The proposed Project location is at approximately 2,800 feet above sea level with an elevation range from 2,700 feet to 3,000 (USGS, 2009).

3.4 SOILS/ EROSION POTENTIAL

The proposed Project site transverses young alluvial valley deposits from the Apple Valley, across the Mojave River, to Victorville alluvial fan deposits, from the east to west respectively. The Natural Resources Conservation Service (NRCS) Soil Survey indicates common soil types in the proposed Project area are Bryman Loamy Fine Sand (slopes 0-15%, Cajon Sand (slopes 2-15%), Haplargids-Calciorthids Complex (slopes15-50%), Helendale Loamy Sand (slopes 0-5%), Kimberlina Loamy Fine Sand, Cool (slopes 2-5%), Riverwash, Victorville Sandy Loam, and Villa Loamy Sand (NRCS, 2008). The survey describes loamy fine sands as alluvium fan remnants derived from granite sources with back/side slope landform positions. Loamy fine sands have a restrictive depth of more than 80 inches to the water table and are well drained. However, the proposed Project area is known to have a high water table, increasing the likeliness of ground water close to the surface, especially, in the river bed. The available water capacity for this soil type ranges from moderate to low. Sandy soils are prone to crusting, water, and wind erosion, causing shifts in the river course (Apple Valley, 1994).

A study of the Mojave River, conducted for this proposed Project in 1994, suggests the total level of scour and degradation is 18 feet and the water surface elevations are 2,773.74 for a 50-year storm, 2,774.95 for a 100-year storm, and 2,779.58 for a 200-year storm. These criteria were used to establish the vertical alignment of the bridge allowing for two feet of freeboard and three feet of potential sedimentation over the 200-year water surface. (Apple Valley, 1994)

Given the desert river system nature of the proposed Project area, it is a normal occurrence for sandy soils to be transported down stream during storm events. The course of the river

frequently changes through the proposed Project area due to erosion during storm events; therefore erosion is present along the Mojave River throughout the proposed Project area.

3.5 CLIMATE AND PRECIPITATION

The climate in the proposed Project area is warm and dry, with an average of 350 days without precipitation. Rainfall averages less than 6 inches annually. Winter temperatures range from lows in the 20s to highs in the 70s. In the summer, temperatures range from the low 40s up to highs of 110 degrees (Table 6). Prevailing winds range from 5-10 knots/hour from the south/southwest to the northeast. (Apple Valley, 2008)

Table 6: Average Low, Mean, and High Temperatures for Apple Valley/ Victorville and Average Precipitation

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Avg. Max Temp (F)	59.5	63.4	68.0	75.3	83.7	93.4	99.1	98.4	92.1	81.2	68.4	60.1	78.6
Avg. Mean Temp (F)	45.5	49.0	52.9	58.7	66.2	74.2	80.0	79.6	73.8	63.2	51.9	45.1	61.7
Avg. Min Temp (F)	31.4	34.5	37.8	42.1	48.6	55.0	60.8	60.7	55.4	45.2	35.4	30.1	44.8
Avg. Precip.(in)	0.77	0.80	1.06	0.21	0.17	0.01	0.07	0.18	0.21	0.13	0.32	0.51	4.44

Source: National Climatic Data Center, 2007.

3.6 POPULATION AND LAND USE

In general, the areas surrounding the Yucca Loma Road Bridge Project consist of suburban residential small pockets of commercial and open space along the Mojave River.

Town of Apple Valley

As of 2007 the estimated population of Apple Valley was 70,297 (Apple Valley, 2007). The population density was approximately 920.59/sq mi. Land uses along the proposed Project corridor within Apple Valley Town limits consists of Open Space (OS) along the eastern side of the Mojave River, and single family residential (R-SF) along Yucca Loma Road until Apple Valley Road. (Apple Valley, 2002)

City of Victorville

The population of the City of Victorville estimated by the state of California is 107,721, a reported 9.5% increase from 2006 (Apple Valley, 2007). According to the Census Bureau, for the year ending in July 2007, Victorville experienced the second-highest population growth rate in the country. Land uses along Green Tree Boulevard and Hesperia Boulevard include low density residential, high density residential, commercial, and light industrial. The land uses along Yates Road around the Spring Valley Lake Community include Open Space and low density residential. (Victorville, 2007)

County of San Bernardino

According to the San Bernardino Associated Governments (SANBAG) quarterly newsletter, the estimated 2007 population of the County of San Bernardino was 2,007,800 marking a 17.5% increase from 2006. Land uses in the proposed Project area within the County of San Bernardino jurisdiction are Open Space (along the Mojave River and Mojave Narrows Regional Park), Flood Way along the Mojave River east of the houses near Spring Valley Lake, Single Family Residential in the housing community surrounding Spring Valley Lake, and a small section of Multi Family Residential along the Victorville City limits (San Bernardino, 2007).

3.7 EXISTING WATER QUALITY

Water quality data collected by the United States Geological Survey (USGS) from 2005 to 2006 for the Mojave River at Lower Narrows near is summarized in Table 7 (USGS 2006). The location of the water quality gauge is downstream of the proposed Project site on the north end of the Mojave Narrows Regional Park and shown in Figure 5.

Table 7: Existing Water Quality in Mojave River at Lower Narrows 2005-2006

Constituent	Units	11/15/05	01/03/06	01/10/06	03/01/06	03/14/06	05/23/06	07/11/06	09/05/06
Instantaneous discharge (00061)	cfs	13	80	18	160	15	8.6	1.8	1.5
Barometric pressure	mmHg	695	695	695	680	--	--	--	695
Dissolved Oxygen	mg/L	10.8	10.5	9.7	11.2	8.4	--	9.2	8.1
Dissolved Oxygen	% of saturation	123	88	102	107	--	--	--	112
pH water, unfltrd field	Std units	8.1	7.7	7.9	7.6	7.9	8.3	8.6	8.2
Specific Conductance, wat unf	uS/cm 25 deg C	647	320	629	230	610	622	658	675
Temperature air	deg C	20.0	11.5	--	13.0	16.5	23.5	33.5	33.5
Temperature water	deg C	17.0	8.0	13.0	8.5	19.5	22.5	27.0	27.0
Hardness water	mg/L as CACO3	190	110	190	68	190	180	170	150
Noncarb hardness, wat flt field	mg/L as CaCO3	17	17	26	9	22	10	--	--
Calcium water, fltrd,	mg/L	58.6	31.9	57.7	19.4	55.9	53.0	51.7	46.6
Magnesium, water, fltrd	mg/L	11.6	7.25	11.4	4.65	11.4	10.5	9.15	7.78
Potassium, water, fltrd	mg/L	6.67	4.25	6.21	2.53	6.23	6.76	11.3	14.2
Sodium adsorption	ratio	2	1	2	1	2	2	2	3

Constituent	Units	11/15/05	01/03/06	01/10/06	03/01/06	03/14/06	05/23/06	07/11/06	09/05/06
Sodium fraction of cations	%	40	39	37	37	36	38	45	49
Sodium, water, fltrd	mg/L	62.4	33.8	54.5	19.1	51.3	52.5	69.2	75.0
Alkalinity, wat flt inc tit field,	mg/L as CACO3	179	93	166	59	166	167	186	199
Bicarbonate, wat flt incrm. Titr., field	mg/L	216	113	201	72	200	198	218	237
Carbonate, wat flt incrm. Titr., field	mg/L	--	--	--	--	--	2	4	3
Chloride, water, fltrd,	mg/L	48.3	32.0	46.1	16.6	43.1	46.3	51.5	52.8
Fluoride, water, fltrd	mg/L	0.5	0.3	0.4	0.2	0.4	0.4	0.6	0.6
Silica, water, fltrd,	mg/L	23.2	15.2	24.4	13.5	23.3	23.9	23.0	21.5
Sulfate water, fltrd	mg/L	69.4	34.9	71.0	19.8	71.2	75.7	70.4	67.9
Residue water, fltrd, sum of constituents	mg/L	389	219	374	134	366	371	399	407
Residue water, fltrd	Tons/acre-ft	0.53	0.33	0.52	0.21	0.52	0.54	0.56	0.55
Residue on evap. At 180degC wat flt	mg/L	391	242	386	152	385	396	410	406
Ammonia water, fltrd	mg/L	--	--	0.09	--	0.06	--	--	--
Ammonia water, fltrd,	mg/L as N	<0.04	<0.04	0.07	<0.04	0.04	<0.04	<0.010	<0.010
Nitrite + nitrate water fltrd,	mg/L as N	0.28	0.72	0.65	0.52	0.85	0.56	<0.06	<0.06
Nitrite water, fltrd,	mg/L as N	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.002	<0.002
Orthophosphate, water, fltrd	mg/L	0.653	0.209	0.518	0.172	0.402	0.411	0.653	0.718
Orthophosphate, water, fltrd	mg/L as P	0.21	0.07	0.17	0.06	0.13	0.13	0.213	0.234
Arsenic water, fltrd	ug/L	2.2	0.85	1.6	0.69	1.5	1.8	3.0	3.0
Boron, water, fltrd	ug/L	140	72	120	51	115	116	131	149
Iron, water, fltrd	ug/L	<6	31	<6	67	<6	8	<6	<6
Manganese, water, fltrd	ug/L	19.4	15.2	21.5	13.0	15.9	6.4	5.5	17.5

3.8 POLLUTANTS OF CONCERN

The Town of Apple Valley, County of San Bernardino, and Cities of Victorville and Hesperia have coordinated the multijurisdictional Mojave Storm Water Management Program under the National Pollution Discharge Elimination System (NPDES), General Permit for Discharges of Storm Water Associated with Construction Activity (Construction General Permit # CAS000002). The NPDES Permit is accompanied by a Fact Sheet for regulated small Municipal Separate Storm Sewer Systems (MS4s). Urban runoff discharged to the MS4 is eventually discharged to surface waters, including the Mojave River. Several pollutants are commonly associated with storm water runoff, including sediment, nutrients, bacteria and viruses, organic compounds, trash and debris, oxygen-demanding substances, oil and grease, toxic pollutants such as pesticides, and metals. These pollutants are described in more detail below. Pollutants of concern during construction include sediments, trash, oil and grease, fuel from equipment, and materials used for concrete and asphalt installation. (SWRCB, 2003)

Sediment

Natural sediment loads are important to downstream environments because they provide habitat, substrate, and nutrition; however, increased sediment loads can result in negative effects to downstream environments. Excessive sediment can be detrimental to aquatic life by interfering with photosynthesis, respiration, growth, and reproduction. In addition, pollutants that adhere to sediment such as nutrients, trace metals, and hydrocarbons can have other harmful effects on the aquatic environment when they occur in elevated levels. Total suspended solids (TSS) is a measure of the amount of sediment mixed with the water column.

Nutrients

Nutrients are typically composed of phosphorus and/or nitrogen. Elevated levels in surface waters cause algal blooms and excessive vegetative growth. As nutrients are absorbed, the vegetative growth decomposes, utilizing oxygen in the process and reducing dissolved oxygen levels. Dissolved oxygen is critical for support of aquatic life. The ammonium form of nitrogen (found in wastewater discharge) converts to nitrite and nitrate in the presence of oxygen, which further reduces dissolved oxygen levels in water.

Bacteria and Viruses

Bacterial levels in urban runoff can exceed public health standards for water contact recreation, creating a harmful environment. The source is animal or human fecal waste. Bacteria and viruses thrive under certain conditions and can alter the aquatic habitat and create a harmful environment for aquatic life.

Organic Compounds

Organic compounds are carbon-based and are found in pesticides, solvents, and hydrocarbons. Elevated levels can directly or indirectly constitute a hazard to life or health. During cleaning activities, these compounds can be washed off into storm drains. Dirt, grease, and grime may adsorb concentrations that are harmful or hazardous to aquatic life.

Oxygen-Demanding Substances

Oxygen-demanding substances include plant debris (such as leaves and lawn clippings), animal wastes, and other organic matter. Microorganisms use dissolved oxygen during consumption of these substances, which reduces a water body's capacity to support aquatic life. One measure of oxygen demand is chemical oxygen demand (COD), which is the amount of oxygen required for chemical oxidation of pollutants in water.

Trash and Debris

Trash and debris can have a significant effect on the recreational value of a water body and aquatic habitat. It also can interfere with aquatic life respiration and can be harmful or hazardous to aquatic animals that accidentally ingest floating debris.

Oil and Grease

Primary sources of oil and grease are petroleum hydrocarbon products, motor products from leaking vehicles, fats, and waxes. Elevated oil and grease concentrations can affect the aesthetic value of the water body and can create a harmful environment for aquatic life and species that use the Mojave River for foraging and nesting.

Pesticides

Pesticides, chemical agents designed to control pest organisms, can persist in the environment and bioaccumulate (concentrate within the body) over several years, resulting in health problems for the affected organism. Pesticides have been repeatedly detected in surface waters and precipitation.

Metals

Bioavailable forms of trace metals are toxic to aquatic life. The most common metals found in urban runoff are lead, zinc, and copper. Sources of heavy metals in surface waters include emissions and deposits from automobiles, industrial wastewater, and common household chemicals. At high concentrations, metals are toxic to aquatic life. Humans can be impacted by contaminated groundwater resources and bioaccumulation of metals in fish and shellfish.

4. ENVIRONMENTAL CONSEQUENCES

4.1 IMPACT ASSESSMENT METHODOLOGY

The purpose of this Water Quality Assessment Report is to analyze the difference between the existing conditions and the proposed Project build conditions with respect to water quality impacts. The assessment takes the following into consideration:

- Application of BMPs (number of BMPs, new technologies, effectiveness)
- Discharges into impaired waters [listed pursuant to Section 303(d) of the CWA or subject to a TMDL]
- Pollutant loads (change in land use)
- Impervious area and relation to amount of runoff (increase or decrease)

The proposed bridge and widening of Yucca Loma Road and Yates Road and Green Tree Boulevard Extension, from two lanes to four lanes, would increase the impervious area within the proposed Project limits by approximately 22.0 acres. The added impervious area would be approximately 0.0009% when compared to the total watershed area (see Table 8). Compared to the watershed area of the Mojave River, at the proposed bridge location (306.6 mi^2 = 196,224 ac), the increase of impervious area would be 0.01%. The area that changes from pervious to impervious would be minimal and would not impact the 100- and 50-year flows of the Mojave River. Thus, the added impervious area would have an insignificant impact to the watershed characteristics.

Table 8: Increase in Impervious Area

Proposed Actions Added	Impervious Area* (ac)	Watershed Area** (ac)	Percentage Increase in Area (%)
Mojave River Bridge	4.0	2,432,000	0.0002
Yucca Loma Road Widening	5.0	2,432,000	0.0002
Yates Road Widening & Green Tree Boulevard Extension	13.0	2,432,000	0.0005
Total	22.0	2,432,000	0.0009
* Based on engineer's estimate ** 3800 square miles (MWA, 2004)			

4.2 POTENTIAL IMPACTS TO WATER QUALITY

Construction Impacts

Pollutants of concern during construction in and adjacent to sensitive river habitats include sediments, trash, oil and grease fuels from equipment, and materials used for concrete and asphalt installation. Using broad scale state wide trends in construction data versus existing highway conditions, Caltrans published in 2002 a "Runoff Characterization Study" that details which pollutants are statistically more often found in higher concentrations during

construction proposed Projects than those found on existing highway system. For metals, these include higher concentrations of Dissolved Arsenic, Dissolved Chromium, Total Chromium, and Total Nickel. In the comparison of conventional constituents, Dissolved Ortho-Phosphate and Total Phosphorus were higher at construction sites while conventional constituents, TSS and Hardness are significantly higher for construction site runoff than highway runoff.

Each of these pollutants on its own or in combination with other pollutants can have a detrimental effect on water quality and aquatic habitats. There is a potential for pollutants to enter the river during construction work. Construction will require special consideration to prevent adverse direct impacts to the surface waters. This specifically includes measures to block pollutants from entering the river and to prevent soil erosion that would result from construction activities. Activities in the river may necessitate innovative BMPs, more frequent inspections, and more deliberate work processes, with respect to water quality protection.

Additional manmade materials that will be temporarily placed in the Mojave River during construction include posts used to support construction falsework and erosion/sediment control devices.

No-Build Alternative

Under the No-Build Alternative the hydrology, water quality, and stormwater runoff will not be subject to a potential increase in impervious area and therefore will not experience increased pollutant runoff or impacts from construction. Improvements to the stormwater drainage system will not be made. Without the proposed bridge over the Mojave River, illegal dumping and unauthorized river crossing that impacts bank stability, vegetation, and water quality will not be reduced.

Avoidance, Minimization, and or Mitigation Measures

Under the General Permit for Discharges of Storm Water Associated with Construction Activity (Construction General Permit # CAS000002, 99-08-DWQ), the proposed Project will be required to prepare a SWPPP and implement erosion and sediment control BMPs detailed in the SWPPP during construction activities. Caltrans Storm Water Quality Manuals (SWPPP/WPCP Preparation Manual) will be used as proposed Project guidance to develop the SWPPP. If the construction BMPs from Table 9 are properly designed, implemented, and maintained, these will minimize and prevent adverse water quality impacts during construction.

A series of mitigation and minimization measures outlined in the following chapter will also ensure that no adverse water quality impacts occur during construction of the proposed Project.

Table 9: Construction BMPs

Category	BMP No.	BMP Name
Temporary Soil Stabilization	SS-1	Scheduling
	SS-2	Preservation of Existing Vegetation
	SS-3	Hydraulic Mulch
	SS-4	Hydroseeding
	SS-5	Soil Binders
	SS-6	Straw Mulch
	SS-7	Geotextiles, Plastic Covers and Erosion Control Blankets/Mats
	SS-8	Wood Mulching
	SS-9	Earth Dikes/Drainage Swales and Lined Ditches
	SS-10	Outlet Protection/Velocity Dissipation Devices
	SS-	Slope Drains
Temporary Sediment Control	SC- I	Silt Fence
	SC-2	Sediment/Desilting Basin
	SC-3	Sediment Trap
	SC-4	Check Dam
	SC-5	Fiber Rolls
	SC-6	Gravel Bag Berm
	SC-7	Street Sweeping and Vacuuming
	SC-8	Sandbag Barrier
	SC-9	Straw Bale Barrier
	SC-10	Storm Drain Inlet Protection
Wind Erosion Control	WE-	Wind Erosion Control
Tracking Control	TC-	Stabilized Construction Entrance/Exit
	TC-2	Stabilized Construction Roadway
	TC-3	Entrance/Outlet Tire Wash
Non-Stormwater Control	NS-1	Water Conservation Practices
	NS-2	Dewatering Operations
	NS-3	Paving and Grinding Operations
	NS-4	Temporary Stream Crossing
	NS-5	Clear Water Diversion
	NS-6	Illicit Connections/Illegal Discharge Detection and Reporting
	NS-7	Potable Water/Irrigation
	NS-8	Vehicle and Equipment Cleaning
	NS-9	Vehicle and Equipment Fueling
	NS-	Vehicle and Equipment Maintenance
	NS-	Pile Driving Operations
	NS-	Concrete Curing
	NS-	Material and Equipment Use over Water
	NS-	Concrete Finishing
	NS-	Structure Demolition/Removal over or Adjacent to Water
Waste Management and Materials Pollution Control	WM	Material Delivery and Storage
	WM	Material Use
	WM	Stockpile Management
	WM	Spill Prevention and Control
	WM	Solid Waste Management
	WM	Hazardous Waste Management
	WM	Contaminated Soil Management
	WM	Concrete Waste Management
	WM	Sanitary/Septic Waste Management
	WM	Liquid Waste Management

Post-Construction Impacts

Consultation with Table 3-14 in Caltrans (2003) Discharge Characterization Study Report indicates that pollutants of concern during operation of a transportation facility typically include a series of conventional pollutants, various trace metals, and nutrients (especially NO3-N). An increase in an impervious area will increase the volume of runoff during a storm, which will more effectively transport pollutants to receiving waters and may lead to downstream erosion without implementation of treatment BMPs.

A "Targeted Design Constituent" (TDC) approach is used by Caltrans as a statewide design guidance criterion for addressing "Primary Pollutants of Concern". Targeted Design Constituents can include: phosphorus; nitrogen; total copper; dissolved copper; total lead; dissolved lead; total zinc; dissolved zinc; sediments; and general metals [unspecified metals]. A proposed Project must consider treatment to target a TDC when an affected water body within the proposed Project limits is on the 303(d) list for the one or more of these constituents. The TDC must also be a pollutant that has been identified during Departmental runoff characterization studies to be discharging with a load or concentration that commonly exceeds allowable standards and must be considered treatable by currently available Department-approved Treatment BMPs. There are no pollutants classified as a TDC in the current proposed Project.

Construction of the proposed Yucca Loma Bridge and approach roadway work will require the addition of hardscape in and adjacent to the Mojave River. Piers will be permanently placed in the river channel and bridge abutments will be immediately outside of the river banks. Construction of the proposed Project will result in approximately 22 acres of new impervious surface and the introduction of small amounts of additional pollutant loads of runoff. Of the 22 acres of impervious surface, four acres are attributed to the Yucca Loma Bridge, five acres will result from the widening of Yucca Loma Road, and 13 acres are from Yates Road and Green Tree Boulevard. The proposed Project is required to implement routine structural BMPs to target pollutants of concern. Design Pollution Prevention, Treatment, and Maintenance BMPs will be specified (under the guidelines of BMPs mentioned in this Report) during the final design (PS&E) phase of the proposed Project.

Storm Drain facilities will be improved throughout the proposed Project alignment. Both Alternative A and Alternative B will replace and improve the existing drainage to the south of Yucca Loma Road. Currently, this facility is clogged and allows water to flow directly into the Mojave River creating substantial erosion and degradation to water quality. Proposed improvements include the addition of rip-rap at the west end of Yucca Loma Road to reduce erosion and permanent filtration devices that will clean stormwater runoff and ultimately improve water quality.

Several treatment BMPs are (Detention devices, Media filters and Multi-Chambered Treatment Trains) proposed to ensure that water quality impacts are not adverse. With incorporation of these measures impacts water quality would actually be improved over current conditions since at present no treatment BMPs are installed. The measures outlined in the following chapter would result in no net increase in storm water discharge rate and no net increase in pollutant discharge rates to the Mojave River.

5. AVOIDANCE, MINIMIZATION, AND/OR MITIGATION MEASURES

Aquatic resources within the proposed Project area are protected under the CWA and the Porter Cologne Water Quality Control Act. These resources are regulated by ACOE under Section 404 of the CWA, Lahontan RWQCB under Section 401 of the CWA, EPA under Section 402 of the CWA, and CDFG under Section 1602 of the California Fish and Game Code. Alternative A and Alternative B will be required to obtain permits from each of these regulatory agencies prior to any construction activities that have the potential to impact the ephemeral and intermittent streams, freshwater marsh, or riparian habitats within the proposed Project area. It is necessary that the proposed Project comply with all measures identified in these permits.

A Stormwater Pollution Prevention Plan (SWPPP) will be developed and will outline measures that enhance the protection of water sources by providing BMPs for temporary soil stabilization, temporary sediment control, wind erosion control, tracking control, non-stormwater management, and waste management and material pollution control (California Department of Transportation 2003). BMPs and Water Pollution Control Plan requirements are assembled in compliance with the local Stormwater Management Plan and with the General Construction Permit and should be considered recommendations for inclusion on applicable plans prepared for the proposed Project.

The following BMPs and Water Pollution Control Plan requirements are recommendations for inclusion on applicable plans prepared during the proposed Project's final design (PS&E) phase. All BMPs and mitigation measures should be prepared in consultation with the project engineer, Town of Apple Valley, City of Victorville, County of San Bernardino, LRWQCB, and other regulatory agencies.

There are five construction related restrictions that pertain to construction BMPs, etc. Appropriate permanent treatment BMPs will be incorporated during the final design (PS&E) phase. When implemented in unison these measures ensure that there would be no adverse impacts to water quality associated with the proposed Project.

To ensure that the proposed Project maintains or improves water quality, both Alternative A and B are recommended to follow the below avoidance, minimization, and/or mitigation measures. In addition to the following water quality measures, the proposed Project shall comply with Biology measures outlined in BIO-1, BIO-2, BIO-3, and BIO-4.

5.1 APPLICABLE BEST MANAGEMENT PRACTICES AND MITIGATION MEASURES

The following minimization or mitigation measures describe the necessary steps to be taken to maintain/improve water quality.

Temporary Measures

Measure WQ-1: A General Permit for Discharges of Stormwater Associated with Construction Activity (Construction General Permit # CAS000002, 99-08-DWQ) shall be obtained because the proposed Project involves more than one acre of disturbance. A SWPPP

shall be prepared and implement erosion and sediment control BMPs detailed in the SWPPP during construction activities. The Department Stormwater Quality Manuals (SWPPP Preparation Manual) should be used as project guidance to develop the SWPPP.

Measure WQ-2: Erosion-Control Measures shall be implemented during construction. To minimize the mobilization of sediment to adjacent water bodies, the following erosion-control and sediment-control measures will be included in the Storm Water Pollution Prevention Plan to be included in the construction specifications, based on standard Town/City/County measures and standard dust-reduction measures.

- Soil exposure should be minimized through the use of temporary BMPs, groundcover, and stabilization measures;
- Material stockpiles should be located in non-traffic areas only. Side slopes should not be steeper than 2:1. All stockpile areas should be surrounded by a filter fabric fence and interceptor dike;
- Sandbagged silt fences should be installed in all waterways in which construction work occurs, both upstream and downstream of the construction site; where water is present. Any accumulated sediment should be removed and trucked to an approved disposal site;
- Areas requiring clearing, grading, revegetation, and recontouring should be identified and areas to be cleared, graded, and recontoured should be minimized;
- Spoil sites should be graded to minimize surface erosion;
- Where appropriate, bare areas should be covered with mulch and cleared areas should be revegetated with native species;
- The contractor shall conduct periodic maintenance of erosion- and sediment-control measures;
- Where rock slope protection is needed, an appropriate seed mix of native species shall be planted on disturbed areas upon completion of construction. Native, non-invasive species shall be used in erosion control plantings to stabilize site conditions and prevent invasive species from colonizing; and
- Measures should be implemented to minimize soil compaction from construction-related travel occurring within streambeds located on the proposed Project site.

Measure WQ-3: Implement a Spill Prevention and Control Program. The Town of Apple Valley/ City of Victorville/ County of San Bernardino and/or its contractor(s) will develop and implement a spill prevention and control program to minimize the potential for and effects from spills of hazardous, toxic, or petroleum substances during proposed Project construction.

Measure WQ-4: To conform to water quality requirements, the SWPPP should include the following:

- Vehicle maintenance and staging and storing equipment, materials, fuels, lubricants, solvents, and other possible contaminants shall be outside of the OHWM. Any

necessary equipment washing shall occur where the water cannot flow into the stream channel.

- Construction vehicles shall be removed from the normal high-water area of the waterway before refueling and lubricating;
- Construction equipment should not be operated in flowing water;
- Construction work shall be conducted according to site-specific construction plans that minimize the potential for sediment input to the aquatic system;
- Raw cement, concrete or concrete washings, asphalt, paint or other coating material, oil or other petroleum products, or any other substances that could be hazardous to aquatic life shall be prevented from contaminating the soil or entering watercourses;
- Equipment used in and around waters of the U.S. shall be in good working order and free of dripping or leaking engine fluids; and
- Any surplus concrete rubble, asphalt, or other rubble from construction shall be taken to an approved disposal site.

Measure WQ-6: All temporary erosion- and sediment-control measures shall be removed after the working area is stabilized or as directed by the engineer.

Measure BIO-1: To protect water quality in the Mojave River, the Town/ City/ County will implement the following Best Management Practices before and during construction:

- All earthwork or foundation activities involving Rivers, culverts, and bridges will occur in the dry season however, the area is subject to summer monsoons so dry season may vary.
- All work in the drainages that may contain fish will be limited to the low-flow period in the dry season.
- Equipment used in and around waters of the United States will be in good working order and free of dripping or leaking engine fluids. All vehicle maintenance, staging, and materials storage will occur at least 91 meters (300 feet) from all waters of the United States. Any necessary equipment washing will occur where the water cannot flow into the stream channel.
- Any surplus concrete rubble, asphalt, or other rubble from construction will be taken to an approved disposal site.
- An erosion control plan will be prepared and implemented for the proposed project.
- It will include the following provisions and protocols:
    - Discharge from dewatering operations, if needed, and runoff from disturbed areas will be made to conform to the water quality requirements of the waste discharge permit issued by the Regional Water Quality Control Board.

- Material stockpiles will be located in non-traffic areas only. Side slopes will not be steeper than 2:1. All stockpile areas will be surrounded by a filter fabric fence and interceptor dike.

- Erosion control measures will be applied throughout construction of the proposed project.

The SWPPP for the project will enhance protection of water sources by providing BMPs for temporary soil stabilization, temporary sediment control, wind erosion control, tracking control, non-stormwater management, and waste management and material pollution control (Caltrans 2003 (2)). Disturbed soil areas will be limited by the contracts special provisions. And the contract will include bid items for all of the site-specific BMPs needed along with a temporary construction site BMP implementation strategy that will be developed during PS&E.

The contractor is required to have construction site BMP material on hand at all times; as to protect the entire project area in the event of a precipitation event. The contractor will conduct periodic maintenance of erosion and sediment control measures. All temporary erosion and sediment control measures will be removed after the working area is stabilized or as directed by the engineer. An appropriate seed mix of native species will be planted on disturbed areas upon completion of construction. Sandbagged silt fences will be installed in all named and unnamed waterways in which construction work occurs, both upstream and downstream of the construction site. Any accumulated sediment will be removed and trucked to an approved disposal site.

Measure BIO-2: The Town will avoid or minimize increased sediment input to the project area channel. As part of the National Pollution Discharge Elimination System General Construction Activity Storm Water Permit, a Storm Water Pollution Prevention Plan will be implemented that includes the following:

- conducting all construction work according to site-specific construction plans that minimize the potential for sediment input to the aquatic system;

- identifying all areas requiring clearing, grading, revegetation, and recontouring, and minimizing the areas to be cleared, graded, and recontoured;

- grading spoil sites to minimize surface erosion;

- avoiding riparian and wetland vegetation wherever possible and identifying and fencing specific trees to protect existing riparian habitat;

- covering bare areas with mulch and revegetating all cleared areas;

- avoiding equipment operation in flowing water during in-channel activities by constructing coffer dams and diverting all streamflows through or around construction sites; and

- constructing sediment catch basins across stream channels immediately below the project site when performing in-channel construction to prevent silt- and sediment-

laden water from entering the main streamflow (accumulated sediments will be periodically removed from the catch basin).

Increased pollutant input to the project area channel will also be minimized and avoided by:

- preventing raw cement, concrete or concrete washings, asphalt, paint or other coating material, oil or other petroleum products, or any other substances that could be hazardous to aquatic life from contaminating the soil or entering watercourses;

- establishing a spill prevention and countermeasure plan before project construction that includes strict onsite handling rules to keep construction and maintenance materials out of drainages and waterways;

- cleaning up all spills immediately according to the spill prevention and countermeasure plan and notifying California Department of Fish and Game and National Oceanic and Atmospheric Administration Fisheries immediately of any spills and cleanup activities;

- providing areas located outside the ordinary high water mark for staging and storing equipment, materials, fuels, lubricants, solvents, and other possible contaminants;

- removing vehicles from the normal high-water area of the waterway before refueling and lubricating; and

- avoiding operation of equipment in flowing water.

Implementation of measures to avoid or minimize the effects of increased sediment input will also avoid and minimize increased input of pollutants associated with sediments (e.g., mercury).

Measure BIO-3: The project has been designed to avoid and minimize impacts to sensitive natural communities to the maximum extent possible. The measures that have been included in the project design include:

- The temporary construction staging areas and access roads will be strategically placed to avoid and/or minimize impacts to the Mojave riparian forest, southern willow scrub, and freshwater marsh habitat areas.

- The project boundaries, which will include the temporary and permanent construction impact areas, will be staked in order to contain construction activities within the project boundaries. The staking will be done in coordination with a biologist in order to avoid and/or minimize impacts to the most sensitive habitat areas and/or the drip line of the preserved trees.

- After staking is completed, the boundaries will be fenced using orange snow fencing or some other material that will serve as an obvious visual barrier for the construction crews. The biologist will monitor the construction of this Environmentally Sensitive Area (ESA) exclusion fencing. The ESA exclusion fence will delineate the boundaries of the sensitive habitat and the locations of the fence will be documented on all construction maps.

- The freshwater marsh area located to the southeast of the terminus of Yates Road will be avoided during construction activities because of its close proximity to the project boundary. A qualified biologist will be on-site during the staking to identify the boundaries of the freshwater marsh and will supervise the placement of ESA exclusion fencing that will be used to protect the marsh during all project activities.

- Vegetation clearing will only occur within the delineated project boundaries in an effort to minimize the impacts to existing desert riparian habitat. Trees located in areas along the edge of the construction zone will be trimmed whenever possible and only those trees that lie within the active construction areas will be removed. The biological monitor will be on site during all tree trimming and tree removal.

Measure BIO-4: The aquatic resources are protected under the FCWA as regulated by the ACOE and under CDFG Section 1600 code. A Section 404 Permit will be obtained from the ACOE and a 1602 Lake and Streambed Alteration Agreement will be obtained from CDFG prior to any impacts to the ephemeral and intermittent streams, freshwater marsh, or riparian habitats. In addition, a Section 401 Permit will have to be obtained from the LRWQCB prior to construction in order to protect the streams and marshes. To avoid and minimize impacts to the ephemeral and intermittent streams and the freshwater marsh, the project has been designed to include measures specifically focused on the protection of these sensitive areas.

- The project boundary, including permanent impact areas and temporary construction staging areas and access roads, will be clearly staked to contain all construction activities within the proposed construction footprint. ESA fencing shall be erected to protect jurisdictional areas not impacted by construction activities. A biological monitor shall be present during the construction of ESA fencing to ensure that all necessary avoidance measures are adhered to during construction.

- The freshwater marsh area located to the southeast of the terminus of Yates Road will be avoided during construction activities. It is in close proximity to the project boundary; consequently, a qualified biologist will be on-site during the staking to identify the boundaries of the freshwater marsh and will supervise the placement of ESA exclusion fencing that will be used to protect the marsh during all project activities.

- Vehicle and equipment staging areas shall be placed at least 300 ft away from all streambeds and other jurisdictional features present in the project area.

- To reduce sedimentation and release of pollutants (oil, fuel, etc.) as a result of construction activities, Best Management Practices (BMPs) shall be developed in collaboration with the local flood control district and implemented to prevent impacts from occurring outside the construction footprint. Examples of minimization efforts include the use of silt-fencing, temporary energy dissipation facilities, and wattles.

For construction-related travel occurring within streambeds located on the site, caution should be taken to prevent soil compaction and erosion within the waterway. A Stormwater Pollution

Prevention Plan (SWPPP) will be developed and will outline measures taken to prevent erosion, soil compaction, and other impacts that may occur outside the construction footprint.

Permanent Measures

Measure WQ-5: Appropriate permanent treatment BMPs will be incorporated during the final design (PS&E) phase. Permanent BMPs may include biofiltration, infiltration or detention devices, media filters and multi-chambered treatment trains.

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